



An Coimisiún um
Rialáil Cumarsáide
Commission for
Communications Regulation

Multi Band Spectrum Award – Information Memorandum and Draft Regulations

The 700 MHz Duplex, 2.1 GHz, 2.3 GHz and
2.6 GHz Bands

Information Memorandum and Draft Regulations

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Chapter 1

1 Introduction

- 1.1 In Document 20/32¹, the Commission for Communications Regulation (“ComReg”) published, for consultation, a draft Information Memorandum and draft Regulations setting out the processes and procedures for the proposed award of the 700 MHz Duplex, 2.1 GHz, 2.3 GHz, 2.6 GHz FDD and 2.6 GHz TDD bands (“Award Spectrum”) which it had developed following extensive consultation.
- 1.2 In Document 20/122, ComReg set out its response to consultation and Decision on the Award Process (as reflected in Decision D11/20 contained in Chapter 10 of that document)².
- 1.3 In light of its Decision as set out in Document 20/122 and its consideration of all submissions received in response to Documents 18/60, 18/103, 19/59R, 19/124, 20/32, 20/56, 20/78 (also see Response to Consultation Document 21/39 being published alongside this document) and having regard to its obligations under Regulation 9(4) of the Authorisation Regulations, ComReg is now publishing this Information Memorandum (“IM”), which details the processes and procedures ComReg will employ to implement Decision D11/20.
- 1.4 On 14 January 2021, an appeal of Decision D11/20 was lodged by Three Ireland (Hutchison) Limited and Three Ireland Services (Hutchison) Limited.³ The lodging of this appeal does not, in itself, affect the taking effect of the Decision or steps being taken to implement it. ComReg has, notwithstanding, made a minor adjustment to the indicative timetable for the Application Stage of the Award Process that had been set out in the draft Information Memorandum (set out here in Chapter 3)⁴.
- 1.5 Although this IM is similar in layout to information memoranda employed by ComReg in previous spectrum awards, ComReg would stress that this IM has been prepared by reference to the specifics of the current Award Process. All prospective Applicants should therefore familiarise themselves with this IM in its entirety and, in particular, should not rely upon knowledge of earlier information memoranda.

¹ Document 20/32 – *Proposed Multi Band Spectrum Award - Draft Information Memorandum and Draft Regulations* – published 13 May 2020.

² ComReg Document 20/122 – *Multi Band Spectrum Award - Response to Consultation and Decision on the 700 MHz Duplex, 2.1 GHz, 2.3 GHz and 2.6 GHz Bands* – published 18 December 2020.

³ The appeal is listed for a five day hearing commencing 2 June 2021.

⁴ See Document 21/39 - *Multi Band Spectrum Award – Response to Consultation on Draft Information Memorandum* – published on 16 April 2021.

1.1 Legal Framework and Agreement

- 1.6 In preparing this IM, ComReg has been guided by its statutory functions, objectives and duties relevant to its management of the radio frequency spectrum (see Annex 2 of Document 20/122) and its most recent Radio Spectrum Management Strategy Statement (Document 18/118⁵).
- 1.7 Any new rights of use for radio frequencies in the Award Spectrum will be assigned through licences granted by ComReg under Section 5 of the Wireless Telegraphy Act 1926, as amended (“the 1926 Act”). In order to grant such licences, ComReg is required to make regulations under Section 6 of the 1926 Act which would prescribe, among other things, the form and duration of the licences, the terms on which they are granted, the circumstances and manner in which they may be suspended or revoked, the fees to be paid on the granting of the licences, and the terms and conditions to be observed by holders of such licences. The making of such regulations is subject to the consent of the Minister for the Environment, Climate and Communications⁶.
- 1.8 In that regard, Annex 2 of this IM contains the following two draft statutory instruments:
- the Wireless Telegraphy (Liberalised Use and Related Licences in the 700 MHz Duplex, 2.1 GHz, 2.3 GHz and 2.6 GHz Bands) Regulations 2021 (“MBSA2 Licence Regulations”). These regulations would apply to the grant of new rights of use for the Award Spectrum; and
 - the Wireless Telegraphy (Third Generation and GSM Licence) (Amendment) and Interim Licensing) Regulations 2021 (“2.1 GHz Band Interim Licence and Early Liberalisation Regulations”). These regulations would give effect to ComReg’s decisions for the liberalisation of existing 2.1 GHz rights of use (see Chapter 4 of Document 20/122) and the grant of interim 2.1 GHz rights of use to Three Ireland (Hutchison) Limited (see Annex 5 of Document 20/122).
- 1.9 In addition, Interested Parties should note the requirement to be authorised to provide an electronic communications network or service in Ireland⁷. Interested

⁵ ComReg Document 18/118 – *Radio Spectrum Management Strategy 2019 to 2021* – published 20 December 2018.

⁶ Section 37 of the Communications Regulation Act 2002 as amended.

⁷ Under Regulation 4(1) of the Authorisation Regulations, any undertaking intending to provide an electronic communications network or service shall, before doing so, notify ComReg of its intention to provide such a network or service, following which that undertaking will be deemed to be authorised under Regulation 4(4). Under Regulation 4(6) of the Authorisation Regulations, any undertaking which fails to comply with Regulation 4(1) or Regulation 4(5) (notification of any changes to the information supplied) commits an offence.

Parties can consult ComReg's website for further details⁸ and, in particular, the General Authorisation contained in Document 03/81R6⁹ which sets out the general conditions of authorisation.

- 1.10 Chapters 3, 4 and 5 of this IM set out important provisions relating to the Award Process to which Interested Parties must agree if they wish to participate in the Award Process and which are binding. Chapter 2 and Annex 2 (Draft Regulations) set out information on the Award Spectrum and the terms and conditions to be attached to licences for new rights of use in respect of the Award Spectrum.
- 1.11 For the avoidance of doubt, references throughout this IM to ComReg exercising its discretion mean ComReg acting reasonably and in accordance with its statutory functions, objectives and duties.
- 1.12 Capitalised terms in this IM, unless otherwise defined, have the meanings assigned to them in Annex 1.

1.2 COVID 19: Further Temporary ECS licences (No.2)

- 1.13 In response to the ongoing extraordinary situation presented by the novel coronavirus (COVID-19), ComReg has consulted upon¹⁰ a further licensing framework¹¹ for a Second Further Temporary ECS Licences assignment for a period of up to 6 months of:
- additional spectrum rights of use in the 700 MHz Duplex; and
 - liberalised spectrum rights of use in the 2.1 GHz Band, as this band is otherwise currently licensed for 3G-use only.
- 1.14 On 22 March 2021 ComReg published Document 21/24¹², its Response to Consultation and Decision on a second further temporary licensing framework for spectrum rights of use in the 700 MHz, 2.1 GHz and 2.6 GHz bands.

⁸ See http://www.comreg.ie/licensing_and_services/general_authorisation.551.html for further details.

⁹ See <https://www.comreg.ie/publication-download/general-authorisation-for-the-provision-of-electronic-communications-networks-and-services>

¹⁰ See ComReg Documents 21/16 available at <https://www.comreg.ie/industry/radio-spectrum/spectrum-awards/covid-19-temporary-spectrum-management-measures>.

¹¹ Draft regulations accompanied Document 21/16.

¹² ComReg 21/24 - Further temporary spectrum management measures - Response to Consultation and Decision on a second further temporary licensing framework for spectrum rights in the 700 MHz, 2.1 GHz and 2.6 GHz Bands – Published 22 March 2021.

1.15 Alongside this, ComReg also published Document 21/24a¹³, an Application Form for a Further Temporary Electronic Communications Service Licence (No.2).

1.16 Each of the MNOs has submitted an application for a Further Temporary ECS Licence (No.2).

1.17 After assessing each of these applications, ComReg has issued licences as detailed in the table below:

Table 1: Second Further Temporary ECS Licences issued due to COVID-19

Licensee	Commencement Date	Expiry Date ¹⁴	Spectrum Bands
Meteor Mobile Communications Limited (“Meteor”)	2 April 2021	1 July 2021	700 MHz and 2.1 GHz bands
Three Ireland (Hutchison) Limited (“Three”)	2 April 2021	1 July 2021	700 MHz and 2.1 GHz bands
Vodafone Ireland Limited (“Vodafone”)	2 April 2021	1 July 2021	700 MHz and 2.1 GHz bands

1.18 When consulting upon this further temporary spectrum licensing framework, ComReg clarified that it was intended solely to address the exceptional and extraordinary situation presented by COVID-19 and is entirely without prejudice to this Award Process.

1.3 Structure of Information Memorandum

1.19 The remainder of this draft IM is structured as follows:

¹³ ComReg 21/24a - Application form for a Further Temporary Electronic Communications Service Licence (No.2) – Published 22 March 2021.

¹⁴ Under the Further Temporary ECS Licence Regulations (No.2), Licences were granted for an initial period of 3 months, with the potential for a renewal of up to a further 3 months, with the renewed rights of use expiring no later than 6 months from the date of the Regulations (i.e. on 1 October 2021 or earlier).

- **Chapter 2** details the Award Spectrum, the Lots included in the Award Process, and the terms and conditions of the various Licences that may be awarded as a result of the Award Process;
- **Chapter 3** details the various stages of the Award Process and the timelines for the Award Process;
- **Chapter 4** details the Auction Rules;
- **Chapter 5** provides additional details on the legal terms and conditions that are applicable to this Award Process;
- Annexes:
 - **Annex 1:** Glossary;
 - **Annex 2:** Draft Statutory Instruments;
 - **Annex 3:** Application Form for participation in the Award Process;
 - **Annex 4:** Rollout and Coverage – Specific Locations;
 - **Annex 5:** Relationships, resolution of Bidder connections, exemptions and changes;
 - **Annex 6:** Worked Example of Activity Rules for the Primary Bid Rounds and Caps on Supplementary Bids;
 - **Annex 7:** Implications of the Final Price Cap;
 - **Annex 8:** Relative Caps in the Primary Bid Rounds;
 - **Annex 9:** Worked Example of Winner and Price Determination;
 - **Annex 10:** Exposure Pricing;
 - **Annex 11:** Determination of Winning Bids and Base Prices in the Main Stage;
 - **Annex 12:** Methodology for generating Assignment Options;
 - **Annex 13:** Relocation rebate; and,
 - **Annex 14:** 2.1 GHz Band – Liberalisation Fee methodology.

- 1.20 In the event of receiving correspondence on matters relating to this document, and to the Award Process in general, ComReg hereby gives notice that it will publish all material correspondence received in this regard subject to the provisions of its guidelines on the treatment of confidential information¹⁵.

¹⁵ See ComReg Document 05/24 – *Guidelines on the treatment of confidential information* – published 23 March 2005.

Chapter 2

2 Licences and Award Spectrum

2.1 Introduction

2.1 By means of this Award Process, ComReg intends to:

- grant new rights of use for 470 MHz of radio frequency spectrum in respect of the Award Spectrum;
- facilitate the granting of interim rights of use to Three Ireland (Hutchison) Limited in the 2.1 GHz Band; and
- facilitate the early liberalisation of existing rights of use in the 2.1 GHz Band.

2.1.1 New rights of use in the Award Spectrum

2.2 ComReg will assign new rights of use in respect of the Award Spectrum through Licences granted to Winning Bidders under Section 5 of the 1926 Act. The Licences will be governed by the MBSA2 Licence Regulations to be made by ComReg under Section 6 of the 1926 Act (subject to the consent of the Minister for the Environment, Climate and Communications). A draft of the MBSA2 Licence Regulations is included in Annex 2 of this document. The main type of Licence to be granted under the MBSA2 Licence Regulations will be MBSA2 Liberalised Use Licences, which will:

- permit a Licensee to keep, possess, install, maintain, work and use apparatus for wireless telegraphy (“Apparatus”) for the terrestrial provision of electronic communications services (“ECS”); and
- grant a “liberalised” right of use for radio frequencies in specific frequency assignments in the Award Spectrum in the national territory of the State (being those identified in Section 2.2 below).

2.3 The terms and conditions attached to MBSA2 Liberalised Use Licences are described in Section 2.3 below and are set out in the MBSA2 Licence Regulations and in the indicative MBSA2 Liberalised Use Licence attached to those regulations¹⁶. Among other things, MBSA2 Liberalised Use Licences are being made available with a commencement date of 14 February 2022 (or such other date as may be specified by ComReg) and shall expire on 13 February

¹⁶ For the avoidance of doubt, in the event of any inconsistency between this IM and the final MBSA2 Licence Regulations, the MBSA2 Licence Regulations prevail.

2042¹⁷.

- 2.4 Winning Bidders will also be entitled to apply for a MBSA2 Preparatory Licence which will allow the holders of such licences to install networks and associated equipment in advance of the commencement date of their MBSA2 Liberalised Use Licence, but will not allow any wireless telegraphy transmissions¹⁸. The terms and conditions attached to a MBSA2 Preparatory Licence are described in Section 2.4 below and are set out in the MBSA2 Licence Regulations and in the indicative MBSA2 Preparatory Licence attached to those regulations.
- 2.5 Under certain pre-conditions, Eircom Limited (“Eir”) will also be entitled to apply for a MBSA2 2.3 GHz Band Transition Licence. The purpose of a MBSA2 2.3 GHz Band Transition Licence is to:
- safeguard the interests of users in remote rural areas who are currently receiving a RurTel Service from Eir under its Universal Service Obligation (“USO”) because they do not presently have access to an alternative fixed telephony service;
 - facilitate the timely and orderly transition of the remaining Eir customers receiving a RurTel Service to a comparable or improved alternative service in accordance with Eir’s obligations under the USO as appropriate;
 - facilitate the determination and specification of a clear end-date for all Transition Activities¹⁹ to be completed, enabling Winning Bidders to introduce new services in the 2.3 GHz Band in affected areas as soon as possible and not unnecessarily delaying the delivery of future liberalised services; and
 - ensure the efficient use of spectrum during the Transition period.
- 2.6 The terms and conditions attached to a MBSA2 2.3 GHz Band Transition Licence are described in Section 2.5 below and are set out in the MBSA2 Licence Regulations and in the indicative MBSA2 2.3 GHz Band Transition Licence attached to those regulations.

¹⁷ Any delay to the commencement of MBSA2 Liberalised Use Licences due to the Transition Activities provided for in Section 3.8 of this Information Memorandum, or otherwise, shall not affect this expiry date.

¹⁸ If a Licensee wishes to test equipment, it must apply separately to ComReg for a test licence (see <https://testandtrial.ie/>).

¹⁹ Transition Activities refer to the activities required by the Existing Licensee to make adjustments to its existing networks in order to comply with the outcome of the Award Process and align its use of spectrum with the rights of use that it obtains, if any, in the Award Process (see Section 3.8 below for further information).

2.7 The MBSA2 Licence Regulations also provide for the granting of MBSA2 Spectrum Lease Licences, the purpose of which is to facilitate the leasing of spectrum rights in the Award Spectrum in accordance with such procedures as may be specified by ComReg under Regulation 19 of the Framework Regulations²⁰. The terms and conditions attached to a MBSA2 Spectrum Lease Licence are described in Section 2.6 below and are set out in the MBSA2 Licence Regulations and in the indicative MBSA2 Spectrum Lease Licence attached to those regulations.

2.1.2 2.1 GHz Band Interim Licences and Early Liberalisation

2.8 ComReg will assign interim rights of use in the 2.1 GHz Band through Licences granted under Section 5 of the 1926 Act. These 2.1 GHz Band Interim Licences will be governed by the 2.1 GHz Band Interim Licence and Early Liberalisation Regulations to be made by ComReg under Section 6 of the 1926 Act (subject to the consent of the Minister for the Environment, Climate and Communications). These regulations will also provide for the early liberalisation of existing rights of use in the 2.1 GHz Band through an amendment of the principal regulations governing these existing 2.1 GHz Band rights of use²¹. A draft of the 2.1 GHz Band Interim Licence and Early Liberalisation Regulations is included in Annex 2 of this document.

2.9 The terms and conditions of such interim and liberalised existing licences in the 2.1 GHz Band are set out in the 2.1 GHz Band Interim Licence and Early Liberalisation Regulations and the indicative licences attached to those regulations.

2.2 The spectrum in the Award Process, Lots and Lot Categories

2.10 Through this Award Process, ComReg is making available new rights of use for 470 MHz of spectrum (i.e. the Award Spectrum) on a national basis.

2.11 Within the Award Spectrum there are 8 different types of Spectrum Blocks, as follows:

²⁰ See ComReg Document 14/11r in this regard.

²¹ i.e. the Wireless Telegraphy (Third Generation and GSM Licence) Regulations, 2002 (S.I. No. 345 of 2002) as amended by the Wireless Telegraphy (Third Generation and GSM Licence) (Amendment) Regulations, 2003 (S.I. No. 340 of 2003).

- 700 MHz Duplex Blocks;
- 2.1 GHz Band Blocks;
- 2.3 GHz Band Generic Frequency Blocks;
- 2.3 GHz Band Fixed Frequency Block;
- 2.6 GHz Band FDD Blocks;
- 2.6 GHz Band TDD Fixed Frequency Block (Lower);
- 2.6 GHz Band TDD Generic Frequency Blocks; and,
- 2.6 GHz Band TDD Fixed Frequency Block (Upper).

2.12 These Spectrum Blocks, with the exception of the 700 MHz Duplex Blocks, are being made available as Lots in two Time Slices (see Table 5 below for further details).

2.13 This results in 15 Lot Categories as listed below, where **A-Lots** refer to the fixed frequency Lots (of which there are 6), and **B-Lots** refer to the frequency-generic Lots (of which there are 107):

- 700 MHz Duplex Lots (“B700”);
- 2.1 GHz Lots Time Slice 1 (“B2.1/1”);
- 2.1 GHz Lots Time Slice 2 (“B2.1/2”);
- 2.3 GHz Generic Frequency Lots Time Slice 1 (“B2.3/1”);
- 2.3 GHz Generic Frequency Lots Time Slice 2 (“B2.3/2”);
- 2.3 GHz Fixed Frequency Lot Time Slice 1 (“A2.3/1”);
- 2.3 GHz Fixed Frequency Lot Time Slice 2 (“A2.3/2”);
- 2.6 GHz FDD Lots Time Slice 1 (“B2.6F/1”);
- 2.6 GHz FDD Lots Time Slice 2 (“B2.6F/2”);
- 2.6 GHz TDD Fixed Frequency Lot (Lower) Time Slice 1 (“A2.6TL/1”);
- 2.6 GHz TDD Fixed Frequency Lot (Lower) Time Slice 2 (“A2.6TL/2”);

- 2.6 GHz TDD Generic Frequency Lots Time Slice 1 (“B2.6T/1”);
- 2.6 GHz TDD Generic Frequency Lots Time Slice 2 (“B2.6T/2”);
- 2.6 GHz TDD Fixed Frequency Lot (Upper) Time Slice 1 (“A2.6TU/1”);
and
- 2.6 GHz TDD Fixed Frequency Lot (Upper) Time Slice 2 (“A2.6TU/2”).

2.14 As a result, there are 113 Lots in the Award Process, across the Award Spectrum.

2.15 Table 2 identifies the Spectrum Blocks and the number of Lots available in Time Slice 1 and Time Slice 2.

2.16 Table 3 and Table 4 below provide details on the fixed frequency Lots (A-Lots) and the frequency-generic Lots (B-Lots) respectively.

Table 2: Spectrum Blocks and the number of available Lots in each Time Slice

Spectrum Blocks	Duplex arrangement and Frequency range	Lot Type	Time Slice 1		Time Slice 2	
			Number of Lots Available	Lot Size	Number of Lots Available	Lot Size
700 MHz Duplex Blocks	FDD: 703-733 MHz paired with 758-788 MHz	B	6 Lots of 2 x 5 MHz ²²			
2.1 GHz Band Blocks	FDD: 1920 – 1980 MHz paired with 2110 – 2170 MHz ²³	B	9	2 x 5 MHz	12	2 x 5 MHz
2.3 GHz Band Generic Frequency Blocks	TDD: 2300 – 2390 MHz unpaired	B	18	5 MHz	18	1 x 5 MHz
2.3 GHz Band Fixed Frequency Block	TDD: 2390 – 2400 MHz unpaired	A	1	10 MHz	1	1 x 10 MHz
2.6 GHz Band FDD Blocks	FDD: 2500 – 2570 MHz paired with 2620 – 2690 MHz	B	14	2 x 5 MHz	14	2 x 5 MHz
2.6 GHz Band TDD Fixed Frequency Block (Lower)	TDD: 2570 – 2575 MHz unpaired	A	1	5 MHz	1	1 x 5 MHz
2.6 GHz Band TDD Generic Frequency Blocks	TDD: 2575 – 2615 MHz unpaired	B	8	5 MHz	8	1 x 5 MHz
2.6 GHz Band TDD Fixed Frequency Block (Upper)	TDD: 2615 – 2620 MHz unpaired	A	1	5 MHz	1	1 x 5 MHz

²² 700 MHz Duplex Blocks are being made available in one temporal period and are therefore not subject to Time Slices.

²³ This includes the three Spectrum Blocks currently assigned to Eir in Time Slice 1: 1935-1940 / 2125-2130 MHz; 1940-1945 / 2130 – 2135 MHz; and 1945-1950 / 2135-2140 MHz.

Table 3: Fixed Frequency A-Lots

Lot Category	Frequency range	Time Slice	Lots available	Lot size
A2.3/1	2390 – 2400 MHz unpaired	1	1	10 MHz
A2.3/2	2390 – 2400 MHz unpaired	2	1	10 MHz
A2.6TL/1	2570 – 2575 MHz unpaired	1	1	5 MHz
A2.6TL/2	2570 – 2575 MHz unpaired	2	1	5 MHz
A2.6TU/1	2615 – 2620 MHz unpaired	1	1	5 MHz
A2.6TU/2	2615 – 2620 MHz unpaired	2	1	5 MHz

Table 4: Frequency generic B-Lots

Lot Category	Frequency range	Time Slice	Number of Lots	Lot size
B700	703 – 733 MHz paired with 758 – 788 MHz	1 & 2	6	2 x 5 MHz
B2.1/1	1920 – 1980 MHz paired with 2110 – 2170 MHz ²⁴	1	9	2 x 5 MHz
B2.1/2	1920 – 1980 MHz paired with 2110 – 2170 MHz	2	12	2 x 5 MHz
B2.3/1	2300 – 2390 MHz unpaired	1	18	5 MHz
B2.3/2	2300 – 2390 MHz unpaired	2	18	5 MHz
B2.6F/1	2500 – 2570 MHz paired with 2620 – 2690 MHz	1	14	2 x 5 MHz
B2.6F/2	2500 – 2570 MHz paired with 2620 – 2690 MHz	2	14	2 x 5 MHz
B2.6T/1	2575 – 2615 MHz unpaired	1	8	5 MHz
B2.6T/2	2575 – 2615 MHz unpaired	2	8	5 MHz

2.17 Figure 1, Figure 2, Figure 3 and Figure 4 below illustrate the band plans for the Award Spectrum in this Award Process.

²⁴ This does not include the three Spectrum Blocks currently assigned to Eir in Time Slice 1: 1935 – 1940 / 2125 – 2130 MHz; 1940 – 1945 / 2130 – 2135 MHz; and 1945 – 1950 / 2135 – 2140 MHz.

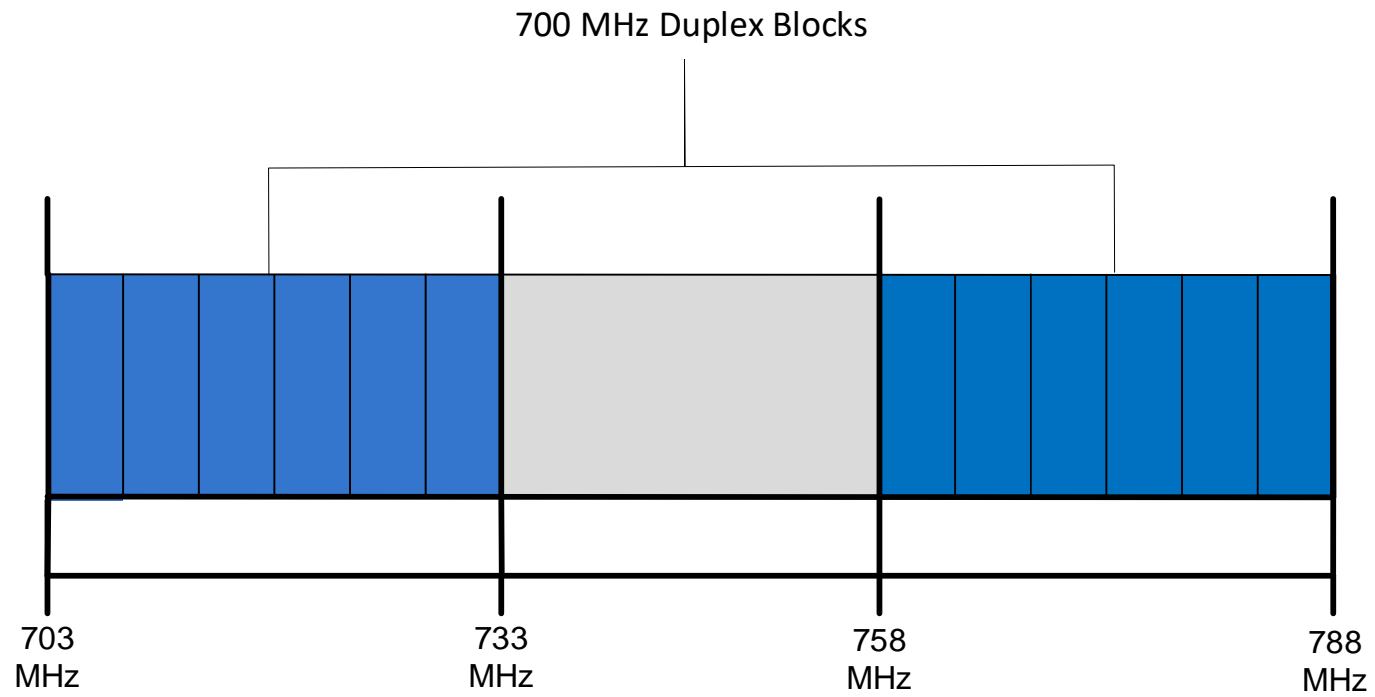


Figure 1: 700 MHz Duplex Blocks

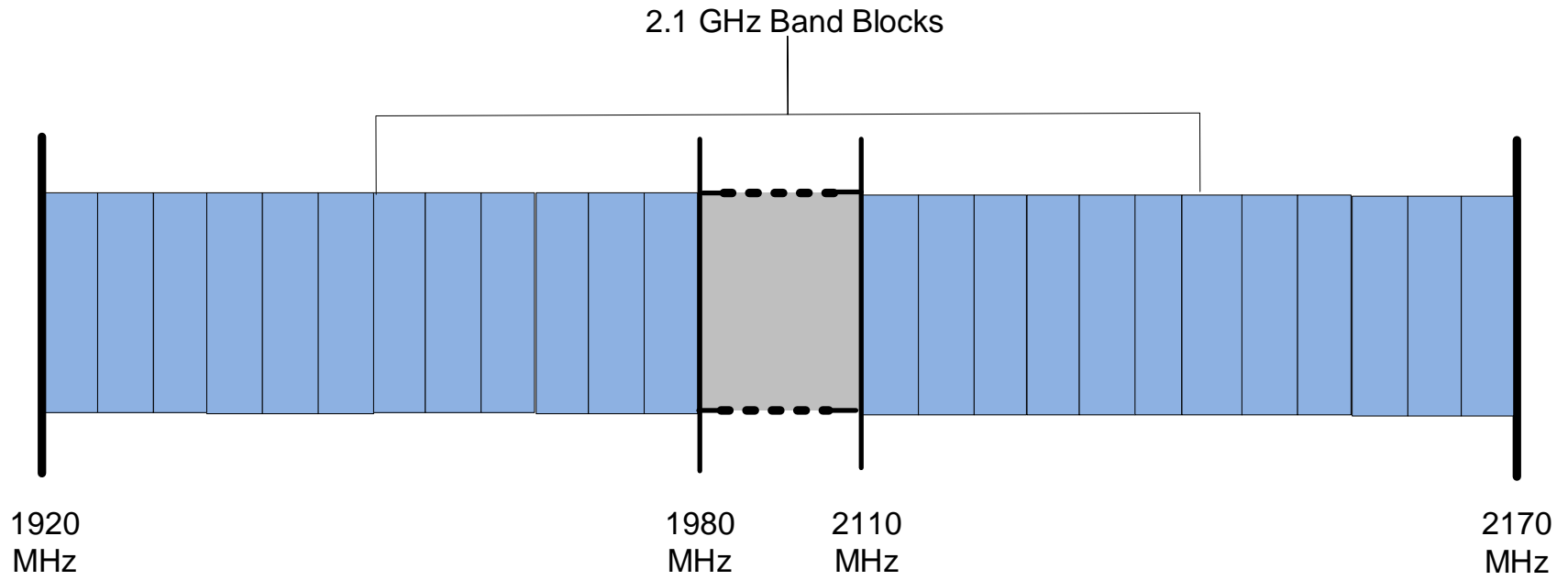


Figure 2: 2.1 GHz Band Blocks

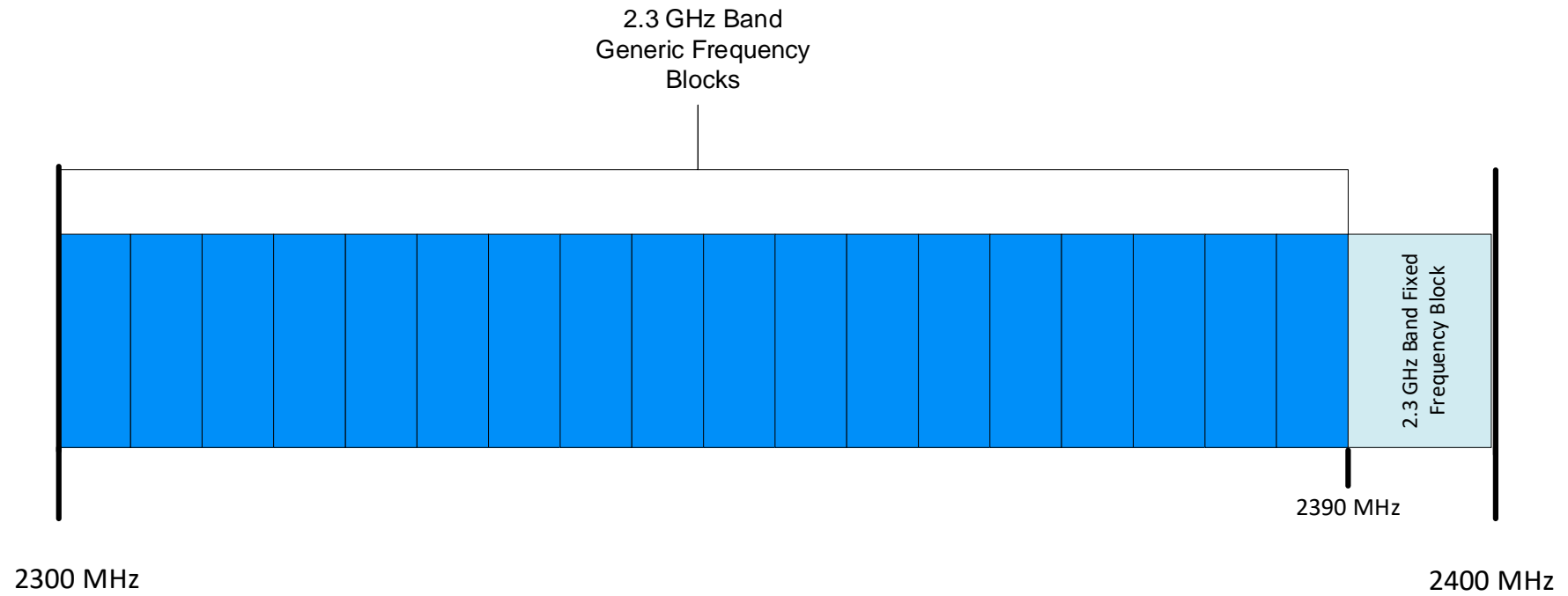


Figure 3: 2.3 GHz Band Blocks

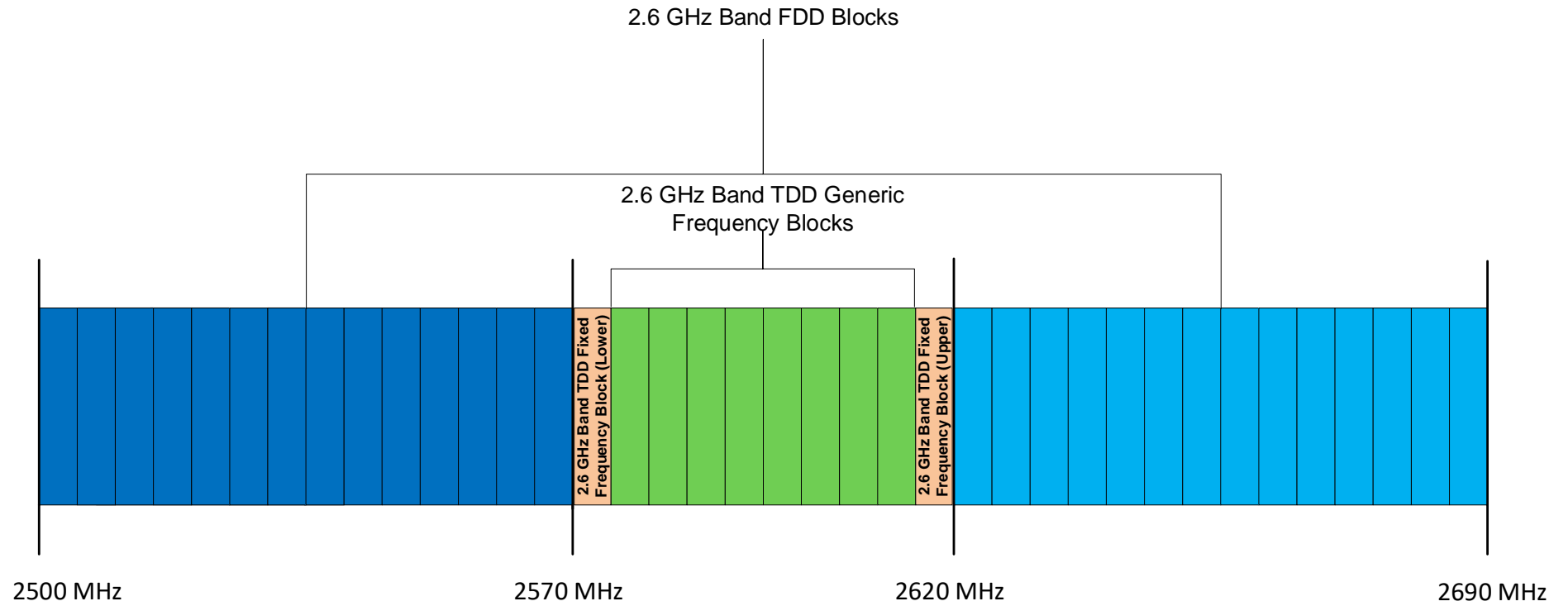


Figure 4: 2.6 GHz Band Blocks

2.3 The MBSA2 Liberalised Use Licence – Terms and Conditions

2.18 The following describes the principal terms and conditions associated with a MBSA2 Liberalised Use Licence. These terms and conditions are set out in the MBSA2 Licence Regulations and the indicative MBSA2 Liberalised Use Licence attached to those regulations (see Annex 2 of this document).²⁵

2.3.1 Entitlement to apply for a MBSA2 Liberalised Use Licence

2.19 In accordance with the rules for the Notification and Grant Stage (see Section 3.7 of this IM), each Winning Bidder will be entitled to apply for a MBSA2 Liberalised Use Licence.

2.3.2 Scope of a MBSA2 Liberalised Use Licence

2.20 A MBSA2 Liberalised Use Licence will permit a Licensee to keep, possess, install, maintain, work and use Apparatus in the portion of the Award Spectrum assigned thereunder for terrestrial systems capable of providing ECS.

2.21 It is a Non-exclusive Licence for the national territory of the State where, as set out in the MBSA2 Licence Regulations:

- a “Non-exclusive” licence means that ComReg is not precluded from authorising the keeping and having possession by persons other than the Licensee, on a Non-Interference and Non-Protected Basis, of Apparatus for the radio frequency spectrum specified in the Licence²⁶; and
- “on a Non-Interference and Non-Protected Basis” means that the use of Apparatus is subject to no Harmful Interference being caused to any Radiocommunication Service, and that no claim may be made for

²⁵ For the avoidance of doubt, in the event of any inconsistency between this Information Memorandum and the MBSA2 Licence Regulations, the latter shall prevail.

²⁶ For the 700 MHz Duplex, 2.1 GHz Band and 2.6 GHz Band, the relevant EC decisions oblige member states to designate and make available the band on a Non-exclusive basis.

For the 2.3 GHz Band, as discussed in Section 7.3 of Document 19/124 and as set out in Section 8.3 of Document 20/122, ComReg’s final position is to make this band available on a Non-exclusive basis as this would, among other things:

- provide for consistency across the spectrum bands in the Award Spectrum;
- accord with standard practice for licensing spectrum bands; and
- likely align with the provisions in any future EC decision on this band, given the approach taken by the European Commission in relation to other bands in the Award Spectrum.

the protection of Apparatus used on this basis against Harmful Interference originating from Radiocommunication Services.

2.22 In addition, all Apparatus licensed under a MBSA2 Liberalised Use Licence is required to comply with, among other things, the conditions of the Licence and the relevant European Commission (“EC”) or Electronic Communications Committee (“ECC”) decisions, including:

- EC Decision 2016/687 in respect of 700 MHz Duplex Blocks;
- EC Decision 2012/688, as amended by EC Decision 2020/667, in respect of 2.1 GHz Band Blocks;
- ECC Decision 14(02) in respect of 2.3 GHz Band Blocks; and
- EC Decision 2008/477, as amended by EC Decision 2020/636, in respect of 2.6 GHz Band Blocks.

2.3.3 MBSA2 Liberalised Use Licence Duration

2.23 Spectrum rights of use in the 700 MHz Duplex are being made available in one temporal period from 14 February 2022 (or such other date as may be specified by ComReg) to 13 February 2042.

2.24 Spectrum rights of use in the 2.1 GHz Band, 2.3 GHz Band and 2.6 GHz Band are being made available in two Time Slices. The commencement date and the expiry date for each Time Slice are set out in Table 5 below:

Table 5: Commencement and expiry dates for spectrum rights of use in the 2.1 GHz Band, 2.3 GHz Band and 2.6 GHz Bands in Time Slice 1 and Time Slice 2

Time Slice	Frequency band	Commencement date	Expiry date
Time Slice 1	2.1 GHz Band	16 October 2022	11 March 2027
	2.3 GHz Band 2.6 GHz Band	14 February 2022 ²⁷	
Time Slice 2	2.1 GHz Band 2.3 GHz Band 2.6 GHz Band	12 March 2027	13 February 2042

2.25 There is no implied or express right of renewal, extension or any other form of prolongation of a MBSA2 Liberalised Use Licence (and the spectrum rights of

²⁷ Or other such date as may be specified by ComReg.

use granted by same) beyond the expiry date of 13 February 2042.

- 2.26 Prior to the expiry of MBSA2 Liberalised Use Licences, ComReg intends to consider the future use of the Award Spectrum, including identifying the appropriate process for dealing with the spectrum which becomes available due to the expiration of MBSA2 Liberalised Use Licences.

Potential for Delayed Commencement of MBSA2 Liberalised Use Licences

- 2.27 It should be noted that circumstances outside ComReg's reasonable control could lead to ComReg being unable to make any or all Lots in the Award Spectrum available for inclusion in a MBSA2 Liberalised Use Licence of a Winning Bidder by the commencement dates identified above²⁸.
- 2.28 Interested Parties are hereby expressly put on notice of the potential for delayed access to any and all Lots in the Award Spectrum and, in submitting an Application, Applicants acknowledge and accept same.
- 2.29 Section 2.3.7 below details the refunds of Licence fees payable to a Winning Bidder or the adjustment of Licence fees payable by a Winning Bidder, as the case may be, in the event of delayed access to Lots beyond the commencement dates of spectrum rights of use as detailed above in this subsection.
- 2.30 To the extent permitted by law, ComReg's aggregate liability for all loss or damage of any nature arising from delayed access to Lots beyond the commencement dates of spectrum rights of use as detailed above in this subsection is expressly limited to the refunds or adjustments of Licence fees as set out in Section 2.3.7 of this Information Memorandum and, by submitting an Application, Interested Parties agree to same.

2.3.4 Licence Conditions Applicable to MBSA2 Liberalised Use Licences

- 2.31 This section describes the conditions which are applicable to MBSA2 Liberalised Use Licences.

²⁸ The circumstances for delayed access to certain Lot(s) could be caused by a number of things including, for example, implications arising from the COVID-19 outbreak; the Award Process continuing on such that it is not possible to issue Licences by the commencement dates identified above; and/or, the Transition Activities of Existing Licensees.

Coverage, Roll-out, Associated Compliance Reporting, Measuring and Monitoring Conditions

Outdoor Coverage

2.32 It is a condition of a MBSA2 Liberalised Use Licence that applies to rights of use in the 700 MHz Duplex that the Licensee shall achieve and maintain a minimum outdoor coverage obligation. The particulars of this obligation are outlined below and depend on whether or not the Licensee is an Existing MNO, and also on the quantum of 700 MHz Duplex spectrum rights held by the Licensee.

Outdoor Coverage – Existing MNOs

2.33 A Licensee that is an Existing MNO and wins spectrum in the 700 MHz Duplex shall achieve and maintain:

- the appropriate²⁹ General Outdoor Coverage Obligations for an Existing MNO as set out in Table 6 below; and
- the appropriate³⁰ minimum Outdoor Coverage Obligations at specific locations for an Existing MNO as set out in Table 7 below.

²⁹ i.e. appropriate to the quantum of spectrum assigned to the Licensee in the 700 MHz Duplex under the Licence.

³⁰ i.e. appropriate to the quantum of spectrum assigned to the Licensee in the 700 MHz Duplex under the Licence.

Table 6: General Outdoor Coverage Obligations for an Existing MNO

Quantum of 700 MHz Duplex spectrum obtained by Licensee in Award	Outdoor coverage service (Single User Throughput Cell Edge)	Coverage dimension	Coverage % levels to be met in ³¹ :		
			3 Years	5 Years	7 Years
At least 2 × 10 MHz	30 Mbit/s	Population	85%	92%	95%
	30 Mbit/s	Motorways	75%	85%	90%
	30 Mbit/s	Primary Roads	60%	75%	80%
	3 Mbit/s	Population	99%	99%	99%
	3 Mbit/s	Geographic Area	90%	91%	92%
Less than 2 × 10 MHz	20 Mbit/s	Population	85%	92%	95%
	20 Mbit/s	Motorways	75%	85%	90%
	20 Mbit/s	Primary Roads	60%	75%	80%
	3 Mbit/s	Population	99%	99%	99%
	3 Mbit/s	Geographic Area	90%	91%	92%

³¹ From the earliest commencement date of the 700 MHz Duplex Blocks in the MBSA2 Liberalised Use Licence.

Table 7: Outdoor Coverage Obligations at specific locations for an Existing MNO

Outdoor coverage service	Location	Coverage % levels and milestones ³²
<p>Outdoors:</p> <p><u>Case 1</u></p> <p>Where the Licensee wins at least 2 x 10 MHz in the 700 MHz Duplex in the Award:</p> <p>30 Mbit/s (Single User Throughput Cell Edge)</p> <p><u>Case 2</u></p> <p>Where the Licensee wins less than 2 x 10 MHz in the 700 MHz Duplex in the Award:</p> <p>20 Mbit/s (Single User Throughput Cell Edge)</p>	<p>Specific locations as set out in Annex 4 which include:</p> <ul style="list-style-type: none"> • Business and technology Parks: Located at the Industrial Development Agency (IDA) Ireland's 31 business and technology Parks and 9 Strategic Sites. The obligation also includes adjacent business and technology parks to those of IDA Ireland; • Hospitals: the Health Service Executive (HSE) identifies a list of the 48 public and 17 private hospitals; • Higher Education Campuses: The Higher Education Authority (HEA) identifies a list of 8 Universities, 11 Institutes of Technology and 5 other colleges; • Air and Sea Ports: the Department of Transport Tourism and Sport (DTTAS) identifies a list of the 7 main airports and the Irish Maritime Development Office (IMDO) identifies a list of the 7 passenger sea ports; • Train and bus stations: the National Transport Authority (NTA) identifies the busiest 144 train stations and Bus Éireann identifies a list of the main 16 bus stations; and • Top visitor attraction information points: Fáilte Ireland identifies a list of the top 21 fee charging and 21 free entry visitor attractions. 	<p>For each category</p> <p>70% in 3 years</p> <p>90% in 5 years</p> <p>100% in 7 years</p>

Outdoor Coverage – New Entrants

2.34 A Licensee that is a New Entrant and wins spectrum in the 700 MHz Duplex shall achieve and maintain the appropriate³³ Outdoor Coverage Obligations for New Entrants as set out in Table 8 below.

³² From the earliest commencement date of the 700 MHz Duplex Blocks in the MBSA2 Liberalised Use Licence.

³³ i.e. appropriate to the quantum of spectrum assigned to the Licensee under the Licence.

Table 8: Outdoor Coverage Obligations for New Entrants

Quantum of spectrum obtained by Licensee in Award	Outdoor Coverage Service (Single User Throughput Cell Edge)	Coverage dimension	Coverage % level to be met in ³⁴ :		
			4 Years	6 Years	10 Years
At least: a. 2 × 10 MHz in the 700 MHz Duplex and b. 2 × 20 MHz³⁵ across any of the 2.1 GHz, 2.3 GHz or 2.6 GHz Bands	30 Mbit/s	Population	75%	80%	90%
a. At least 2 × 10 MHz in the 700 MHz Duplex and b. less than 2 × 20 MHz³⁶ across any of the 2.1 GHz, 2.3 GHz or 2.6 GHz Bands	20 Mbit/s	Population	75%	80%	90%
a. 2 × 5 MHz in 700 MHz Duplex and b. any quantum of spectrum across any of the 2.1 GHz, 2.3 GHz or 2.6 GHz Bands	10 Mbit/s	Population	75%	80%	90%

³⁴ From the earliest commencement date of the 700 MHz Duplex Blocks in the MBSA2 Liberalised Use Licence.

³⁵ Or equivalent: i.e. 40 MHz of TDD spectrum.

³⁶ Or equivalent: i.e. 40 MHz of TDD spectrum.

Native Wi-Fi

- 2.35 It is a condition of a MBSA2 Liberalised Use Licence that, if the Licensee is assigned one or more 700 MHz Duplex Blocks under the Licence and provides a mobile voice and/or text service using rights of use in the Award Spectrum, then the Licensee shall within 2 years of the earliest commencement date of the 700 MHz Duplex Block(s):
- use (i.e. deploy and maintain) Native Wi-Fi³⁷ technology on its network in respect of rights of use in the Award Spectrum; and
 - make available Native Wi-Fi voice and/or text services (as appropriate to the type of mobile service/s provided by the Licensee) to all end users on its network (including the end users of third-party customers³⁸), where those end users:
 - have established for themselves a suitable Wi-Fi connection; and
 - have a Native Wi-Fi / Wi-Fi calling-enabled mobile device.

Measuring and Monitoring Coverage Compliance

- 2.36 For the purpose of determining compliance with the above outdoor coverage obligations, ComReg will measure and monitor the coverage obligation based on the following principles:
- (a) ComReg's radio network planning tools, supported by field measurements which may include drive tests where appropriate, will be the key component in assessing compliance with the coverage obligations;
 - (b) all spectrum rights of use available to the Licensee can be used to contribute to meeting the coverage obligations;
 - (c) while acknowledging that newer technologies will be rolled out over time, LTE³⁹ technology is expected to continue to be used by operators in delivering data to consumers for some time;
 - (d) ComReg will in this regard use a Reference Signal Received Power

³⁷ "Native Wi-Fi" means a technology which allows mobile phone calls and texts to be made on a device utilising a Wi-Fi connection rather than through the mobile network directly, and "Wi-Fi" means the wireless technology, based on the IEEE 802.11 family of standards, commonly used for local area networking of devices and Internet access.

³⁸ e.g. MVNOs.

³⁹ "LTE" means the technology defined by 3GPP called Long Term Evolution.

(RSRP) metric for LTE as a proxy for determining Licensees' compliance with the coverage levels;

- (e) the obligations are set to incentivise Licensees to rollout new sites as appropriate, upgrade sites with additional spectrum and make use of improvements in technology, such as new standards including carrier aggregation and carrier sharing or extension techniques;
- (f) depending on how the above techniques are deployed on a network, this will yield varying benefits in terms of increasing the range of a cell for a given throughput;
- (g) where carrier aggregation is deployed using carriers with similar propagation characteristics (e.g. carriers in the 700 MHz Duplex, 800 MHz Band and 900 MHz Band) that the additional bandwidth and resultant throughput gains will be available, to a large extent, for the whole of the cell range;
- (h) where frequency bands with different propagation characteristics are carrier aggregated (e.g. the 700 MHz Duplex and the 2.1 GHz Band), the throughput enhancements will be considered over the range of the highest of the frequency bands (e.g. the 2.1 GHz Band);
- (i) an RSRP base level of -103 dBm will be used as a proxy for 30 Mbit/s SUTP (Single User Throughput)⁴⁰ using a 10 MHz downlink carrier. Where capacity increasing techniques are used (such as carrier aggregation and or deploying additional bandwidth), a lower RSRP value can be used as follows:
 - where additional 10 MHz downlink carriers are added using two or three band carrier aggregation across bands with similar propagation characteristics (e.g. carriers in the 700 MHz Duplex, 800 MHz Band and 900 MHz Band) an RSRP level of -108 dBm and -113 dBm will apply respectively;
- (j) an RSRP base level of -112 dBm will be used as a proxy for a 3 Mbit/s SUTP using a 10 MHz downlink carrier. Where capacity increasing techniques are used, such as carrier aggregation and or deploying additional bandwidth, a lower RSRP value can be used as follows:

⁴⁰ ComReg notes that for the purpose of assessing compliance with the obligation where an Existing MNO was to obtain 2 x 5 MHz in the 700 MHz Duplex (i.e. where the obligation is to provide 20 Mbit/s SUTP), ComReg will deploy the same methodology for the 30 Mbit/s case, (i.e. assume a 2 x 10 MHz carrier is deployed).

- where additional 10 MHz downlink carriers are added using two or three band carrier aggregation across bands with similar propagation characteristics (e.g. carriers in the 700 MHz Duplex, 800 MHz Band and 900 MHz Band) a RSRP level of -114 dBm and -116 dBm will apply respectively;
- (k) noting that there may be many different potential combinations of spectrum and deployment techniques that could be used by a New Entrant, ComReg will apply the same principles as identified above in determining the appropriate approach to measuring and monitoring the coverage obligations; and
- (l) as new technologies or coverage enhancing techniques are rolled out, ComReg will consider proposals from Licensees as to how this could influence meeting the coverage obligations, following which ComReg may determine additional metrics and base levels as a proxy for determining the Licensee's compliance with the coverage levels.
- 2.37 ComReg will identify a population file for the purposes of measuring and monitoring the population coverage obligation by using the most up to date and appropriate datasets available at the time of conducting the measurement, which, at this juncture, ComReg envisages to consist of:
- (a) generating the population dataset by combining information from the CSO and the Eircode⁴¹ datasets; and
 - (b) using the residential addresses in the Eircode database to determine the geographic coordinates of the residential locations and the population statistics for the small areas dataset as provided by the CSO.
- 2.38 In the absence of manifest error, the population file used by ComReg will be definitive in assessing compliance with the obligation.
- 2.39 It is a condition of a MBSA2 Liberalised Use Licence that the holder of rights of use in the 700 MHz Duplex shall conduct a self-assessment each year as to whether it has met and maintained its coverage obligations and submits an annual report to ComReg regarding same ("Annual Coverage Compliance Report"). Details of this compliance reporting condition are set out in Section 4 of Part 4 of Schedule 1 of the MBSA2 Licence Regulations, which include that:

⁴¹ "Eircode" means Ireland's postcode system which identifies every home and business address in the State with a unique code.

- the Licensee shall identify in the Annual Coverage Compliance Report whether it has either (a) met the relevant outdoor coverage obligations and Native Wi-Fi coverage obligations specified in its Licence, or (b) failed to meet any of said obligations. The Licensee shall identify the outdoor coverage levels obtained at the time of the report. Where the Licensee has failed to meet any of the relevant coverage obligations, the Licensee shall provide detailed reasons and supporting information for same; and
- the Licensee shall submit its Annual Coverage Compliance Report each calendar year within 30 calendar days following the anniversary of the commencement date of its MBSA2 Liberalised Use Licence.

2.40 ComReg reserves the right to publish details of these reports, subject to the assessment of confidential information in line with ComReg Document 05/24.

Rollout Obligations for the 2.1 GHz, 2.3 GHz and 2.6 GHz Bands

2.41 It is a condition of a MBSA2 Liberalised Use Licence that, if the Licensee has obtained rights of use to spectrum in a Performance Band⁴², the Licensee shall meet the appropriate rollout base station obligations set out below.

2.42 For the purposes of this condition:

- “rollout base station” means a network-controlled Apparatus with a minimum spectrum efficiency capability of 4 bits/Hz; and
- “network-controlled Apparatus” means Apparatus which has backhaul capability⁴³ over a network connection under the control of the Licensee. For the avoidance of doubt, “plug-and-play” type Apparatus (such as femto cells, terminal stations and repeaters) are not network-controlled Apparatus.

2.43 First, where the Licensee is an Existing Operator and is assigned rights of use to spectrum in a Performance Band it shall achieve, within 4 years of the earliest commencement date of a Spectrum Block in that band and maintain thereafter, the applicable rollout base station obligation for that band as detailed in Table 9 below.

2.44 However, in this regard, where the Licensee is an Existing Operator (Mobile),

⁴² i.e. Any of the following: 2.1 GHz Band, 2.3 GHz Band, 2.6 GHz FDD Band or 2.6 GHz TDD Band.

⁴³ If any of the Performance Bands are used for the provision of backhaul connectivity, even if such Apparatus comprises of multiple hops to the network, this counts as a single Rollout Base Station, provided such backhaul connectivity carries data originating from or destined for multiple customer premises. The connection to individual customer premises equipment is excluded.

is assigned rights of use in a Performance Band and can demonstrate to the satisfaction of ComReg that the services that it is providing in a Performance Band do not include mobile Electronic Communications Services, then the rollout base station obligation applicable to the Licensee in respect of that band will be the same as that applicable to an Existing Operator (Other) in respect of that band, as detailed in Table 9 below.

- 2.45 Second, where the Licensee is a New Operator and is assigned rights of use in a Performance Band, it shall at achieve within 5 years of the earliest commencement date of a Spectrum Block in that band and maintain thereafter the applicable rollout base station obligation for that band as detailed in Table 10 in each of the Performance Bands where rights of use are obtained.
- 2.46 However, where a Licensee is a New Operator, is assigned rights of use in a Performance Band and is providing both mobile Electronic Communications Services and Electronic Communications Services other than mobile Electronic Communications Services in a Performance Band, then the rollout base station obligation applicable to the Licensee in respect of that band will be that applicable to a New Operator (Mobile) in respect of that band, as detailed in Table 10 below.

Table 9: Existing Operator rollout base station obligations for the Performance Bands

Band	Rollout Obligation			
	Number of rollout base stations to be worked and used			
Band	2.1 GHz	2.3 GHz	2.6 GHz TDD	2.6 GHz FDD
Time	4 Years			
Existing Operator (Mobile)	1,200	525	525	525
Existing Operator (Other)	290	290	290	290

Table 10: New Operator rollout base station obligations for the Performance Bands

	Rollout Obligation			
	Number of rollout base stations to be worked and used			
Band	2.1 GHz	2.3 GHz	2.6 GHz TDD	2.6 GHz FDD
Time	5 Years			
New Operator (Mobile)	290	290	290	290
New Operator (Other)	80	80	80	80

- 2.47 Rollout base stations worked and used pursuant to a spectrum leasing arrangement count towards the base station rollout obligation of the Lessor's Licence.
- 2.48 Where a Licensee shares a rollout base station with another Licensee, such rollout base stations can count towards the rollout base station obligation of each Licensee, provided that at least one licensed Spectrum Block of each Licensee is worked and used by the rollout base station.

Monitoring Rollout Base Station Compliance

- 2.49 It is a condition of a MBSA2 Liberalised Use Licence that the Licensee shall submit an annual report to ComReg regarding compliance with its rollout base station obligation ("Annual Rollout Compliance Report"). Details of this compliance reporting condition are set out in Section 5 of Part 4 of Schedule 1 of the MBSA2 Licence Regulations and include that:
- the Licensee shall identify in the Annual Rollout Compliance Report whether it has either (a) met the relevant rollout base station obligation specified in its Licence, or (b) failed to meet the said obligation and reasons for same. ComReg may seek to verify that the rollout base station obligation has been met. For example, by means of infrastructure surveys or other alternative means as it deems appropriate;
 - the information required for the Annual Rollout Compliance Report shall be agreed with ComReg in advance, and the Annual Rollout Compliance Report shall have sufficient detail and granularity to allow

ComReg to verify the results of the Licensee's Annual Rollout Compliance Report; and

- the Licensee shall submit its Annual Rollout Compliance Report each calendar year within 30 calendar days following the anniversary of the commencement date of its MBSA2 Liberalised Use Licence.

2.50 ComReg reserves the right to publish details of these reports, subject to the assessment of confidential information in line with ComReg Document 05/24.

Quality of Service and associated compliance reporting conditions

2.51 It is a condition of a MBSA2 Liberalised Use Licence that the Licensee shall meet the minimum Quality of Service ("QoS") obligations⁴⁴ as currently set out in Section 6 of Part 4 of Schedule 1 of the MBSA2 Licence Regulations. These QoS obligations consist of the following:

- minimum "availability of the network" standard;
- minimum "voice call" standard⁴⁵; and
- a "VoLTE availability" obligation⁴⁶.

2.52 It is a further condition of a MBSA2 Liberalised Use Licence that a Licensee shall, every twelve months, measure and submit an annual report to ComReg regarding its compliance with (a) the availability of the network standard, (b) the voice call QoS standard and (c) the VoLTE availability obligation ("Annual QoS Compliance Report"). Details of this compliance reporting condition are set out in Section 6 of Part 4 of Schedule 1 of the MBSA2 Licence Regulations and include that:

⁴⁴ The QoS obligations attached to a MBSA2 Liberalised Use Licence apply to all relevant services provided using the spectrum blocks listed in Part 1 of a Licensee's Licence. For the avoidance of doubt, this will include all relevant services of the Licensee and those services provided by any third parties (e.g. MVNOs) via contractual or other arrangements with the Licensee that use those spectrum blocks.

⁴⁵ The minimum "voice call" standard obligation also applies to all relevant 'managed' voice call services, provided to customers and third-party customers by the Licensee. 'Managed' voice call services include traditional voice call services carried over circuit-switched connections and the 'managed' packet-switched voice call services (e.g. using VoIP or similar protocols) which can be provided over different technologies (e.g. VoLTE, Native Wi-Fi, etc.).

⁴⁶ The VoLTE obligation applies to any Licensee that has (a) deployed LTE in any of the bands in which it holds rights of use under a MBSA2 Liberalised Use Licence and (b) also offers a mobile voice service to consumers using those bands.

- the Licensee shall identify in the Annual QoS Compliance Report whether it has either (a) met the relevant QoS obligations specified in its Licence, or (b) failed to meet any of the said obligations and, if so, reasons for same;
- the information required for the Annual QoS Compliance Report shall be agreed with ComReg in advance and the Annual QoS Compliance Report shall have sufficient detail and granularity to allow ComReg to verify the results of the Licensee's Annual QoS Compliance Report;
- the Licensee shall submit its Annual QoS Compliance Report each calendar year within the 30 calendar days following the anniversary of the commencement date of its MBSA2 Liberalised Use Licence.

2.53 Upon request by ComReg, the Licensee shall carry out drive test measurements and submit these results to ComReg⁴⁷. These drive test measurements are to be carried out at the Licensee's own expense and to a standard as agreed with ComReg.

2.54 ComReg reserves the right to publish details of these reports and measurement results, subject to the assessment of confidential information in line with ComReg Document 05/24.

Cessation of use of a terrestrial system

2.55 It is a condition of a MBSA2 Liberalised Use Licence that, in Part 2 of its Licence, the Licensee shall specify the terrestrial system applicable to each Apparatus specified in its Licence.

2.56 It is a further condition of a MBSA2 Liberalised Use Licence that, where a Licensee intends to cease the use of a terrestrial system that is used to provide services under its MBSA2 Liberalised Use Licence⁴⁸, the Licensee shall:

⁴⁷ ComReg does not envisage drive test measurements being required on a frequent basis, but notes that such measurements may be appropriate in circumstances where:

- a Licensee is submitting an Annual QoS Compliance Report for the first time; or
- ComReg's own verification checks, or other information suggests that there may be discrepancies in the compliance report on QoS or the Licensee may not be meeting its QoS obligations.

⁴⁸ For the avoidance of doubt, the entitlement of a Licensee to cease the use of a terrestrial system is without prejudice to the contractual rights of parties who have entered into contracts with the Licensee.

- notify ComReg of this intention at least 6 months⁴⁹ in advance of the proposed termination date; and
- use all reasonable endeavours to ensure that any adverse effects on users caused by the cessation of use of a terrestrial system are minimised.

Assignment of rights and obligations of a MBSA2 Liberalised Use Licence

2.57 The assignment (i.e. Transfer or Lease) of rights and obligations of a MBSA2 Liberalised Use Licence will be permitted.

2.58 In relation to any such assignment of rights and obligations, among other things, it is a condition of the MBSA2 Liberalised Use Licence that the Licensee shall:

- notify ComReg of its intention to transfer some or all of its rights of use of radio frequencies attached to its MBSA2 Liberalised Use Licence;
- only transfer the rights of use for radio frequencies attached to its MBSA2 Liberalised Use Licence in accordance with the Transfer Regulations⁵⁰;
- notify ComReg of its intention to lease any rights of use for radio frequencies attached to its MBSA2 Liberalised Use Licence;
- only lease the rights of use for radio frequencies attached to its MBSA2 Liberalised Use Licence in accordance with such procedures as may be specified by ComReg under Regulation 19 of the Framework Regulations;
- not, without the prior consent of ComReg (which shall not be unreasonably withheld), lease any rights of use for radio frequencies attached to its MBSA2 Liberalised Use Licence; and

⁴⁹ Should a Licensee notify ComReg that it could cease using one technology in favour of another within a time period shorter than 6 months, such a proposal would be assessed by ComReg at the relevant time in light of its statutory functions, objectives and duties, considering, among other things, how consumer disruption would be minimised.

⁵⁰ S.I. No. 34 of 2014. These regulations provide for the transfer of spectrum rights of use in the RSPB bands, which include the 2.1 GHz and 2.6 GHz Bands, but do not presently include the 700 MHz Duplex or 2.3 GHz Band. However, ComReg intends to amend these regulations to include the 700 MHz Duplex and 2.3 GHz Band.

See also ComReg Document 14/11r for the current "Procedures and Guidelines, and Notification Form(s)" of the Spectrum Transfer and Lease Framework in Ireland

- ensure that, if the address of the Licensee or its Transferee or Lessee changes, the Licensee, Transferee or Lessee shall, as soon as possible, but in any event within 28 calendar days, notify ComReg in writing of the change.

2.59 It should be noted that the Transfer Regulations do not apply to spectrum transfers forming part of a merger or acquisition which is required to be notified to the Competition and Consumer Protection Commission in accordance with Part 3 of the Competition Act 2002 (as amended) or to the European Commission in accordance with Council Regulation (EC) No 139/2004.

Provision of updated information for Part 2 and Part 3 of the Licence

2.60 Part 2 and Part 3 of the MBSA2 Liberalised Use Licence details the Apparatus to which the Licence relates and the location of each Apparatus.

2.61 It is a condition of the MBSA2 Liberalised Use Licence that the Licensee shall submit up to date information to ComReg in respect of Parts 2 and 3 of its MBSA2 Liberalised Use Licence in advance of its Licence commencement date and on or before 14 February each calendar year that the Licence is in force.

2.62 It is ComReg's intention to publish details of MBSA2 Liberalised Use Licences, including information contained in Part 2 and Part 3, on its website subject to the assessment of confidential information in line with ComReg Document 05/24.

Payment of fees

2.63 It is a condition of a MBSA2 Liberalised Use Licence that the Licensee shall make payment of all applicable fees as detailed in the MBSA2 Licence Regulations.

2.3.5 MBSA2 Liberalised Use Licence Technical Conditions

2.64 This section outlines the technical conditions which apply to a MBSA2 Liberalised Use Licence, including:

- those applicable to each band in the Award Spectrum, including that only terrestrial systems compatible with the relevant EC Decisions and ECC Decision are worked and used in the Award Spectrum;

- compliance with the European Union (Radio Equipment) Regulations 2017⁵¹ and the European Communities (Electromagnetic Compatibility) Regulations 2017⁵²; and
- compliance with planning arrangements agreed in all memoranda of understanding (“MoU”) between ComReg and its neighbouring administrations, particularly with Ofcom (or its successor) in the UK, in relation to the Award Spectrum⁵³.

700 MHz Duplex

- 2.65 The technical conditions for a MBSA2 Liberalised Use Licence for 700 MHz Duplex Blocks are detailed in Section 2 of Part 4 of Schedule 1 of the MBSA2 Licence Regulations.
- 2.66 The conditions are in accordance with the parameters set out in the Annex to EC Decision 2016/687/EU and, among other things, require a Licensee in the 700 MHz Duplex to:
- ensure that the in-block radiated power from a base station transmitter in the downlink direction does not exceed 64 dBm / 5 MHz EIRP;
 - comply with the out-of-block Block Edge Mask (BEM) as specified in Section B of the Annex to EC Decision 2016/687/EU; and
 - provide protection to the frequency range 470 – 694 MHz where a Licensee wins more than 2 × 10 MHz in the 700 MHz Duplex and if this assignment is deployed starting at 703 MHz.

2.1 GHz Band

- 2.67 The technical conditions for a MBSA2 Liberalised Use Licence for 2.1 GHz Band Blocks are detailed in Section 2 Part 4 of Schedule 1 of the MBSA2 Licence Regulations.
- 2.68 The conditions are in accordance with the parameters set out in EC Decision 2012/688 as amended by EC Decision 2020/667⁵⁴ and, among other things,

⁵¹ S.I. No. 248/2017 - European Union (Radio Equipment) Regulations 2017.

⁵² S.I. No. 69/2017 - European Communities (Electromagnetic Compatibility) Regulations 2017.

⁵³ MoU's are available on the ComReg website under [International Spectrum Coordination](#), available at www.comreg.ie.

⁵⁴ European Commission Implementing Decision (EU) 2020/667, available at: <https://eur-lex.europa.eu/legalcontent/EN/TXT/PDF/?uri=CELEX:32020D0667&from=EN>

require a Licensee in the 2.1 GHz Band to:

- ensure that the in-block radiated power from a base station transmitter in the downlink direction does not exceed:
 - 64 dBm / 5 MHz EIRP per antenna for non-AAS⁵⁵; and
 - 57 dBm / 5MHz TRP per cell⁵⁶ for AAS⁵⁷
- comply with the out-of-block Block Edge Mask (BEM) as specified in the Section C of the Annex to EC Decision 2012/688 as amended by EC Decision 2020/667.

2.3 GHz Band

2.69 The technical conditions for a MBSA2 Liberalised Use Licence for 2.3 GHz Band Blocks are detailed in Section 2 of Part 4 of Schedule 1 of the MBSA2 Licence Regulations.

2.70 As there is no relevant EC decision for this band, the technical conditions for the 2.3 GHz Band are in accordance with the parameters set out in the Annex to ECC Decision (14)02 and, among other things, require a Licensee in the 2.3 GHz Band to:

- comply with the TDD Inter-Licensee Synchronisation Procedure as set out in Section 3 of Part 4 of Schedule 1 of the MBSA2 Licence Regulations;
- ensure that the in-block radiated power from a base station transmitter in the downlink direction for the 2.3 GHz Band Generic Frequency Blocks does not exceed 68 dBm / 5 MHz EIRP per antenna;

⁵⁵ “Non-Active Antenna Systems” or “non-AAS” means a Base Station and an antenna system that provides one or more antenna connectors, which are connected to one or more separately designed passive antenna elements to radiate radio waves. The amplitude and phase of the signals to the antenna elements is not continually adjusted in response to short term changes in the radio environment.

⁵⁶ In a multi-sector base station, the AAS radiated power limit applies to each one of the individual sectors.

⁵⁷ “Active Antenna Systems” or “AAS” means a Base Station and an antenna system where the amplitude and/or phase between antenna elements is continually adjusted resulting in an antenna pattern that varies in response to short term changes in the radio environment. This excludes long-term beam shaping such as fixed electrical down tilt. In AAS Base Stations, the antenna system is integrated as part of the Base Station system or product.

- ensure that the in-block radiated power from a base station transmitter in the downlink direction for the 2.3 GHz Band Fixed Frequency Block does not exceed 45 dBm / 5MHz EIRP; and
- comply with the out-of-block BEM as specified in Section A2.1 of Annex 2 fo the ECC Decision (14)02.

2.71 A Licensee which obtains Spectrum Blocks in the range 2305 to 2330 MHz is required to coordinate with any MBSA2 2.3 GHz Band Transition Licensee before the deployment of base stations within the coordination area⁵⁸ identified in Document 20/122b (as may be updated by ComReg). This coordination will be required until the MBSA2 2.3 GHz Band Transition Licensee completes its Transition Activities (which will be specified in a Transition Plan/s).

2.6 GHz Band

2.72 The technical conditions for a MBSA2 Liberalised Use Licence for 2.6 GHz Band FDD Blocks, 2.6 GHz Band TDD Fixed Frequency Block (Lower), 2.6 GHz Band TDD Generic Frequency Blocks and 2.6 GHz Band TDD Fixed Frequency Block (Upper) are detailed in Section 2 of Part 4 of Schedule 1 of the MBSA2 Licence Regulations.

2.73 The conditions are in accordance with the parameters set out in the Annex to EC Decision 2008/477/EU as amended by EC Decision 2020/636⁵⁹ and, among other things, require a Licensee to:

- operate an FDD duplex mode of operation within the 2.6 GHz Band FDD Blocks;
- operate a TDD, base station transmission only or terminal station transmission only mode of operation, as appropriate, within the 2570 – 2620 MHz frequency range;
- ensure that the in-block radiated power from a base station transmitter in the downlink direction in any 2.6 GHz Band FDD Blocks, any 2.6 GHz Band TDD Generic Frequency Blocks, and the 2.6 GHz Band TDD Fixed Frequency Block (Upper)⁶⁰ assigned to a Licensee does not exceed:

⁵⁸ Up-to-date .SHP file describing the coordination area is available at the ComReg Spectrum Awards Page see <https://www.comreg.ie/industry/radio-spectrum/spectrum-awards/>

⁵⁹ European Commission Implementing Decision 2020/636/EU, available at: <https://eur-lex.europa.eu/legalcontent/EN/TXT/PDF/?uri=CELEX:32020D0636&from=en>

⁶⁰ The 2.6 GHz Band TDD Fixed Frequency Block (Upper), which is immediately adjacent to the FDD downlink, may suffer an increased risk of interference due to the emissions from the FDD downlink.

- 68 dBm / 5 MHz EIRP per antenna for Non-AAS; and
 - 60 dBm / 5 MHz TRP per cell for AAS;
- ensure that the in-block radiated power from a base station transmitter in the downlink direction in the 2.6 GHz Band TDD Fixed Frequency Block (Lower) assigned to a Licensee does not exceed:
 - 25 dBm / 5 MHz EIRP per antenna for Non-AAS; and
 - 22 dBm / 5 MHz TRP limit per cell for AAS;
- comply with the out-of-block BEMs as specified in the Annex to EC Decision 2008/477 as amended by EC Decision 2020/636;
- comply with the inter-Licensee synchronisation procedure as set out in Section 3 of Part 4 of Schedule 1 of the MBSA2 Licence Regulations; and
- ensure protection of all aeronautical primary radars operating in the 2700 – 2900 MHz frequency range by complying with the technical conditions detailed in the MBSA2 Licence Regulations. These include a coordination zone of 1 km around each radar location⁶¹, in-band power flux density (pfd) limits, and out-of-band pfd limits⁶².

Radio Equipment Regulations

2.74 All radio equipment placed on the Irish market or put into service must comply with the European Union (Radio Equipment) Regulations 2017⁶³. It is a function of ComReg to ensure compliance with these regulations, which includes defining the regulated interface requirements for radio services in Ireland (currently set out in Document 06/47R⁶⁴).

2.75 It is a condition of a MBSA2 Liberalised Use Licence that the Licensee shall

⁶¹ Current Aeronautical Primary Radar locations and technical parameters are detailed in Plum Reports, ComReg Documents 20/122b, 19/124c and 19/59c. The technical conditions shall apply to all current, new and amended radar locations.

⁶² As noted in footnote 181 of Document 20/122, as these pfd limits may vary depending on the number of Licensees in the 2.6 GHz Band and the quantum of spectrum assigned to each Licensee in the downlink part of the 2.6 GHz Band (2570 – 2690 MHz), the pfd limit per Licensee is derived by the formulae set out in the MBSA2 Licence Regulations.

⁶³ S.I. No. 248/2017, giving effect to Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 and to Regulation (EC) No 765/2008 of 9 July 2008.

⁶⁴ Interface Requirements for Radio Services in Ireland – ComReg Document 06/47R. <https://www.comreg.ie/publication-download/interface-requirements-for-radio-services-in-ireland>

ensure that:

- Apparatus complies with relevant radio interface specifications set out in Document 06/47R (as may be amended from time to time); and
- Apparatus, or any part thereof, complies with the European Union (Radio Equipment) Regulations 2017, including ensuring that:
 - any electromagnetic disturbance generated by any Apparatus does not exceed the level above which it may cause interference with any other lawful radio and telecommunications equipment or apparatus for wireless telegraphy; and
 - any radio and telecommunications equipment or other apparatus for wireless telegraphy supplied by a Licensee, or any installations constructed by a Licensee, shall be appropriately immune to electromagnetic interference.

Guard bands

2.76 In the Award Spectrum, there are no guard bands created by ComReg between adjacent Licensees. Bidders should therefore identify any guard band requirements that their choice of technology may require and should bid accordingly.

2.3.6 Fees for a MBSA2 Liberalised Use Licence

2.77 The fee for a MBSA2 Liberalised Use Licence consists of:

- (i) a once-off, upfront **Spectrum Access Fee (“SAF”)**, which is paid by a Winning Bidder at the conclusion of the Award Process and prior to the grant of the Licence; and
- (ii) an annual **Spectrum Usage Fee (“SUF”)** which is an index-linked fee that is paid at defined intervals over the duration of the Licence⁶⁵.

2.78 Licences granted on foot of this Award Process are not subject to Value Added Tax (“VAT”). However, if the VAT rules should change over the duration of the Licences so as to require the application of VAT to such fees, then VAT would be applied as appropriate and, in submitting an Application, Applicants acknowledge and accept same.

⁶⁵ For the avoidance of doubt, because the commencement date of each particular Licence may be different, the date on which the first SUF falls due, may be different for different Licensees.

Spectrum Access Fee

2.79 The SAF payable by a Winning Bidder for a MBSA2 Liberalised Use Licence in the Notification and Grant Stage is an upfront fee that comprises:

- the Base Price associated with the Winning Bid for that Winning Bidder, payable for winning Lots in the Main Stage of the Award Process; and
- the sum of the Additional Prices for that Winning Bidder, if any, payable for the assignment of B-Lots as a result of the Assignment Stage of the Award Process.

2.80 The **Base Price** for a Winning Bidder is determined as follows:

- where the Main Stage of the Award Process is not required, the Base Price is the sum of the Reserve Prices for all Lots to be included in the Licence. Table 11 and Table 12 below set out the Reserve Prices per Lot for each Lot Category;
- where the Main Stage of the Award Process is required, the Base Price is determined by the Main Stage of the Auction as detailed in Chapter 4 of this document. The Base Price will be no less than the sum of the Reserve Prices for all Lots to be included in the Licence.

Table 11: Reserve Price per 700 MHz Duplex Lot

Lot Category	Reserve Price (€)
B700	9,158,000

Table 12: Reserve Prices per Lot per Time Slice

Lot Category	Reserve Price (€) for Time Slice 1 (“/1”)	Reserve Price (€) for Time Slice 2 (“/2”)
B2.1	1,398,000	3,188,000
B2.3	163,000	319,000
A2.3	197,000	285,000
B2.6F	326,000	638,000
A2.6TL	25,000	35,000
B2.6T	163,000	319,000
A2.6TU	25,000	35,000

2.81 For each band, the **Additional Price** for a Winning Bidder, if any, is the price

associated with the assignment of specific Lots within the band to this Winning Bidder as determined in the Assignment Stage of this Award Process. This price will be determined using the methodology as detailed in Chapter 4.

Spectrum Usage Fees

- 2.82 The SUF is an index-linked fee that is paid at defined intervals over the duration of the Licence. For a MBSA2 Liberalised Use Licence, the total annual SUF is the sum of the SUFs associated with each Lot included in the Licence.
- 2.83 SUFs are index-linked to the overall Consumer Price Index⁶⁶ (“CPI”) as published by the Central Statistics Office⁶⁷ of Ireland (or its successor). As the CPI may vary over time, the SUF per Lot may increase or decrease over the duration of the Licence.
- 2.84 The annual SUF before CPI Adjustment per Lot type is set out in Table 13 and Table 14 below.

Table 13: Annual SUF before CPI Adjustment per 700 MHz Duplex Lot

Lot Category	Annual SUF before CPI Adjustment (€)
B700	998,931

⁶⁶ If the CPI data ceases to be published or if the method of its calculation changes fundamentally, ComReg reserves the right to select another appropriate index and to amend the method of calculating indexing accordingly.

⁶⁷ See <http://www.cso.ie>.

Table 14: Annual SUF before CPI Adjustment per Lot (excluding 700 MHz Duplex Lot)

Lot Category	Annual SUF before CPI Adjustment (€) for Time Slice 1 (“/1”)	Annual SUF before CPI Adjustment (€) for Time Slice 2 (“/2”)
B2.1	525,753	525,753
A2.3	52,575	52,575
B2.3	52,575	52,575
B2.6F	105,151	105,151
A2.6TL	5,000	5,000
A2.6TU	5,000	5,000
B2.6T	52,575	52,575

- 2.85 The CPI Adjustment for a SUF is calculated using 14 February 2022 as the base date for the CPI (i.e. CPI = 100). When calculating the CPI adjustment for the SUF, ComReg will use the most current CPI data available to it at that time. For example, for 14 February, ComReg envisages that the most up to date CPI data available is likely to be from January of that year.
- 2.86 The first SUF is to be paid by a Winning Bidder in advance of Licence commencement and for the spectrum rights of use that commence within 1 year of that Licence commencement date. Thereafter annual SUFs are to be paid on or before 14 February each calendar year for the duration of the Licence for the spectrum rights of use licensed in that year.
- 2.87 Where rights of use for radio frequencies are granted for a period that includes part of a whole year (i.e. less than 365 days⁶⁸), the SUF for that part of the year shall be calculated using the above methodology and adjusted on a linear pro-rata daily basis.

Arrangements for Paying Fees

- 2.88 The Licence fees for a MBSA2 Liberalised Use Licence are to be paid into ComReg’s bank account, the details of which will be made available to

⁶⁸ Or less than 366 days in the case of a whole year period which includes a 29 February during a leap year.

Licensees as appropriate⁶⁹.

- 2.89 Where the due date for payment of a fee is not a Working Day, payment shall be made on or before the Working Day immediately preceding that due date.
- 2.90 As set out in Section 3.7 of this document, a Winning Bidder which fails to pay the SAF and/or applicable first SUF by the applicable due date/s may forfeit its Deposit and its entitlement to be granted the Licence concerned. Any such forfeiture of a Deposit or non-granting of a Licence will not prejudice ComReg's entitlement to recover the full amount of the SAF and/or first SUF as a simple contract debt.
- 2.91 Where a Licensee has already been granted a MBSA2 Liberalised Use Licence, failure by a Licensee to make a Licence fee payment on or before the date it falls due constitutes non-compliance by the Licensee with its Licence conditions and ComReg may take steps to recover the sum due. This is without prejudice to its right to take compliance actions in accordance with its statutory powers, including those set out in the Authorisation Regulations (see also under Section 2.3.8 below).
- 2.92 A Licensee shall pay interest on any fee or part thereof that has not been paid by its due date and is outstanding⁷⁰. The applicable interest rate shall be that which applies to late payments in commercial transactions under the European Communities (Late Payment in Commercial Transactions) Regulations 2012 (S.I. No. 580/2012), as amended. The applicable time period for any interest payment shall run from the date on which the full / partial fee fell due to the date on which the full / partial fee is paid.
- 2.93 An amount payable by a Licensee in respect of an outstanding Licence fee may be recovered by ComReg from the Licensee as a simple contract debt in any court of competent jurisdiction.

2.3.7 Refunds or Adjustments of Licence Fees

- 2.94 As noted in Section 2.3.3 of this document, in limited circumstances ComReg may refund or adjust Licence fees payable by Winning Bidders due to the delayed commencement of Lots.
- 2.95 The refund or adjustment of fees payable to a Winning Bidder for each Lot so

⁶⁹ ComReg may amend the details of the account to which the Licence fees shall be paid and this will be notified to the Licensee as required.

⁷⁰ For the avoidance of doubt, any fees paid in respect of late payment are not subject to refunds or adjustments as discussed in Section 2.3.7.

delayed shall be calculated as follows:

- a pro-rata portion of the SAF already paid by the Winning Bidder on a daily basis for each whole day following the commencement dates as set out in Section 2.3.3 that ComReg does not make spectrum rights of use in the Lot available⁷¹; and
 - a linear pro-rata portion of relevant SUFs already paid by the Winning Bidder on a daily basis for each whole day following the commencement dates as set out in Section 2.3.3 that ComReg does not make the Lot available for use.
- 2.96 The pro-rata portion of the SAF already paid will be determined using a discounted cashflow approach that calculates the daily value for each Lot so delayed by assuming a flat cash flow and applying a relevant discount rate⁷².
- 2.97 ComReg currently intends to use all monies received from each Applicant/Bidder to purchase NTMA⁷³ Exchequer Notes.⁷⁴ Interest, if earned⁷⁵, less any financial fees and related taxation, if applicable, will be paid by ComReg to the Winning Bidder on refunds of any such monies.
- 2.98 For each month following the commencement dates as set out in Section 2.3.3, refunds to the Winning Bidder will be paid by ComReg within 5 Working Days of the end of the month or, if desired by the Winning Bidder, these refunds can be offset against the following year's SUF (or multiple years' SUF). For the avoidance of doubt:
- no refund of the SAF and/or SUFs, including interest, if earned, shall be payable by ComReg to any Winning Bidder for any delay to the availability of any Lot caused, or contributed to, by acts or omissions of that Winning Bidder, its servants or agents, or any failure on behalf of its suppliers;

⁷¹ To calculate the SAF associated with a Lot in a MBSA2 Liberalised Use Licence, ComReg will use the Round Prices in the final Primary Bid Round and other relevant information.

⁷² The real discount rate will be based on the annual mobile nominal WACC of 5.85% per annum and assumed annual inflation of 1.5% per annum for the part of the Licence term still in the future, giving a real discount rate of 4.35% per annum.

⁷³ National Treasury Management Agency.

⁷⁴ However, ComReg reserves the right to manage all monies held in accordance with good treasury management.

⁷⁵ The current rate of interest on NTMA Exchequer Notes is zero per cent. However, the rate of interest associated with the NTMA Exchequer Notes could be a negative rate. For the avoidance of doubt, ComReg reserves the rights to calculate the refund paid to the Winning Bidder to be less the amount of negative interest accrued over the period a Deposit has been held by ComReg. See also Section 3.3.4 below.

- in submitting an Application, an Applicant agrees that if it becomes a Winning Bidder, a failure to obtain consents, approvals, Apparatus or funding necessary to deploy a network or complete its Transition Activities as provided for under Section 3.8 of this document shall be deemed to be an omission on behalf of that Winning Bidder; and
- to the extent permitted by law, ComReg's liability for damage or loss of any nature arising from delayed access to Lots is expressly limited to the refunds or adjustments identified above and, in submitting an Application, an Applicant agrees to same.

Other Refunds of Licence Fees

2.99 Where a Licensee requests an amendment to its Licence which is accepted by ComReg and which results in a reduction in the:

- quantum of rights of use for radio frequencies held under the Licence⁷⁶;
or
- duration of one or more Spectrum Blocks held under the Licence,

the Licensee shall not be entitled to any refund of the applicable SAF but shall be entitled to a refund in respect of the excess of any SUF already paid.

2.100 A Licensee who surrenders any Spectrum Blocks held under its Licence will not be liable for any SUFs in respect of such surrendered Spectrum Blocks, beyond the date upon which the Licensee ceases to have use of those Spectrum Blocks under its amended Licence.

2.101 Where a Licence is amended, surrendered, or withdrawn following an enforcement action by ComReg, ComReg will not refund any fees (SAF or SUFs) already paid by the Licensee concerned in respect of such Licence.

Relocation Rebate

2.102 Where Eir, in relation to its Existing 2.1 GHz Band Licence, incurs Relocation costs as a result of the Assignment Stage that it otherwise would not have incurred, these costs qualify for a rebate under the relocation costs rules and methodology as set out in Annex 13 of this document.

2.3.8 Enforcement Actions – Compliance with Licence Conditions, Licence Suspension and Licence Withdrawal

2.103 ComReg will enforce conditions attached to Licences in accordance with its

⁷⁶ That is, a reduction in the Licensee's assigned quantum of rights of use in the Award Spectrum.

statutory powers, including those set out in the Authorisation Regulations.

2.104 A Licence may be suspended or withdrawn in accordance with the Authorisation Regulations.

2.105 If enforcement action by ComReg results in the suspension, withdrawal, or foreshortening of a Licence or part thereof, ComReg will not refund any fees (SAF or SUFs) already paid by the Licensee concerned in respect of such Licence.

2.3.9 Amending a MBSA2 Liberalised Use Licence

2.106 ComReg may amend any of the rights, obligations, conditions, and procedures relating to a Licence from time to time and in accordance with the Authorisation Regulations.

2.3.10 Other Considerations

Potential Collaboration Agreements between Wireless Operators

2.107 ComReg's most recent consideration of the issues associated with potential collaboration agreements between wireless operators (such as spectrum pooling, spectrum sharing and network sharing) is set out in Section 7.4.2 of its Radio Spectrum Management Strategy – 2016 to 2018 (Document 16/50).

2.4 The MBSA2 Preparatory Licences – Terms and Conditions

2.108 Winning Bidders will be entitled to apply for a MBSA2 Preparatory Licence, which will allow the holders of such licences to install networks and associated equipment in advance of the commencement date of their MBSA2 Liberalised Use Licence, but will not allow any wireless telegraphy transmissions⁷⁷.

2.109 The following outlines the principal terms and conditions associated with a MBSA2 Preparatory Licence. These terms and conditions are set out in the MBSA2 Licence Regulations.

2.4.1 Entitlement to Apply for a MBSA2 Preparatory Licence

2.110 In accordance with the rules for the Notification and Grant Stage as discussed

⁷⁷ If a licensee wishes to test equipment then they must apply for a separate test licence as applicable.

in Section 3.7 of this Information Memorandum, Winning Bidders will be entitled to apply for a MBSA2 Preparatory Licence.

2.4.2 Scope of a MBSA2 Preparatory Licence

2.111 A MBSA2 Preparatory Licence allows the Licensee to keep and have possession of, install and maintain Apparatus for terrestrial systems capable of providing electronic communications services in the Award Spectrum. It is a condition of a MBSA2 Preparatory Licence that the Licensee shall not work or use said Apparatus⁷⁸.

2.112 It is a Non-exclusive Licence for the national territory of the State and all Apparatus licensed under the MBSA2 Preparatory Licence is required to comply with, among other things, the relevant EC or ECC decisions, including:

- EC Decision 2016/687 in respect of the 700 MHz Duplex;
- EC Decision 2012/688, as amended by EC Decision 2020/667, in respect of the 2.1 GHz Band;
- ECC Decision 14(02) in respect of the 2.3 GHz Band; and
- EC Decision 2008/477, as amended by EC Decision 2020/636, in respect of the 2.6 GHz Band.

2.4.3 MBSA2 Preparatory Licence – Duration and Renewal

2.113 The duration of a MBSA2 Preparatory Licence is set by reference to its commencement and expiry dates.

2.114 Before a MBSA2 Preparatory Licence will be granted to a Winning Bidder, it must pay the SAF associated with its MBSA2 Liberalised Use Licence (see also Section 2.4.5 below in respect of the administrative fee). Consequently, the commencement date of a MBSA2 Preparatory Licence will be defined by reference to the timing of the Award Process and the Notification and Grant Stage as discussed in Section 3.7 of this document.

2.115 The expiry date of a MBSA2 Preparatory Licence will be set by reference to the earliest commencement date of a Spectrum Block in each of the Award Spectrum bands to be included in the Licensee's MBSA2 Liberalised Use Licence.

⁷⁸ If a Licensee wishes to test equipment, they must apply separately to ComReg for a test licence (see <https://testandtrial.ie/> in that regard).

2.4.4 Licence Conditions Applicable to all MBSA2 Preparatory Licences

2.116 The conditions associated with a MBSA2 Preparatory Licence are set out in Regulation 6 and Schedule 3 of the MBSA2 Licence Regulations.

2.4.5 Fees for a MBSA2 Preparatory Licence

2.117 An administrative fee of €100.00 will be payable to ComReg prior to the issue of a MBSA2 Preparatory Licence.

2.118 In addition, before a MBSA2 Preparatory Licence will be issued, Winning Bidders must pay the SAF associated with its MBSA2 Liberalised Use Licence.

2.4.6 Enforcement Actions – Compliance with Licence Conditions, Licence Suspension and Licence Withdrawal

2.119 ComReg will enforce conditions attached to a MBSA2 Preparatory Licence in accordance with its statutory powers, including those set out in the Authorisation Regulations.

2.120 A MBSA2 Preparatory Licence may be suspended or withdrawn in accordance with the Authorisation Regulations.

2.4.7 Amendment of a MBSA2 Preparatory Licence

2.121 ComReg may amend the rights, obligations and procedures relating to a MBSA2 Preparatory Licence from time to time in accordance with the Authorisation Regulations.

2.5 MBSA2 2.3 GHz Band Transition Licence – Terms and Conditions

2.122 Following the Award Process, if an Existing 2.3 GHz Band Licensee⁷⁹ wishes to continue to provide services in the 2.3 GHz Band along with the corresponding paired spectrum in the 2.4 GHz Band⁸⁰ it will need to apply for a MBSA2 2.3 GHz Band Transition Licence and may be required to make adjustments to its existing network (referred to as “Transition Activities”) in order to comply with the outcome of the Award Process.

⁷⁹ Eir is currently the only Existing 2.3 GHz Band Licensee.

⁸⁰ The corresponding pairing of the 2.3 GHz Point to Multi-Point links operate in the 2.4 GHz Band.

2.123 Subject to certain conditions, an Existing 2.3 GHz Band Licensee will be able to apply for a MBSA2 2.3 GHz Band Transition Licence to facilitate the timely and orderly completion of its Transition Activities in line with the Transition Plan for an Existing 2.3 GHz Band Licensee as provided for in Section 3.8 of this document.

2.124 The following describes the principal terms and conditions associated with the MBSA2 2.3 GHz Band Transition Licence, which are set out in the MBSA2 Licence Regulations.

2.5.1 Entitlement to apply for a MBSA2 2.3 GHz Band Transition Licence

2.125 To be entitled to apply for a MBSA2 2.3 GHz Band Transition Licence, the following preconditions apply, namely that the undertaking:

- is an Existing 2.3 GHz Band Licensee; and
- agrees to take appropriate measures that will ensure the migration of its RurTel customers to an alternative platform/s in a timely, efficient and orderly manner.

2.126 An undertaking will only be able to apply for a MBSA2 2.3 GHz Band Transition Licence for Point to Multi-Point Radio Links as specified in Parts 1 and 2 of Schedule 4 of the MBSA2 Licence Regulations. A Point to Multi-Point Radio Link in a MBSA2 2.3 GHz Band Transition Licence shall only be licensed for the corresponding duplex frequencies, and for equipment with the same functionality, as currently licensed under the undertaking's Existing 2.3 GHz Band Licence(s).

2.5.2 Scope of a MBSA2 2.3 GHz Band Transition Licence

2.127 A MBSA2 2.3 GHz Band Transition Licence allows the Licensee to keep and have possession of, install, maintain, work and use Apparatus for Point to Multi-Point Radio Links for the provision of RurTel Services in the 2.3 GHz Band and 2.4 GHz Band.

2.128 A MBSA2 2.3 GHz Band Transition Licence is also a Non-exclusive Licence for Point to Multi-Point Radio Links as specified in Parts 1 and 2 of that Licence and all Apparatus licensed under a MBSA2 2.3 GHz Band Transition Licence is required to comply with, among other things, the conditions in the Licence and the MBSA2 Licence Regulations.

2.5.3 MBSA2 2.3 GHz Band Transition Licence – Duration and Renewal

- 2.129 The duration of the MBSA2 2.3 GHz Band Transition Licence is set by reference to its commencement and expiry dates.
- 2.130 The commencement date of a MBSA2 2.3 GHz Band Transition Licence will be 14 February 2022, or such other date as determined by ComReg.
- 2.131 The expiry date of a MBSA2 2.3 GHz Band Transition Licence will be determined by ComReg by reference to the completion of the Licensee's Transition Activities.
- 2.132 Once issued, the duration of a MBSA2 2.3 GHz Band Transition Licence may be amended by ComReg in accordance with the provisions of the Authorisation Regulations.

2.5.4 Licence Conditions Applicable to all MBSA2 2.3 GHz Band Transition Licences

- 2.133 The terms and conditions of a MBSA2 2.3 GHz Band Transition Licence will be similar to those for the Existing 2.3 GHz Band Licence, except that:
- the duration and the frequency assignment for each Point to Multi-Point Radio Link in the Licence will be determined and amended by ComReg, as appropriate, in order to facilitate the completion of any Transition Plan in the 2.3 GHz Band; and
 - the Licensee will be subject to any co-channel inter-operator coordination procedure determined by ComReg.
- 2.134 The conditions associated with a MBSA2 2.3 GHz Band Transition Licence are set out in Regulation 6 and Schedule 4 of the MBSA2 Licence Regulations. Among other things, the MBSA2 Licence Regulations sets out conditions requiring that the Apparatus, or any part thereof, also complies with the provisions of the European Union (Radio Equipment) Regulations 2017.
- 2.135 It is also a condition of a MBSA2 2.3 GHz Band Transition Licence that the Licensee submit up to date information to ComReg in respect of Parts 1 and Part 2 of its MBSA2 2.3 GHz Band Transition Licence in advance of its Licence commencement date and on or before 14 February for each calendar year that the Licence is in force.
- 2.136 It is ComReg's intention to publish details of MBSA2 2.3 GHz Band Transition Licences, including information contained in Part 1 and Part 2, on its website

subject to the assessment of confidential information in line with ComReg Document 05/24.

2.5.5 Fees for a MBSA2 2.3 GHz Band Transition Licence⁸¹

2.137 The annual fee per Point to Multi-Point Radio Link in a MBSA2 2.3 GHz Band Transition Licence shall be calculated on the basis of:

$$A \times (B/100) = C$$

where:

- A is €4,000, namely the relevant annual fee for a Point to Multi-Point Radio Link operating on a frequency greater than or equal to 1 GHz and less than 17 GHz and with a bandwidth of less than or equal to 3.5 MHz, as set out in Schedule 2 of the Wireless Telegraphy (Radio Link Licence) Regulations, 2009 (S.I. No 370 of 2009) on the basis of Table 1 thereof;
- B is the CPI relevant to the period from a baseline date of September 2009 (where CPI = 100) to the date of making of the Wireless Telegraphy (Liberalised Use and Related Licences in the 700 MHz Duplex, 2.1 GHz, 2.3 GHz and 2.6 GHz Bands) Regulations 2021⁸²; and
- C is the appropriate fee to be paid.

2.138 Where spectrum rights for a Point to Multi-Point Radio Link are granted for a portion of a year in a MBSA2 2.3 GHz Band Transition Licence, the fee to be paid by the Licensee for that Point to Multi-Point Radio Link shall be calculated as follows:

$$C \times (D/12) = E$$

where:

- C is the relevant annual fee for the Point to Multi-Point Radio Link as set out above;
- D is the number of whole months for which the spectrum rights for the Point to Multi-Point Radio Link are granted (if granted for a period of less than one month then, for the purpose of these calculations only, they shall be considered as a being granted for a period of one month); and
- E is the appropriate fee to be paid.

⁸¹ By way of background, readers are referred to Section 9.3.2 of Document 19/59R (and as also summarised in paragraphs 8.26 – 8.27 of Document 19/124 and Section 9.1.5 of Document 20/122).

⁸² The Consumer Price Index for this period will be calculated using the most current CPI data available from the CSO at the time of making the MBSA2 Licence Regulations.

- 2.139 Where the spectrum rights of use in the 2307 - 2327 MHz frequency range for a Point to Multi-Point Radio Link in a MBSA2 2.3 GHz Band Transition Licence are fully licensed to the Licensee in its MBSA2 Liberalised Use Licence, the relevant fees for that Point to Multi-Point Radio Link shall be reduced by 50%.
- 2.140 Additionally, before a MBSA2 2.3 GHz Band Transition Licence will be issued, a Winning Bidder must pay the SAF associated with its MBSA2 Liberalised Use Licence (if applicable).
- 2.141 ComReg may refund or adjust Licence fees payable by a MBSA2 2.3 GHz Band Transition Licensee. Where the duration of a Point to Multi-Point Radio Link in a MBSA2 2.3 GHz Band Transition Licence is reduced (e.g. following decommissioning of the Point to Multi-Point Radio Link), the Licensee may be entitled to a refund of the annual fee already paid in the relevant year, on a linear pro rata daily basis having regard to the reduced duration.

2.5.6 Enforcement Actions – Compliance with Licence Conditions, Licence Suspension and Licence Withdrawal

- 2.142 ComReg will enforce conditions attached to a MBSA2 2.3 GHz Band Transition Licence in accordance with its statutory powers, including those set out in the Authorisation Regulations.
- 2.143 A MBSA2 2.3 GHz Band Transition Licence may be suspended or withdrawn in accordance with the Authorisation Regulations.
- 2.144 In the event that enforcement action by ComReg results in the suspension, withdrawal (or foreshortening) of a MBSA2 2.3 GHz Band Transition Licence, no Licence fees paid in connection with that MBSA2 2.3 GHz Band Transition Licence will be refundable.

2.5.7 Amendment of a MBSA2 2.3 GHz Band Transition Licence

- 2.145 ComReg may amend the rights, obligations and procedures relating to a MBSA2 2.3 GHz Band Transition Licence from time to time in accordance with the Authorisation Regulations.

2.6 The MBSA2 Spectrum Lease Licence

- 2.146 The purpose of the MBSA2 Spectrum Lease Licence is to facilitate the leasing of spectrum rights in the Award Spectrum in accordance with such procedures as may be specified by ComReg under Regulation 19 of the Framework

Regulations⁸³.

2.147 The following describes the principal terms and conditions associated with the MBSA2 Spectrum Lease Licence. These terms and conditions are set out in Schedule 2 of the MBSA2 Licence Regulations.

2.6.1 Entitlement to apply for a MBSA2 Spectrum Lease Licence

2.148 A MBSA2 Spectrum Lease Licence may be applied for in accordance with such procedures as may be specified by ComReg under Regulation 19 of the Framework Regulations.

2.6.2 Scope of the MBSA2 Spectrum Lease Licence

2.149 A MBSA2 Spectrum Lease Licence allows the Licensee to keep and have possession of, install, maintain, work and use Apparatus for terrestrial systems capable of providing ECS in the Award Spectrum.

2.150 A MBSA2 Spectrum Lease Licence is a Non-exclusive Licence for one or more specific areas of the State as set out in the schedule to same, and all Apparatus licensed under the MBSA2 Spectrum Lease Licence are required to comply with, among other things, the relevant EC and ECC decisions, including:

- EC Decision 2016/687 in respect of Lots available in the 700 MHz Duplex;
- EC Decision 2012/688, as amended by EC Decision 2020/667, in respect of Lots available in the 2.1 GHz Band;
- ECC Decision 14(02) in respect of Lots available in the 2.3 GHz Band; and
- EC Decision 2008/477, as amended by EC Decision 2020/636, in respect of Lots available in the 2.6 GHz Band.

2.6.3 MBSA2 Spectrum Lease Licence Duration and Renewal

2.151 The duration of a MBSA2 Spectrum Lease Licence is set by reference to its commencement and expiry dates as detailed in the Licence. These dates will be determined in accordance with such procedures as may be specified by ComReg under Regulation 19 of the Framework Regulations.

⁸³ See ComReg Document 14/11r in this regard.

2.6.4 Licence Conditions Applicable to all MBSA2 Spectrum Lease Licences

- 2.152 The conditions associated with a MBSA2 Spectrum Lease Licence are set out in Regulation 6 and Schedule 2 of the MBSA2 Licence Regulations. Among other things, the MBSA2 Licence Regulations sets out conditions in relation to ensuring that the Apparatus or any part thereof, complies with the European Union (Radio Equipment) Regulations 2017.
- 2.153 It is also a condition of a MBSA2 Spectrum Lease Licence that the Licensee submit up to date information to ComReg in respect of Parts 2 and 3 of its MBSA2 Spectrum Lease Licence in advance of its licence commencement date and on or before 14 February for each calendar year that the Licence is in force. Part 2 and Part 3 of the MBSA2 Spectrum Lease Licence details the Apparatus to which the Licence relates and the location of each Apparatus.
- 2.154 It is ComReg's intention to publish details of MBSA2 Spectrum Lease Licences, including information contained in Part 2 and Part 3, on its website subject to the assessment of confidential information in line with ComReg Document 05/24.

2.6.5 Fees for a MBSA2 Spectrum Lease Licence

- 2.155 The fee for a MBSA2 Spectrum Lease Licence will be determined in accordance with such procedures as may be specified by ComReg under Regulation 19 of the Framework Regulations.

2.6.6 Enforcement Actions – Compliance with Licence Conditions, Licence Suspension and Licence Withdrawal

- 2.156 ComReg will enforce conditions attached to a MBSA2 Spectrum Lease Licence in accordance with its statutory powers, including those set out in the Authorisation Regulations.
- 2.157 A MBSA2 Spectrum Lease Licence may be suspended or withdrawn in accordance with the Authorisation Regulations.
- 2.158 In the event that enforcement action by ComReg results in the suspension, withdrawal (or foreshortening) of a MBSA2 Spectrum Lease Licence, no Licence fees paid in connection with the MBSA2 Spectrum Lease Licence will be refundable.

2.6.7 Amendment of a MBSA2 Spectrum Lease Licence

2.159 ComReg may amend the rights, obligations and procedures relating to a MBSA2 Band Spectrum Lease Licence from time to time in accordance with the Authorisation Regulations.

Chapter 3

3 The Award Process

- 3.1 This chapter provides an overview of the various stages of the Award Process and sets down rules around the structure of Bidding Groups and Bidder behaviour during the Award Process. The detailed rules that apply to the Auction stages of the Award Process are described in Chapter 4.
- 3.2 For the purpose of this document, and for the Award Process, the term:
- “Award Rules” shall refer to the rules and procedures relating to the Award Process, as presented in Chapters 3 and Chapter 4 of this Information Memorandum, and to any other material to which the rules in Chapters 3 and 4 directly refer; whereas
 - “Auction Rules” shall refer to the rules and procedures relating specifically to the Auction itself, as presented in Chapter 4 only, and to any other material to which the rules in Chapter 4 directly refer.
- 3.3 While Chapter 3 provides a description of some Auction Rules, in particular in Sections 3.5 and 3.6 below, to the extent that there is any inconsistency between the description of the rules set out in this chapter and the Auction Rules set out in Chapter 4, the description set out in Chapter 4 prevails.
- 3.4 For the avoidance of doubt, references throughout this Information Memorandum to ComReg using its discretion shall mean ComReg exercising such discretion acting reasonably and in accordance with its statutory functions, objectives and duties.

3.1 Lots Available

- 3.5 The available spectrum rights of use will be awarded on a national basis, using the band plans set out in Section 2.2 of this document.
- 3.6 A total of 113 Lots across the Award Spectrum will be available.
- 3.7 There are two Lot Types:
- **A-Lots** – comprising 6 fixed frequency Lots; and
 - **B-Lots** – comprising 107 frequency-generic Lots.
- 3.8 B-Lots will first be bid for on a frequency-generic basis. That is, demand for B-

Lots expressed⁸⁴ by Bidders will be for blocks of spectrum within the frequency ranges outlined below but which do not have specific frequencies associated with them. The specific frequency assignments for the B-Lots will subsequently be determined in a separate Assignment Stage.

- 3.9 All A-Lots have a fixed frequency range associated with them.
- 3.10 The 700 MHz Duplex Lots are being made available in one temporal period from 14 February 2022 (or some other date as may be specified by ComReg in accordance with the provisions set out in Chapter 2) to 13 February 2042.
- 3.11 The 2.1 GHz Band Lots are being made available in two distinct temporal periods (called “Time Slices”) as follows:
- **Time Slice 1:** 16 October 2022 to 11 March 2027; and
 - **Time Slice 2:** 12 March 2027 to 13 February 2042.
- 3.12 All remaining Lots are also being made available in two distinct Time Slices as follows:
- **Time Slice 1:** 14 February 2022 (or some later date as may be specified by ComReg) to 11 March 2027; and
 - **Time Slice 2:** 12 March 2027 to 13 February 2042.
- 3.13 Therefore, for the Main Stage of the Award Process, Lots will be divided into 15 **Lot Categories** where the suffix “/1” or “/2” indicates the relevant Time Slice.
- 3.14 Table 15 and Table 16 below provide an overview of the Lot Categories for the A-Lots and B-Lots respectively, identifying for each Lot Category:
- the frequency range for the Lot(s) in that Lot Category;
 - the duration of rights of use associated with Lots in that Lot Category;
 - the Time Slice pertaining to the Lot Category;
 - the number of Lots available in that Lot Category;

⁸⁴ This includes Initial Bids as expressed in the Application Form. A Bidder’s Initial Bid is the Package defined by the Lots specified by the Bidder on its Initial Bid Form and the corresponding Bid Amount calculated as the sum of the Reserve Prices for the Lots specified on the Bidder’s Initial Bid Form.

- the size of each Lot (in MHz) in that Lot Category;
- the Reserve Price⁸⁵ per Lot for Lots in that Lot Category and the associated annual Spectrum Usage Fee (SUFs) per Lot before CPI Adjustment; and
- the number of Eligibility Points associated with a Lot in that Lot Category for the purpose of applying the Activity Rules in the Main Stage of the Auction⁸⁶.

⁸⁵ Licences are awarded subject to payment of the SAF determined by the Award Process and the first applicable SUF payment. The Reserve Price indicates the minimum SAF for each Lot included in the Licence and does not include the first or any subsequent payment of SUFs.

⁸⁶ The Eligibility Points are used to rank different combinations of Lots (or Packages) in order to implement the Activity Rules. The Eligibility of a Package of Lots comprises two Eligibility scores, one for each Time Slice. For a given Time Slice, the Eligibility of a Package of Lots is equal to the sum of Eligibility Points of all the Lots in that Time Slice included in the Package. The Activity Rules constrain the amount that Bidders can offer when bidding for Packages of Lots with greater Eligibility in one or both of the Time Slices than their earlier Bids. However, Bidders can still bid for such Packages of Lots subject to these constraints being met. Further details are provided in Section 3.5 and Section 4.2.

Table 15: Fixed Frequency A-Lots available in the Award Process

Lot Category	Frequency range	Duration ⁸⁷	Time Slice	Lots available	Lot size	Reserve Price per Lot (€)	Annual SUF per Lot before CPI Adjustment (€)	Eligibility Points/Lot
A2.3/1	2390 – 2400 MHz unpaired	14/02/2022 to 11/03/2027	1	1	10 MHz	197,000	52,575	2
A2.3/2	2390 – 2400 MHz unpaired	12/03/2027 to 13/02/2042	2	1	10 MHz	285,000	52,575	2
A2.6TL/1	2570 – 2575MHz unpaired	14/02/2022 to 11/03/2027	1	1	5 MHz	25,000	5,000	1
A2.6TL/2	2570 – 2575MHz unpaired	12/03/2027 to 13/02/2042	2	1	5 MHz	35,000	5,000	1
A2.6TU/1	2615 – 2620 MHz unpaired	14/02/2022 to 11/03/2027	1	1	5 MHz	25,000	5,000	1
A2.6TU/2	2615 – 2620 MHz unpaired	12/03/2027 to 13/02/2042	2	1	5 MHz	35,000	5,000	1

⁸⁷ Note that, as discussed in subsection 2.3.3, the commencement date of 14 February 2022 may be adjusted by ComReg.

Table 16: Frequency generic B-Lots available in the Award Process

Lot Category	Frequency range	Duration ⁸⁸	Time Slice	Number of Lots	Lot size	Reserve Price per Lot (€)	Annual SUF per Lot (€)	Eligibility Points/Lot
B700	703 – 733 MHz paired with 758 – 788 MHz	14/02/2022 to 13/02/2042	1 & 2	6	2 x 5 MHz	9,158,000	998,931	4
B2.1/1	1920 – 1980 MHz paired with 2110 – 2170 MHz	16/10/2022 to 11/03/2027	1	9	2 x 5 MHz	1,398,000	525,753	2
B2.1/2	1920 – 1980 MHz paired with 2110 – 2170 MHz	12/03/2027 to 13/02/2042	2	12	2 x 5 MHz	3,188,000	525,753	2
B2.3/1	2300 – 2390 MHz unpaired	14/02/2022 to 11/03/2027	1	18	5 MHz	163,000	52,575	1
B2.3/2	2300 – 2390 MHz unpaired	12/03/2027 to 13/02/2042	2	18	5 MHz	319,000	52,575	1
B2.6F/1	2500 – 2570 MHz paired with 2620 – 2690 MHz	14/02/2022 to 11/03/2027	1	14	2 x 5 MHz	326,000	105,151	2

⁸⁸ Note that, as discussed in subsection 2.3.3, the commencement and expiry dates of Lots in Time Slice 1 may be adjusted by ComReg.

⁸⁹ This does not include the three lots currently assigned to Eir.

Lot Category	Frequency range	Duration ⁸⁸	Time Slice	Number of Lots	Lot size	Reserve Price per Lot (€)	Annual SUF per Lot (€)	Eligibility Points/Lot
B2.6F/2	2500 – 2570 MHz paired with 2620 – 2690 MHz	12/03/2027 to 13/02/2042	2	14	2 × 5 MHz	638,000	105,151	2
B2.6T/1	2575 – 2615 MHz unpaired	14/02/2022 to 11/03/2027	1	8	5 MHz	163,000	52,575	1
B2.6T/2	2575 – 2615 MHz unpaired	12/03/2027 to 13/02/2042	2	8	5 MHz	319,000	52,575	1

3.2 Process Overview and Timeline

3.15 The Award Process will comprise of the following stages:

- i. **Application Stage** (see Section 3.3 below) – Applicants must submit Applications to ComReg to participate in the Award Process. Applications will be submitted in two phases and such Applications must be made in accordance with the procedures described in Section 3.3 of this document. A complete and valid Application must include an **Initial Bid Form** nominating a selection of Lots at Reserve Prices;
- ii. **Qualification Stage** (see Section 3.4 below) – ComReg will assess all Applications received in two phases in order to determine which Applicants are qualified to participate in the Award Process as Bidders. ComReg will also establish whether an Auction is necessary on the basis of the demand expressed by Bidders in their Initial Bids.
- iii. if required, an **Auction**, consisting of a Main Stage and/or an Assignment Stage, where:
 - o **the Main Stage** (see Section 3.5 below) determines the number of Lots to be awarded to each Bidder in each Lot Category, and the Base Prices that Winning Bidders will have to pay for their Lots. The Main Stage consists of:
 - one or more Primary Bid Rounds, during which Bidders express their demand for Lots at given Round Prices set by the Auctioneer each Round;
 - a Supplementary Bids Round, in which Bidders can submit multiple, mutually-exclusive Bids for alternative Packages of Lots, with discretionary Bid Amounts (subject to the constraints described in Section 3.5.3 of this document); and
 - an announcement to all Bidders of the Winning Bidders and the number of Lots won by each Winning Bidder in each Lot Category and, for each Winning Bidder, its own Base Price⁹⁰.

⁹⁰ The Base Price is the price to be paid by a Winning Bidder for the Package of Lots assigned to it in the Main Stage of the Auction (determined using the process set out in Section 4.2.5).

- **Assignment Stage** (see Section 3.6 below) – if required for any band⁹¹, which determines the specific frequencies to be assigned to each Winning Bidder of frequency-generic B-Lots (i.e. Assignment Bidders) and the Additional Prices to be paid by each Assignment Bidder. The Assignment Stage consists of:
 - if required⁹², an Assignment Round, in which Assignment Bidders may bid for their preferred frequency assignments for the frequency-generic B-Lots won in the Main Stage. This provisionally⁹³ determines the specific frequencies to be assigned to each Assignment Bidder, which will be notified to all Assignment Bidders, along with each Assignment Bidder's own Additional Prices that it must pay for its frequency assignment in each band; and
 - a Negotiation Phase, in which Assignment Bidders can negotiate a re-organisation of the frequency assignments resulting from the Assignment Round (subject to restrictions and approval from ComReg).
- iv. **Notification and Grant Stage** (see Section 3.7 below) – ComReg will notify the Winning Bidders of their entitlement to apply for and be granted a Licence in accordance with the outcome of the Award Process, subject to certain conditions being met including the payment of fees.

3.16 This above process is illustrated in Figure 5 below.

3.17 If an Auction is necessary, an Electronic Auction System (EAS) will be used. This will provide Bidders an interface through which they must check and submit their Bids.

⁹¹ Where a Winning Bidder is assigned all B-Lots in a band, an Assignment Stage would not be required for that band. If for all bands there is either just a single Winning Bidder that has won all B-Lots or there is no Winning Bidder, then no Assignment Stage will be required.

⁹² If there is more than one feasible frequency assignment (Assignment Option) for at least one Assignment Bidder, the Assignment Stage will include an Assignment Round to determine the specific frequencies to be provisionally assigned to each Assignment Bidder.

⁹³ This is provisional in the sense that the subsequent Negotiation Phase could result in alternative frequency assignments.

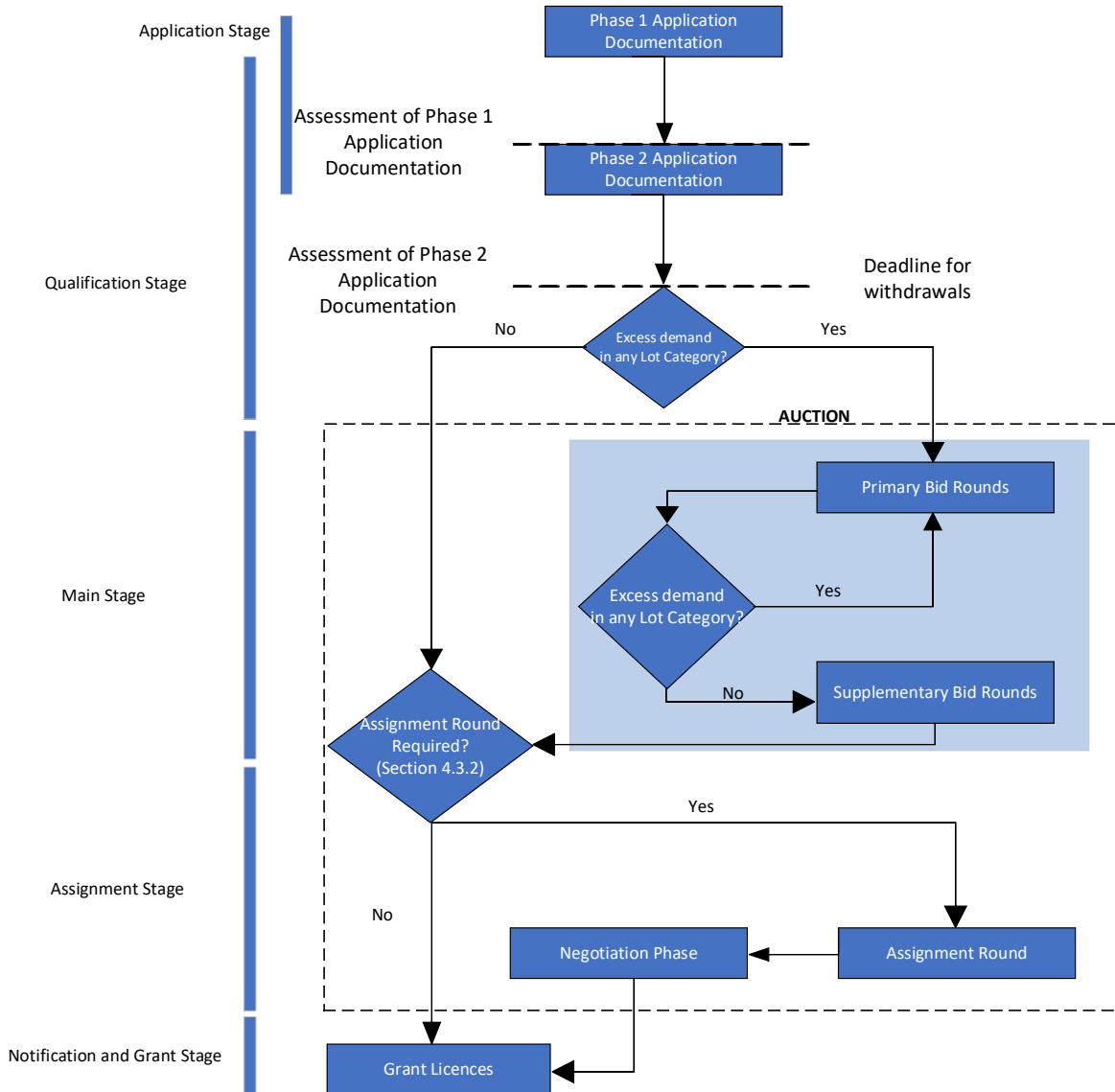


Figure 5: Overview of the Award Process

- 3.18 The indicative timeline for the first two stages of the Award Process (i.e. the Application Stage and the Qualification Stage) is set out in Table 17 below.
- 3.19 ComReg reserves the right to vary these indicative timelines as may be necessary, in order to take into account any changed or unforeseen circumstances. ComReg, in doing so, would give appropriate notice to Interested Parties (e.g. by issuing a public notice on its website, or giving notice to selected parties, such as Applicants or Bidders, depending on the stage of the Award Process).

Table 17: Indicative timeline for the Award Process

Stage	Milestone	Indicative Timeline ⁹⁴
Application Stage	Publication of final IM on the ComReg website and start of Award Process	Friday 16 April 2021
	Registration of Interested Parties for online presentation	By 28 April 2021
	Online presentation to Interested Parties on the Award Process and the Auction Rules	Friday 7 May 2021
	Deadline for submission of Phase 1 Questions regarding the Award Process	Friday 14 May 2021
	Final date for ComReg to publish its responses to Phase 1 Questions regarding the Award Process on its website	Friday 28 May 2021
	Phoneline open for scheduling Phase 1 Application appointments.	2 June 2021 to 17 June 2021
	Deadline for submission of completed Phase 1 Application Documentation	Friday 18 June 2021
	<i>Restrictions on Award Process related communications come into effect</i>	<i>On submission of first Phase 1 Application Documentation to ComReg</i>
	Deadline for submission of Phase 2 Questions regarding the Award Process	Friday 16 July 2021
	Final date for ComReg to issue responses to Phase 2 Questions regarding the Award Process to Applicants.	30 July 2021
	ComReg will accept calls for confirmation of the receipt of Deposits	29 July 2021 to 6 August 2021

⁹⁴ Subject to change, which may include changes that might be required following publication of any judgment on the appeal on Decision D11/20.

Stage	Milestone	Indicative Timeline ⁹⁴
	Deadline for submission of completed Phase 2 Application Documentation	Friday 6 August 2021
	Deadline for receipt of Deposits	23:59 hours on Friday 6 August 2021
Qualification Stage	Deadline for withdrawal of Application	Friday 13 August 2021
	Commencement of Bidder Training (Auction Playground and Online WDP)	Monday 16 August 2021
	Online Bidder Training presentation	Tuesday 17 August 2021
	<p>Each Applicant to be informed by ComReg about whether or not it has been successful in qualifying as a Bidder.</p> <p>Confirmation that:</p> <ul style="list-style-type: none"> • a Main Stage of the Auction is required and notification to Bidders of scheduled start date of the mock auctions; or • a Main Stage is not required but an Assignment Stage is required and notification to Winning Bidders of Winning Bids and scheduled start date of the mock auctions; or • neither a Main Stage or an Assignment Stage is required and progression to Notification and Grant Stage 	Friday 3 September 2021 ⁹⁵
	Return of Deposits to Applicants who have not been successful in qualifying as a Bidder or who withdrew their Application.	Friday 10 September 2021

⁹⁵ ComReg reserves the right to bring this date forward.

Stage	Milestone	Indicative Timeline ⁹⁴
	Circulation of Bidder Materials as required for accessing and using the EAS and proceed to the start of mock auction for Bidders. ⁹⁶	Friday 10 September 2021
Main Stage (if required)	Auction to determine the Winning Bidder(s) for Lots and the Base Prices to be paid	TBD
Assignment Stage (if required)	Determination of the specific frequencies to be assigned to each Winning Bidder of frequency-generic B-Lots and the Additional Prices to be paid by each Assignment Bidder	TBD

3.20 All references to a specific time of day in this IM are to Irish time.

3.21 ComReg is currently not in a position to specify with certainty the timing of the later stages of the Award Process as these will depend on the outcome of earlier stages in the Award Process⁹⁷, the appeal of Decision D11/20 and/or circumstances outside ComReg's control.

3.22 ComReg will provide further information on the timing of these later stages to the appropriate parties (e.g. Bidders, Winning Bidders) during the course of the Award Process. However, ComReg can confirm that, subject to developments outside its control, the timelines for these later stages will be in accordance with the provisions of this IM which, among other things, provides that:

- the start date of the Auction will be notified to Bidders with at least ten clear Working Days prior notice (see Section 3.4.1 of this document);
- there will be at least three clear Working Days between the last Primary Bid Round and the start of the Supplementary Bids Round (see Section 4.2.3 of this document);
- following the outcome of the Assignment Round (if required), a period of ten clear Working Days will be provided to Assignment Bidders to negotiate a re-organisation of the specific frequencies awarded in the

⁹⁶ ComReg will share the relevant bidder materials for accessing the Bidder Training software (i.e. EAS playground, Online WDP) at an earlier time.

⁹⁷ For example: the outcome of the Qualification Stage will determine whether there is a need for a Main Stage, the end of the Main Stage informs the start date of the Assignment Stage etc. (except where a Main Stage is not required but an Assignment Stage is).

Assignment Round, subject to a number of restrictions and approval by ComReg (see Section 4.3.11); and

- upon completion of the Assignment Stage, ComReg will issue a communication to Winning Bidders and Existing Licensees of the specific frequency assignments determined by the Assignment Stage to inform the formulation of a Transition Plan (as further detailed in Section 3.8 of this document).

3.3 Application Stage

3.23 The Award Process begins on the date of publication of this IM.

3.24 The Application Stage will be split into two phases whereby:

- **Phase 1** of the Application Stage will allow Interested Parties to submit the Phase 1 Application Form along with the other required supporting documentation as set out in Section 3.3.2 (“Phase 1 Application Documentation”). The deadline for this is **17:30 (Irish time) on Friday 18 June 2021 (“Phase 1 Application Date”)**; and
- **Phase 2** of the Application Stage will allow Applicants to submit the Phase 2 Application Form, together with the required monetary Deposit, and update information provided at phase 1 (“Phase 2 Application Documentation”) if required. The deadline for this is **17:30 (Irish time) on Friday 6 August 2021 (“Phase 2 Application Date”)**⁹⁸.

3.25 Interested Parties that have submitted Phase 1 Application Documentation become Applicants. ComReg will only accept Phase 2 Application Documentation from Applicants. Documentation from both of these phases is required to support a valid and complete Application (see Section 3.3.2 for further information on the Phase 1 Application Documentation and Phase 2 Application Documentation required). Where an Applicant has been informed by ComReg that it has submitted a valid and complete Application, it becomes a Bidder.

3.26 For an Application to be deemed valid and complete, ComReg must have received the following:

⁹⁸ If the deadline for submitting Application documents in this Information Memorandum and that subsequently published on ComReg’s website differ, the deadline for submitting Application documents published subsequently on ComReg’s website takes precedence. ComReg is under no obligation to consider Applications that have not been submitted in full by the Phase 1 and Phase 2 Application Dates.

- a completed Application Form consisting of a completed Phase 1 Application Form and a completed Phase 2 Application Form⁹⁹;
- receipt of a Deposit, in cleared funds, in ComReg's Nominated Bank Account; and
- any other documentation required to be annexed to the Application Forms.

3.27 A writeable PDF format of both the Phase 1 Application Form and Phase 2 Application Form will be made available on the ComReg website alongside or shortly after publication of this document.

3.28 A valid and complete Application represents a binding offer to pay the SAF and annual SUFs linked to each of the Lots specified in this IM in consideration for a Licence for those Lots, in accordance with the outcome of the Award Process and the IM.

3.29 ComReg is mindful of the complexities involved in the Award Process. Accordingly, during the time between publication of this document and the Phase 1 Application Date, ComReg will provide a presentation on the Award Process and Auction Rules. This presentation will seek to provide as much clarity around the Award Process and Auction Rules as possible, taking into account the fact that some Interested Parties may not have previously participated in any similar process. ComReg would welcome suggestions from Interested Parties on what topics would be useful to address at the online presentation. Such suggestions should be submitted to ComReg via the email addresses and by the deadline indicated in the following paragraph.

3.30 Interested Parties that wish to view the online presentation must e-mail joseph.coughlan@comreg.ie and cc patrick.bolton@comreg.ie by **12:00 hours (Irish time) on Wednesday 28 April 2021**, providing the name(s), and e-mail address(es) of those that wish to receive the presentation.

3.31 ComReg will also facilitate the submission of questions regarding the Award Process and Auction Rules and will respond publicly to these questions on an anonymised basis (see Section 3.3.1 below in this regard and the procedure on how to submit questions).

Joint Bidding

3.32 Prior to the Phase 1 Application Date, Interested Parties can decide, if they wish, to bid jointly in the Award Process as a consortium. This consortium will be

⁹⁹ See Annex 3a and Annex 3b.

deemed to be a single entity for the purposes of the Award Process and, in the event of this single entity becoming a Winning Bidder in the Award Process, a MBSA2 Liberalised Use Licence would be issued to this consortium as a single entity. ComReg envisages that this could be a useful option for smaller potential Bidders. See Section 3.3.5 below for rules that apply to joint bidding.

Electronic Submission of Documents

- 3.33 To ensure the secure management of Confidential Information, Interested Parties will be required to submit their Phase 1 Application Documentation in its entirety in hardcopy format in person. For the avoidance of doubt, should ComReg determine that a document provided as part of the Phase 1 Application Documentation does not fully meet the requirements as set out in this IM and an updated document is required to be provided by the Applicant, the original of the updated document/s must also be provided in hardcopy in person.
- 3.34 However, should an Applicant wish to do so, Phase 2 Application Documentation can be submitted via electronic means with the use of electronic signatures (where a signature is required in respect of the relevant document). ComReg will establish a secure file transfer protocol for electronic submissions, the details of which will only be shared with Applicants in person following the submission of Phase 1 Application Documentation.
- 3.35 In order to maintain the security and integrity of the Award Process and to ensure that Applicants are appropriately bound by the documents they submit as part of the Award Process, documents submitted to ComReg electronically which are required to be signed must be executed by means of an electronic signature¹⁰⁰ of an Authorised Agent (or both Authorised Agents as the case may be) which complies with the requirements set out below. This will then be considered as the original version of a submitted document. Where Applicants choose not to submit Phase 2 Application Documentation electronically, they will need to submit their documents to ComReg in person in accordance with the submission process for hardcopy documents that applied for Phase 1 Application Documentation (see Section 3.3.7 below for more details).
- 3.36 ComReg will only accept electronic signatures that have been generated by means of a secure reputable third party electronic signature platform for which a verifiable audit trail can be provided. Scanned copies of manuscript

¹⁰⁰ All references in this document and in the Information Memorandum to an “*electronic signature*” means an electronic signature which meets the following definition specified by the eIDAS Regulation:

“*electronic signature*’ means data in electronic form which is attached to or logically associated with the data in electronic form and which is used by the signatory to sign”.

signatures, typewritten or jpeg or other pictorial or graphic representations of a signature will not be accepted. The following types of electronic signatures will be accepted:

- advanced electronic signatures and qualified electronic signatures within the meaning of, and complying with, the eIDAS Regulation¹⁰¹; and
- a simple or basic electronic signature generated by means of a secure reputable third party electronic signature platform using, at a minimum, two factor authentication¹⁰². The information used as part of the two factor authentication process (i.e. e-mail address and mobile phone number of the relevant Authorised Agent¹⁰³) must be the same information provided by the Applicant as part of the Phase 1 Application Form (Table A3.1).

- 3.37 Each document which is electronically signed must be accompanied by a document, or equivalent confirmation, which reflects the verifiable electronic audit trail for the electronic signature. This is sometimes referred to as a certificate of completion (or equivalent) by commonly used electronic signature platforms and demonstrates how and when the electronic signature process for the relevant document was undertaken.
- 3.38 Where an Applicant is from outside Ireland, evidence will be required that the Applicant and its Authorised Agents will be bound by any signature which is submitted electronically as part of the Award Process. This evidence must be provided by means of a legal opinion from a law firm in the Interested Party/Applicant's jurisdiction, carrying in excess of €20,000,000 in professional indemnity insurance, addressed to ComReg, certifying that the Applicant and its Authorised Agents are entitled to use, and will be bound by, the electronic signature and electronic signature process which the relevant Applicant will use as part of the Award Process¹⁰⁴.
- 3.39 ComReg reserves the right to inspect and seek verification of any electronic signature or electronic signature process and to reject an electronic signature or electronic signature process which does not comply with the above

¹⁰¹ Regulation (EU) No 910/2014 of the European Parliament and of the Council of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC.

¹⁰² For the avoidance of doubt, the electronic software is used to carry out the two-factor authentication.

¹⁰³ This does not preclude the Applicant from using further appropriate electronic security measures.

¹⁰⁴ Where applicable, this legal opinion may be combined with the legal opinion provided in respect of Paragraph 3.57 below.

requirements.

- 3.40 The specimen signature of the Authorised Agent will be used to verify the signatures submitted on hardcopy documents executed by the Authorised Agent as part of the Award Process. Note that where a document is permitted by the Award Rules to be executed electronically by means of an electronic signature which complies with the Award Rules, it is not obligatory that the same specimen signature of the Authorised Agent be used where the relevant electronic signature platform auto-generates an electronic signature of the Authorised Agent. In such circumstances, the electronic signature audit information (required to be submitted pursuant to the Award Rules) will be used to verify the electronic signatures submitted on documents executed by the Authorised Agent as part of the Award Process.
- 3.41 Depending on the responses of Applicants in their Phase 1 Application Documentation as to whether they intend to submit their Phase 2 Application Documentation electronically, ComReg reserves the right to amend the process set out in this section in respect of all or parts of the Phase 2 process. This may include, without limitation, discontinuing the use of hardcopy or electronic submissions. ComReg will provide further details in respect of the electronic submission process following submission of Phase 1 Application Documentation.
- 3.42 Any questions in respect of these requirements should be submitted early in the Award Process and in accordance with Section 3.3.1 below.

3.3.1 Questions

- 3.43 ComReg will facilitate the submission of questions by Interested Parties in advance of each of the two application phases in order to promote clarity and understanding of the Award Process and Auction Rules (see also Section 5.2.5 on errors). Submission of these questions will also be in two phases as set out below.
- 3.44 ComReg will aim to respond to all questions received prior to the deadlines on an ongoing basis and as far as possible within 10 Working Days. The deadlines for the submission of questions on the Award Process are set out in the following paragraphs.
- 3.45 **The deadline for the submission of questions at phase 1 (Phase 1 Questions) is 16:30 hours (Irish time) on Friday 14 May 2021.**
- 3.46 Phase 1 Questions must be submitted in written, hardcopy format only and cannot be submitted in any electronic format. Questions should be delivered by

hand or courier to ComReg's offices **between the hours of 11:00 – 13:00 and 14:30 – 16:30 (Irish time) on Monday 10 May 2021 – Friday 14 May 2021 inclusive** and addressed as follows:

Mr Joseph Coughlan (RE: MBSA2 Award Process)
Cc Mr Patrick Bolton
Market Framework Division
Commission for Communications Regulation
One Dockland Central
Guild Street
Dublin 1
Ireland
D01 E4X0

- 3.47 Phase 1 Questions should be submitted in a sealed envelope. Interested Parties submitting questions control delivery of any submission, including the anonymity of same. Please ensure that the envelope does not contain any marks which could identify the Interested Party. Interested Parties are required to identify themselves on the question sheet within the sealed envelope.
- 3.48 Receipt of Phase 1 Questions will be acknowledged by ComReg. ComReg will publish all questions together with their associated responses on an anonymous basis on its website.
- 3.49 ComReg reserves the right, where appropriate, to amend any previous responses to Phase 1 Questions provided up until **Friday 28 May 2021**, such that responses made before this date are for general guidance only and should not be considered as final, or be relied upon, until **Friday 28 May 2021**.
- 3.50 **The deadline for the submission of questions at phase 2 (Phase 2 Questions) is 16:30 hours (Irish time) on Friday 16 July 2021.**
- 3.51 Phase 2 Questions will only be accepted from Applicants. Phase 2 Questions can be submitted to ComReg via a dedicated electronic portal only, details for accessing and uploading documents via this portal will be given to Applicants in person following the submission of Phase 1 Application Documentation.
- 3.52 Receipt of Phase 2 Questions will be acknowledged by ComReg.
- 3.53 ComReg will set out all Phase 2 Questions together with their associated responses on an anonymous basis and distribute same to all Applicants.
- 3.54 ComReg reserves the right, where appropriate, to amend any previous responses to Phase 2 Questions provided up until **Friday 30 July 2021**, such

that any responses made before this date are for general guidance only and should not be considered as final, or be relied upon, until **Friday 30 July 2021**.

3.3.2 Application Form and Supporting Documents

3.55 Each Applicant must complete and sign the Phase 1 and Phase 2 Application Forms as set out in Annex 3a and Annex 3b respectively.

3.56 The Application Form consists of 3 parts to be submitted in two phases as follows:

- **Phase 1 Application Form:**
 - Part 1: Administrative Information; and
 - Part 2: Applicant Declaration;
- **Phase 2 Application Form:**
 - Part 3: Initial Bid Form.

Phase 1 Application Form

3.57 Part 1 of the Application Form concerns Administrative Information and requires the intending Applicant to provide, among other things, details of the person(s) identified as its direct point of contact for the purposes of the Award Process. In completing this part of the Application Form, the intending Applicant must also submit appropriate evidence that the persons signing the Application Forms and the persons bidding on behalf of the intending Applicant ("**Authorised Agents**") are duly authorised by the intending Applicant to do so. Appropriate evidence would include:

- where the intending Applicant is incorporated in the EU, evidence that the Authorised Agents are registered pursuant to the appropriate national implementing measures transposing Article 10 of Directive 2009/101/EC (Regulation 7 of S.I. 306 of 2014 in Ireland);
- a board resolution from the intending Applicant which is a company registered in Ireland;
- an irrevocable power of attorney; or
- in respect of a intending Applicant from outside Ireland, equivalent evidence supported by a legal opinion from a law firm in its jurisdiction, carrying in excess of €20,000,000 in professional indemnity insurance, addressed to ComReg, certifying that the Authorised Agents are entitled to bind the intending Applicant contractually.

3.58 Part 1 of the Application Form also includes a statement of intent regarding the method that the intending Applicant will use to submit its Phase 2 Application Documentation. The Phase 2 Application Documentation may, at the Applicant's election, be submitted manually in hardcopy form or electronically via the electronic transfer protocol specified by ComReg. Where the Applicant intends to submit its Phase 2 Application Documentation electronically, it must comply with the following requirements as part of Part 1 of the Phase 1 Application Form:

- the intending Applicant is required to indicate whether it intends to execute its Initial Bid Form in phase 2 electronically by means of electronic signature and submit it electronically to ComReg; and
- the intending Applicant is required to indicate which type of secure reputable third party electronic signature platform and which type of electronic signature will be used in respect of the Initial Bid Form at phase 2 and confirm that, if a basic or simple electronic signature will be used, two factor authentication which complies with paragraphs 3.36 – 3.37 will be used; and
- where an intending Applicant is from outside Ireland, evidence must be provided at this stage that the intending Applicant and its Authorised Agents will be bound by any signature which is submitted electronically as part of the Award Process. This evidence must be provided by means of a legal opinion from a law firm in the intending Applicant's jurisdiction, carrying in excess of €20,000,000 in professional indemnity insurance, addressed to ComReg, certifying that the intending Applicant and its Authorised Agents are entitled to use, and will be bound by, the electronic signature and electronic signature process which the relevant intending Applicant will use as part of the Award Process.

3.59 ComReg reserves the right to raise questions or seek verification in respect of any electronic signature process to be used and to refuse to accept an electronic signature which does not comply with the above requirements. Where an electronic signature or electronic signature process is refused, ComReg may, at its discretion, allow a period of time for an Applicant to make arrangements to comply with the electronic signature process.

3.60 The 'Applicant Declaration' in Part 2 of the Application Form, which must be signed by the intending Applicant or by a person duly authorised to sign the Applicant Declaration on behalf of the intending Applicant, requires the intending Applicant to agree to be bound by among other things:

- the provisions regarding agreements with third parties;
- the Award Rules relating to confidentiality;
- the rules around Applicant/Bidder behaviour applying for the duration of the Award Process¹⁰⁵;
- the Auction Rules; and
- the Transition Rules which form part of the Award Rules.

3.61 In order for an Application to be valid, it must also include information regarding the ownership structure of the intending Applicant (“**Ownership Structure Document**”).

3.62 Accompanying the Ownership Structure Document the intending Applicant must provide a document that:

- (a) certifies to the best of its knowledge that the Ownership Structure Document is a detailed, complete and clear overview of its ownership structure;
- (b) certifies that the intending Applicant’s ownership structure complies with the rules set out in Section 3.3.5; and
- (c) lists the intending Applicant’s Insiders (as the term is defined at paragraph 3.95 below).

3.63 If at any point during the Award Process an Applicant/Bidder is found by ComReg to have submitted information on its ownership structure which is materially incomplete or incorrect, ComReg shall have the discretion to take whatever measures it deems appropriate, including requiring Applicants/Bidders to verify information already provided and/or to provide additional information and supporting evidence. If ComReg is unable to determine to its reasonable satisfaction that two or more Applicants/Bidders are not connected or associated (in the terms as set out in Section 3.3.5) on the basis of information provided to it, it reserves the right to treat those Applicants/Bidders as being connected or associated.

Phase 2 Application Form

3.64 Part 3 of the Application Form, entitled “**Initial Bid Form**”, provides a table

¹⁰⁵ Which apply in addition to but without prejudice to Irish and EU competition law.

containing, for each Lot Category, the:

- Lot Category name;
- frequency range associated with the Lot Category;
- duration associated with Lots in the Lot Category;
- Time Slice pertaining to the Lot Category;
- number of Lots available in the Lot Category;
- size of each Lot (in MHz) in the Lot Category;
- Reserve Price per Lot (€) in the Lot Category;
- annual SUF per Lot (€) in the Lot Category;
- number of Eligibility Points per Lot in the Lot Category; and
- number of Lots applied for by the Applicant in the Lot Category.

3.65 Details of the Lots available are set out in Section 3.1 above.

3.66 On its Initial Bid Form, an Applicant must specify the number of Lots in each Lot Category it is willing to buy at the applicable Reserve Price. This selection of Lots at the Reserve Prices will be the Bidder's Initial Bid. In the event that the Main Stage of the Auction is not required, each Bidder will be awarded the Lots included in its Initial Bid. In the event that the Main Stage of the Auction is required, the Initial Bid will remain as a binding Bid that could become a Winning Bid. The Initial Bid is also relevant to the application of the Activity Rules for the Main Stage, as discussed below.

3.67 Applications are subject to Competition Caps (see Section 4.1.3) and bidding restrictions relating to the 2.6 GHz TDD Band. If an Application Form includes Lots that, if awarded, would exceed the relevant Competition Caps and bidding restrictions relating to the 2.6 GHz TDD Band, ComReg may, at its discretion, contact the particular Applicant and seek to resolve the issue by having the Applicant amend its Initial Bid Form. If ComReg is unable to resolve the issue in this manner, ComReg shall reject the Application on the basis that it is invalid and shall notify the Applicant of its decision.

3.68 Applicants may, in submission of Phase 2 Application Documentation, update its Phase 1 Application Documentation as required, however any updated Phase 1 Application Documentation, including any update to its list of Insiders

must be submitted in hardcopy in person, consistent with Phase 1 Application Form process.

- 3.69 An Applicant shall submit the Initial Bid Form in the manner indicated in its Phase 1 Application Form, i.e. in hardcopy or electronically (accompanied by an electronic signature in accordance with the Award Rules). To secure the integrity of the Award Process, an Applicant may not change the manner of its submission as identified in its Phase 1 Application Form unless ComReg has expressly agreed in writing prior to the deadline for submission of Phase 2 Questions regarding the Award Process. Note that it will be a requirement of any such consent that the relevant Award Rules (and associated documentation and verification, if applicable) in respect of the hardcopy or electronic execution and submission process are complied with.
- 3.70 A completed valid Application Form represents an unconditional offer to buy the number of Lots specified by the Applicant in its Initial Bid Form at the Reserve Prices, and to discharge the related SUFs over the term of the Licence. For the avoidance of doubt, no legal obligations on the part of ComReg to grant any Licences will arise unless and until the granting and commencement of a Licence or Licences by ComReg following the completion of the Award Process.
- 3.71 In addition, in submitting a completed Application, an intending Applicant agrees to be bound by the terms and conditions of the Award Process as set out in this IM which, among other things, include the following:
- its acknowledgement that the commencement date of Lots may be delayed as specified by ComReg;
 - to the extent permitted by law, its agreement that ComReg's aggregate liability for all losses or damages of any nature arising from delayed access to Lots is expressly limited to the refunds or adjustments of Licence fees as set out in Section 2.3.7 of this IM;
 - its agreement that in the event that it identifies or suspects an error or omission in the rules of the Award Process or the implementation of these rules by the EAS it shall notify ComReg at the earliest opportunity;
 - its agreement that if it becomes a Winning Bidder it will participate as required by the Award Rules and be bound by the outcome of the Assignment Stage;
 - its agreement that if it becomes a Winning Bidder, then its failure to obtain consents, approvals, Apparatus or funding necessary to deploy

a network or complete Transition Activities shall be deemed to be a breach of the Award Rules by that Winning Bidder; and

- its agreement to participate in the development of the Transition Plan and to be bound by the Transition Rules of the Award Process.

3.3.3 Requests for a change in the content of an Application

3.72 Where an Applicant wishes to change any aspect of their Application, they should contact the persons referred to in Section 3.3.1 by letter via the secure file portal outlining the nature of the change and justification for same. The Applicant must set out in detail the reasons for the proposed change and the information which became available since submission of its original Application documents that necessitated the change. ComReg will have regard to the information provided by the Applicant in determining whether any changes are permitted. ComReg reserves the right not to accept changes submitted after the Phase 1 or Phase 2 Application Dates as appropriate.

3.3.4 Deposits

3.73 An Applicant must submit a monetary Deposit with its Phase 2 Application Documentation. The required amount of the Deposit shall at least correspond to the sum of the Reserve Prices of Lots requested by the Applicant in its Initial Bid Form.

3.74 All Deposits must be transferred only to the bank account nominated by ComReg as specified in the Application Form and must be received as cleared funds in that bank account before **23:59 hours (Irish time) on Friday 6 August 2021**. Applicants are cautioned to ensure that the cleared funds received by ComReg are required to be the amount of the Deposit specified in euro. Applicants should ensure that the amount of funds received by ComReg is not diminished by bank charges, exchange rate fluctuations or similar matters. **Please note that the bank account details provided in the Application Form are different to those used for other ComReg payments. Applicants should therefore refrain from contacting ComReg Finance or Licensing staff in relation to these transfers as such staff cannot address such matters.** Appropriate contact details are provided at paragraph 3.79 below. Applicants should ensure that Deposits are made to the bank account specified in this IM and by the deadline for the receipt of deposits. To ensure this, **Applicants must transfer Deposits to ComReg's Nominated Bank Account in advance of the Phase 2 Application Date.**

3.75 ComReg currently intends to use all monies received from each

Applicant/Bidder to purchase NTMA Exchequer Notes¹⁰⁶. Interest, if earned¹⁰⁷, will be paid by ComReg on funds held by it during the Award Process and Applicants will receive any interest accrued, if earned, less any financial fees and related taxation if applicable.

- 3.76 If a Deposit Call is issued (see Sections 4.2.2, 4.2.4 and 4.3.8), ComReg will specify a time period of not less than three Working Days during which the notified Bidder's additional Deposit funds must be received as cleared funds in ComReg's Nominated Bank Account (as specified in Annex 3).
- 3.77 If any Bidder who is subject to a Deposit Call does not provide the required additional cleared Deposit funds by the set deadline, ComReg at its discretion may void some or all of the Bidder's Bids.
- 3.78 Where any part of this IM indicates that:
- an Applicant or Bidder may in part or whole forfeit its Deposit; and/or
 - ComReg may impose a sanction on an Applicant/Bidder that includes forfeiture of all or part of the Deposit paid by that Applicant/Bidder on Application,

ComReg will adopt a proportionate and fair approach taking into account its statutory objectives and the circumstances of each case (including the nature and seriousness of any breach or non-compliance).

- 3.79 Where an Applicant wishes to confirm receipt of a Deposit, it should contact ComReg by telephone using the telephone number provided in Section 3.3.7 paragraph 3.136. In order to ensure that the rules on confidentiality and Applicant/Bidder behaviour are not breached an **Applicant should not contact any other ComReg staff by letter or email or contact ComReg using any other telephone number**. ComReg will only receive such telephone calls between **16:00 – 17:00** on every Working Day between **Thursday 29 July 2021** and **Friday 6 August 2021**.
- 3.80 Where a Deposit Call is issued during the Award Process, instructions on the method to confirm receipt of Deposit will be provided.

¹⁰⁶ However, ComReg reserves the right to manage all monies held in accordance with good treasury management.

¹⁰⁷ The current rate of interest on NTMA Exchequer Notes is zero percent. However, the rate of interest associated with the NTMA Exchequer Notes may be negative. In such circumstances, ComReg reserves the rights to calculate the refund paid to the Winning Bidder by subtracting the amount of negative interest accrued over the period a Deposit has been held by ComReg.

3.3.5 Ownership rules

- 3.81 All Applicants are subject to the ownership rules.
- 3.82 The ownership rules apply from the submission of Phase 1 Application Documentation until the public announcement on the outcome of the Award Process by ComReg.
- 3.83 Applicants are subject to the ownership rules to help ensure that where they become Bidders they both bid for and, if applicable, win Licences as independent entities and in accordance with applicable law. In particular, the ownership rules ensure that the Competition Caps cannot be circumvented and prevent an Applicant/Bidder from having any unfair advantage or distorting competition within the Award Process by being able to coordinate with another Applicant or Bidder.
- 3.84 In essence, the ownership rules prohibit any entity in a “Bidding Group” (that is, a Bidder and its Connected Persons) from also participating in another Bidding Group or from being connected to or associated with any entity in another Bidding Group.
- 3.85 In particular, the following relations must not exist:
- an Applicant/Bidder or Connected Person within one Bidding Group must not also be an Applicant/Bidder or Connected Person in another Bidding Group;
 - two or more Applicants or Bidders must not be Associated Bidders.
- 3.86 Before submitting its Phase 1 Application Documentation, the Applicant must take all reasonable measures to identify its Connected Persons, Associated Bidders and Insiders. Before submitting its Phase 2 Application Documentation, an Applicant must again carry out this exercise.
- 3.87 Annex 5 is illustrative of the types of relations that ComReg considers to fall within the concepts of Connected Persons and Associated Bidders (Insiders are discussed in the following section). If ComReg considers that one of the prohibited relations referred to above may exist, the procedure set out in Annex 5 will apply. Annex 5 also describes when ComReg may grant exemptions from the ownership rules, and the rules relating to joint bidding, restructuring and changes to ownership structure.
- 3.88 The rules set out above and in Annex 5 do not imply that ComReg has taken a position in this IM on what Bidder connections, ownership structures or

associations of a Bidder may or may not be lawful or permitted under Irish or EU competition law or other applicable law. Such assessment falls outside the scope of this IM.

Joint bidding

- 3.89 A Bidding Group may be under the joint control of two or more persons. Persons wishing to bid in consortium will be viewed as a single entity for the purposes of applying the ownership rules (as detailed in this Section), rules on confidentiality and Applicant / Bidder behaviour (see Section 3.3.6) and the Award Rules. Note, in particular, that such an entity would be subject to the same Competition Caps as other Bidders (see Section 4.1.3 below).

3.3.6 Confidential Information and Applicant/Bidder behaviour

- 3.90 This section sets out the rules (in addition to those rules under Irish and EU competition law which continue to apply regardless of this Award Process) that govern the behaviour of Applicants/Bidders from the time of submission of their Phase 1 Application Documentation until the public announcement on the outcome of the Award Process by ComReg¹⁰⁸. These rules require that any Applicant/Bidder must refrain from any action that could undermine the running of the Award Process. This section also sets out a number of specific rules in relation to Confidential Information and Applicant/Bidder behaviour, other restrictive practices capable of distorting the outcome of the Award Process, and the behaviour of employees, contractors and legal entities that are related or connected to the Applicant/Bidder.
- 3.91 As part of its Applicant Declaration, each Applicant is required to confirm that it has and will continue to comply with the Award Rules and that it has ensured that its Connected Persons, employees and Insiders¹⁰⁹ have and will continue to at all times comply with these rules. If at any point it becomes apparent that an Applicant/Bidder, its employees, its Connected Persons or its Insiders (as defined below) have failed to comply with the Award Rules, the Applicant/Bidder, as appropriate, will be deemed responsible for that breach and may, depending on the nature and seriousness of the breach, be excluded from the Award Process and/or forfeit part or all of the Deposit it had paid at the Application Stage. In certain circumstances, ComReg may also suspend or withdraw a Winning Bidder's Licence(s) if, after award of the Licence(s), it

¹⁰⁸ Note that, in the case where a Bidder were to submit multiple Application documents (in which case the most recent Application documents only would be considered by ComReg), the period from which the rules on Confidential Information would begin to apply is from the first submission of any Phase 1 Application Documentation.

¹⁰⁹ See paragraph 3.95 for a definition of an Insider.

emerges that the Bidder, its employees, its Connected Persons or its Insiders breached the Award Rules.

- 3.92 Applicants should note that, even if they are unsuccessful in becoming Bidders, they remain bound by the Award Rules on the release of Confidential Information until the public announcement on the outcome of the Award Process by ComReg. For the avoidance of doubt, this does not however release Interested Parties from their general obligations of confidence which persist outside the Award Rules.

Confidential Information and Insiders

- 3.93 **“Confidential Information”** means any information which is not in the public domain and which, if it became known to another Applicant/Bidder, may influence the amount that the Applicant/Bidder is willing to bid for Lots or the strategy it adopts in Bidding for such Lots in the Auction. Confidential Information shall include (but not necessarily be limited to) information as to an Applicant’s/Bidder’s business case, its pre-Auction activities, its Auction strategy, information as to the identity of an Applicant’s/Bidder’s Authorised Agents, or the prices it is willing to bid for spectrum in the Award Process. Confidential Information relating to individual Applicants/Bidders shall also include:
- a) the Applicant’s/Bidder’s actual participation in the Award Process, including the Auction itself;
 - b) the Applicant’s/Bidder’s Eligibility to make Bids within the Auction; and
 - c) the composition and value of any and all Bids made so far by the Applicant/Bidder within the Award Process including the Auction.
- 3.94 Confidential Information shall also include any information concerning the outcome of various stages of the Award Process (regardless of whether such information is specific to that Applicant/Bidder). The rules regarding Confidential Information set out in this section shall apply from the date of first submission of any Phase 1 Application Documentation or the Phase 1 Application Date, whichever is the earlier, until a public announcement on the outcome of the Award Process by ComReg. For the avoidance of doubt, while the rules regarding Confidential Information may be removed or relaxed by ComReg to the extent necessary to achieve specified purposes including, for example, where Assignment Bidders wish to negotiate with other Assignment Bidders during the Negotiation Phase of the Assignment Stage¹¹⁰, confidentiality regarding the outcome of the Award Process must be maintained until ComReg

¹¹⁰ See Sections 3.6.2 and 4.3.11 below for more information.

makes a public announcement on the outcome of the Award Process.

3.95 An “**Insider**” includes an entity that is not a Connected Person and has:

- provided advice to the Applicant/Bidder in formulating its Bid strategy and/or business case in connection with the Award Process; or
- either by itself or in concert with another person or other persons undertaken, wholly or partly, to finance or assist a member of a Bidding Group in connection with the Award Process; or
- otherwise received Confidential Information about an Applicant/Bidder.

3.96 An Insider can be a legal entity or a natural person. For example, an Insider could be a bank or other funder, with knowledge of an Applicant’s/Bidder’s business case, valuations or Bid ceilings, or it could be an auditor, consultant, lawyer, economic adviser, or other professional assisting in the preparation of a Bid. Each Applicant must submit a list of its Insiders to ComReg at the time of submission of its Phase 1 Application Documentation. An Applicant may then, upon submission of Phase 2 Application Documentation, update its list of Insiders as required (however such information must be submitted in hardcopy in accordance with the Phase 1 Application Form process). An Applicant/Bidder must inform ComReg at the earliest opportunity of any change to its list of Insiders.

3.97 Except in accordance with the Exemption from Insider Rules as discussed below, Bidding Groups and Insiders must not convey Confidential Information to any other person, including another Bidding Group or its Insiders, either by making such information public, or by communicating such information directly to another Bidding Group or its Insiders or indirectly through an intermediate source.

3.98 It is possible that, at the Phase 1 and/or Phase 2 Application Date, an Applicant is unaware that it has a common Insider with another Applicant. If ComReg becomes aware that two or more Applicants/Bidders have a common Insider, it shall notify the Applicant/Bidders concerned indicating that the issue can be resolved in one of three ways:

- The Applicant/Bidder can apply, within a timeframe stipulated by ComReg, for an exemption from the rules on common Insiders (see further below);

- The Applicant/Bidders can terminate the relationship with the common Insider insofar as the Award Process is concerned within a deadline set by ComReg; or
- The Applicant/Bidder can withdraw from participation in the Award Process within a deadline set by ComReg. However, the composition of the remaining Applicant/Bidder and the content of its Application must remain unchanged, subject to ComReg's discretion to approve appropriate amendments

3.99 For the avoidance of doubt, if ComReg identifies that a common Insider exists between two Applicants/Bidders, it will inform each Applicant/Bidder of that fact but will not disclose the identity of the other Applicant/Bidder. It will be for each Applicant/Bidder to communicate this information to the Insider and to resolve this issue in cooperation with the Insider in accordance with the Award Rules. The Insider will obviously play an important role in this regard, being the only party with full knowledge of the situation and, in accordance with this Information Memorandum, ComReg may also deem it appropriate to engage with the Insider directly in order to resolve the situation.

3.100 It is important to note that, in seeking to resolve such a conflict, it will be incumbent upon each Applicant/Bidder and the Insider to ensure compliance with the rules on Confidential Information (which, as per paragraph 3.93 of this Information Memorandum, includes knowledge of an entity's participation in the Award) set out in Section 3.3.6 of this Information Memorandum. So, for example, in such a situation it would not be appropriate for an Applicant/Bidder to seek to reveal the identity of the other Applicant/Bidder via the Insider or otherwise.

3.101 If a common Insider issue is not resolved to ComReg's satisfaction in one of the above three ways, ComReg will exclude the Applicant/Bidders affected from further participation in the Award Process. If the relationship comes to light later in the Award Process, i.e. after the Auction has commenced, then ComReg may exclude the Applicant/Bidders as appropriate from further participation in the Award Process (see paragraph 3.124 of this Information Memorandum below in that regard) and this may result in partial or whole Deposit forfeiture for the affected Applicant/Bidders. ComReg may also declare the result of the Award Process not binding, wholly or partly, on it.

Exemption from Insider Rules

3.102 ComReg may, in exceptional circumstances and at its sole discretion, grant exemption from the rules relating to common Insiders described above. ComReg may attach terms to any such exemption.

- 3.103 In considering whether to grant an exemption and any terms to attach to an exemption, ComReg will consider the arrangements put in place by a common Insider to prevent the sharing of Confidential Information relating to one Bidding Group with individuals acting for or connected to another Bidding Group.
- 3.104 In considering whether or not to grant an exemption, ComReg will require certain information from each relevant Applicant/Bidder, including (but not necessarily limited to) the following:
- details of all individuals acting for each Applicant/Bidder within the common Insider;
 - an organisation chart showing the positions of each of these individuals within the common Insider;
 - a copy of any appropriate policies, procedures and manuals used by the common Insider in relation to the segregation of Applicant/Bidder data; and
 - a written undertaking from the common Insider, in a form acceptable to ComReg, to put in place sufficient safeguards which ensure the segregation of all Confidential Information relating to the Applicants/Bidders that it is acting for and not to use any common personnel in relation to the different Applicants/Bidders.
- 3.105 If an Applicant/Bidder seeks an exemption, it will consent to ComReg contacting the managing director, managing partner, or person occupying an equivalent position in the common Insider, to seek the appropriate written undertaking, which shall be expressed to be for the benefit of ComReg.

Directors and employees

- 3.106 Circumstances may arise where Bidding Groups and their respective Insiders have common directors and/or employees. If this occurs, the Applicants/Bidders concerned need to ensure that the respective persons:
- are not, directly or indirectly, involved in the preparation and/or submission of the Application for more than one Bidding Group, such that they are involved in the Award Process for one Bidding Group only; and
 - are not in possession of, do not obtain, or have knowledge of any Confidential Information concerning more than one Bidding Group.
- 3.107 An Applicant/Bidder shall ensure that its Connected Persons take all reasonable

measures to identify and inform the Applicant/Bidder if they have any board members or employees who are Insiders in relation to another Bidding Group, such that the Applicant/Bidder can take appropriate precautions to ensure that the rules on confidentiality and Applicant/Bidder behaviour are not breached.

Disruption to the Award Process

- 3.108 All Applicants/Bidders shall, and shall procure that their Connected Persons, refrain from undertaking any action that is intended to, or is likely to, distort the outcome of the Award Process.
- 3.109 Save, and only to the extent necessary, for the participation of Assignment Bidders in the Negotiation Phase, all Applicants/Bidders shall, and shall procure that their Connected Persons, refrain from doing any of the following:
- disclose any Confidential Information beyond the Bidding Group and its Insiders;
 - disclose any Confidential Information in breach of undertakings made by the Bidder pursuant to any exemption to the rules on ownership and Insiders granted by ComReg;
 - knowingly obtain Confidential Information in relation to any other Bidding Group;
 - communicate with other Applicants/Bidders or their Connected Persons with the intention or effect of coordinating Bidding within the Auction;
 - enter into agreements with other Applicants/Bidders or their Connected Persons in relation to the Award Process;
 - for the duration of the Award Process, exchange information, coordinate or enter into agreements with other Applicants/Bidders and their Connected Persons regarding the Applicant's/Bidder's strategy for use of the Licence.
- 3.110 The above requirements shall be binding upon all Applicants/Bidders until ComReg has received all SAFs payable and applicable first SUFs and has publicly announced the outcome of the Award Process.
- 3.111 Subject to ComReg's discretion to conclude otherwise, any merger or acquisition that may occur during the Award Process shall not be considered an act that could adversely affect the Award Process, provided that such a merger or acquisition would not result in a member of one Bidding Group also being a member of another Bidding Group.

3.112 Notwithstanding the provisions of the paragraphs above, any member of a Bidding Group or its Insiders may disclose Confidential Information to its employees, agents or other representatives, and vice versa, where this is necessary for the purposes of:

- determining the Applicant's/Bidder's participation and preparing for its participation in the Award Process, including its Bid strategy;
- assisting the Applicant/Bidder during the Auction in relation to its participation in the Auction; and
- dealing with commercial and regulatory matters following, and directly concerned with, the outcome of the Award Process, including for example liaison with ComReg prior to the grant of Licences.

3.113 However, such disclosure shall not include disclosure to any members of another Bidding Group or its Insiders except with ComReg's prior written consent.

Restrictive agreements

3.114 From the publication of this IM until ComReg publicly announces the final outcome of the Award Process, a Bidding Group or its Insiders may not enter into any agreement or establish any understanding with a provider of equipment or software, which directly or indirectly:

- restricts the provider's ability to supply equipment or software to another Applicant/Bidder or its Connected Persons regarding the planning, establishment or operation of a network in Ireland involving the frequencies which are subject to this Award Process; or
- restricts the prices or other terms and conditions that the provider can offer another Applicant/Bidder or its Connected Persons regarding the planning, establishment or operation of a network in Ireland involving the frequencies which are subject to this Award Process.

3.115 From the publication of this IM until ComReg publicly announces the final outcome of the Award Process, an Applicant/Bidder, its Connected Persons or Insiders may not either prior to or during the Auction enter into any agreement or establish any understanding with a third party if the agreement or understanding directs such third party not to participate in the Award Process, restricts the ability of such third party to participate in the Award Process, or holds out the expectation that such third party will receive any financial or other benefit as a result of not participating, or restricting its participation in the Award

Process.

Reporting breaches of the Award Rules

- 3.116 If any Applicant/Bidder becomes aware of an actual or potential breach of the Award Rules or other offending behaviour that may distort the outcome of the Award Process, it must notify ComReg at the earliest opportunity using the process described below and outline the nature of the potential breach or other offending behaviour.
- 3.117 ComReg will be available to receive such a notification on every Working Day from the Phase 1 Application Date until the public announcement by ComReg on the outcome of the Award Process.
- 3.118 Such notifications should be made by telephone using the number **+353 (0)1 804 9761** as follows:
- during days when Primary Bid Rounds, the Supplementary Bid Round and the Assignment Round are taking place, the times will be as specified to Bidders via the EAS; and
 - for all other Working Days, between **16:00 hours (Irish Time) and 17:00 hours (Irish Time)**.
- 3.119 ComReg will record all phone calls made or received during the Award Process in order to manage technical issues and risks arising, and to ensure the integrity and administrative efficiency of the Award Process. These recordings, which shall be stored securely, shall be retained and used only for these purposes and shall be deleted once they are no longer required by ComReg for these purposes. In the event of a dispute arising, ComReg may rely on the contents of these recordings.
- 3.120 The Applicant/Bidder **must also at the earliest opportunity** provide such a notification in writing, setting out specific details and evidence supporting the notification made. This information should be sent to **Mr. Joseph Coughlan** (copying **Mr Patrick Bolton**) via the secure electronic file portal¹¹¹. The Applicant/Bidder must strictly follow the above process for making such a notification and must not use any other means to contact ComReg or its personnel for such purposes.

Sanctions

- 3.121 As part of their Applications, Applicants agree to be bound by a series of

¹¹¹ The details of which will be provided to Applicants upon submission of an Application.

possible administrative sanctions for infringement of the Award Rules.

3.122 Interested Parties should also note that certain breaches of the Award Rules and other behaviours that Applicants/Bidders could engage in may entitle other Applicants/Bidders to seek redress under civil law and, moreover, may also constitute offences relating to, among other things, competition law, fraud, conspiracy and unlawful use of a computer. In respect of certain such behaviours, liability can be imposed on the individual(s) engaging in the behaviour as well as on the organisation(s). For the avoidance of doubt, in the event that any such behaviour (i.e. other than behaviour which amounts to a breach of the Award Rules) comes to the attention of Applicants/Bidders during the Award Process, they are still obliged to notify ComReg immediately to enable appropriate action to be taken.

3.123 In the event that an Applicant/Bidder, its employees, its Connected Persons or Insiders breaches any of the Award Rules, the Applicant / Bidder can also face, subject to ComReg's discretion, a number of administrative sanctions, including exclusion from the Award Process, depending on the severity of the breach. Specifically, the list of possible sanctions may include, but is not limited to:

- a restriction of a Bidder's ability to make further Bids and/or voiding some or all of the Bids already submitted by the Bidder from the winner and price determination process;
- exclusion from the Award Process; and/or
- forfeiture of part or all of the Deposit which was paid on Application.

3.124 If a Bidder is excluded from the Award Process, then ComReg, at its discretion, may void Bids made up to that point by the Bidder in question, in addition to preventing further Bids by that Bidder. For the avoidance of doubt, on exclusion of a Bidder, ComReg may continue with the Auction unchanged, save for the exclusion of that Bidder. In the event that ComReg considered it appropriate, all Bids and calculations made up to that point may remain valid and binding, although it reserves the right to make such alterations to the Auction as it considers appropriate at its discretion with a view to maintaining the integrity and efficacy of the Auction. In particular:

- if a Bidder were excluded during the Primary Bid Rounds, ComReg would typically expect to not re-run Primary Bid Rounds already completed, although it reserves the right to do so;
- if a Bidder were excluded after the Main Stage of the Auction had been completed and results of the Main Stage had been made known to all

Bidders, ComReg would not typically expect to re-run the Main Stage, although it reserves the right to do so; and

- if a Bidder were excluded after the Main Stage of the Auction had been completed but results of the Main Stage had not yet been made known to all Bidders, ComReg would typically expect to re-calculate the outcome of the Main Stage voiding the Bids of the excluded Bidder¹¹².

3.125 A breach by an individual Applicant/Bidder, its employees, its Connected Persons or Insiders of any of the Award Rules may lead to the forfeiture of part or all of the Deposits paid by that Applicant/Bidder during the Award Process.

3.126 For illustrative purposes only, actions which may lead to an Applicant's/Bidder's exclusion from the Award Process and/or the forfeiture of an Applicant's/Bidder's Deposit include the following:

- submitting materially¹¹³ false or misleading information to ComReg;
- failing to update ComReg, in a timely manner, in relation to any change to material information submitted as part of its Application or during the Award Process;
- failure to report a breach of the Award Rules or other offending behaviour that may distort the outcome of the Award Process;
- an Applicant/Bidder, its employees, its Connected Persons or Insiders colluding or attempting to collude with any other person to distort the outcome of the Award Process, or acting in a way which is likely to distort the outcome of the Award Process;
- an Applicant/Bidder, its employees, its Connected Persons or Insiders disclosing Confidential Information to others during the period of restrictions on communications, other than in accordance with this IM;
- an Applicant/Bidder, its employees, its Connected Persons or Insiders knowingly obtaining or attempting to obtain Confidential Information in relation to any other Applicant/Bidder;

¹¹² The issue of exclusion of a Bidder at the end of the Main Stage is addressed in Section 4.2.5.

¹¹³ Where reference is made in this Information Memorandum to matters being material, ComReg, acting reasonably, shall be entitled to decide whether or not a matter is material. Accordingly, where an Applicant has any doubt as to the materiality of a matter, it should be reported to ComReg.

- any member, director or employee of a member of an Applicant/Bidder, its Connected Persons or Insiders being involved in the participation by another Bidding Group in the Award Process;
- an Applicant/Bidder, its employees, its Connected Persons or Insiders canvassing directly or indirectly any member of ComReg or any person associated in any way with the Award Process; and
- any other breach of the Award Rules or the agreement with ComReg described in Chapter 5 that is not a trivial or inconsequential breach.

3.127 In certain circumstances, ComReg may also suspend or withdraw a Winning Bidder's Licence(s) if, after granting the Licence(s), it emerges that the Bidder, its employees, its Connected Persons or its Insiders breached the Award Rules or the agreement with ComReg described in Chapter 5.

3.128 In cases where breaches are caused not by the Applicant/Bidder or its employees, but by its Connected Persons or Insiders, then ComReg has discretion to waive or limit the application of sanctions set out in this section if it can be shown that the breach occurred without the Applicant's/Bidder's knowledge, that the Applicant/Bidder has taken all reasonable steps to avoid the breach and/or minimise its effects and that the breach has not caused material detriment to the Award Process.

3.129 Nothing in this IM shall preclude ComReg from seeking alternative remedies for breach of the Award Rules or the agreement with ComReg described in Chapter 5, including, but not limited to, a claim for damages, or the bringing of proceedings under the Competition Act 2002, the Communications Regulation Act 2002, the Specific Regulations or the national legislation which transposes the European Electronic Communications Code into Irish law (as appropriate).

3.3.7 Application Procedure

3.130 In order to participate as a Bidder in the Award Process, an Interested Party must submit the following documents using the methods described in the following sections.

Phase 1 Application Documentation

3.131 Further to Section 3.3.2 above, Phase 1 Application Documentation consists of:

- a completed and signed Phase 1 Application Form (Annex 3a of this document);

- an Ownership Structure Document along with appropriate certification in relation to same in accordance with paragraphs 3.61 and 3.62 of the IM;
- appropriate evidence in respect of Authorised Agents in accordance with paragraph 3.57 of the IM; and
- a statement of whether an Applicant will submit its Phase 2 Application Documentation:
 - electronically with electronic signature/s¹¹⁴; or
 - in hardcopy, in a similar way as for the Phase 1 Application Documentation.

3.132 An Interested Party must submit five identical paper copies of each of the above documents. The original documents should be identified as such.

3.133 The container(s) in which the above paper documentation are submitted must not in any way disclose the identity of the Interested Party.

3.134 ComReg will only accept Phase 1 Application Documentation submitted between **09.00 hours and 17.30 hours** (Irish time) on any of the following Working Days:

- **Monday 14 June 2021;**
- **Tuesday 15 June 2021**
- **Wednesday 16 June 2021;**
- **Thursday 17 June 2021; and**
- **Friday 18 June 2021.**

3.135 Interested Parties must make appointments with ComReg to submit their Phase 1 Application Documentation. To make an appointment for submission of Phase 1 Application Documentation, an Interested Party must contact **Mr Joseph Coughlan or Mr. Patrick Bolton** by telephone between **10:00 to 13:00 and 14:00 to 16:00 hours (Irish time)** on Working Days between **Thursday 2 June 2021 and Thursday 17 June 2021** inclusive.

3.136 The number for telephoning Mr. Coughlan or Mr. Bolton is: **+353 (0)1 804 9761**. ComReg will record all phone calls made or received during the Award Process

¹¹⁴ Details of what constitutes an electronic signature is set out in paragraphs 3.33 – 3.42 above, details of the dedicated file portal to send the documents electronically will be given to Applicants at the time of the submission of Phase 1 Application Documentation.

in order to manage technical issues and risks arising, and to ensure the integrity and administrative efficiency of the Award Process. These recordings, which shall be stored securely, shall be retained and used only for these purposes. In the event of a dispute arising ComReg may seek to rely on the contents of these recordings.

- 3.137 All submitted application documents will be date and time stamped upon being received by ComReg. Once Phase 1 Application Documentation is received by ComReg, the Interested Party is deemed to be an Applicant.
- 3.138 Each Applicant will be given a receipt acknowledging the submission of its Phase 1 Application Documentation.
- 3.139 Only in exceptional circumstances outside the control of the Applicant will Phase 1 Application Documentation be accepted after 17:30 hours on the Phase 1 Application Date and this will be at ComReg's discretion.

Submission of a second or subsequent Application documents during phase 1 of the Application Stage

- 3.140 Phase 1 Application Documentation can be replaced at any time up to 17.30 hours (Irish time) on the Phase 1 Application Date, Friday 18 June 2021.
- 3.141 In the event that an Applicant submits more than one version of Phase 1 Application Documentation prior to 17:30 hours on the Phase 1 Application Date, only the latest Phase 1 Application Documentation received from that Applicant will be taken into consideration.
- 3.142 On the submission of second or subsequent Phase 1 Application Documentation prior to the Phase 1 Application Date then the Applicant must return the receipt for the prior Phase 1 Application Documentation to ComReg. This receipt will be endorsed to indicate that the earlier Phase 1 Application Documentation has been superseded and will not be evaluated. Any superseded Phase 1 Application Documentation will not be returned and will be securely destroyed.
- 3.143 No Phase 1 Application Documentation will be opened by ComReg before 17:30 hours on **Friday 18 June 2021** (the Phase 1 Application Date). All Applications will be opened at the same time and place and in the presence of an independent auditor.
- 3.144 At the time of submission of Phase 1 Application Documentation, ComReg will provide each Applicant with details on how ComReg will securely communicate with the Applicant. ComReg aims to make use of an electronic means as much

as possible to facilitate the process after the Phase 1 Application Date.

- 3.145 Should ComReg determine that additional information is required from an Applicant regarding its Phase 1 Application Documentation, it will instruct the Applicant on the process for providing same.

Phase 2 Application Documentation

- 3.146 As per Section 3.3.2 above, Phase 2 Application Documentation consists of:

- completed and signed Phase 2 Application Form;
- a corresponding monetary Deposit; and
- if required, updated Phase 1 Application Documentation¹¹⁵.

- 3.147 ComReg will only accept **Phase 2 Application Documentation** submitted before **17:30 hours** (Irish time) on the Phase 2 Application Date¹¹⁶. This applies where documents are submitted electronically with electronic signature and/or in hardcopy.

- 3.148 Only in exceptional circumstances outside the control of the Applicant will Phase 2 Application Documentation received after 17:30 hours on the Phase 2 Application Date be accepted and this will be at ComReg's discretion.

- 3.149 ComReg reserves the right to reject any documents submitted after this deadline and, in submitting Phase 1 Application Documentation, Applicants acknowledge and accept same.

Electronic submission

- 3.150 Where an Applicant has chosen to submit Phase 2 Application Documentation electronically with electronic signature (see Section 3.3.2 above in that regard), it must make its submission using the secure file transfer protocol as will be shared with the Applicant on the submission of its Phase 1 Application Documentation. Phase 2 Application Documentation submitted by any other means (including by email, fax, post or hand delivery) will not be accepted (save in circumstances where the Applicant has obtained ComReg's express prior written consent).

- 3.151 Applicants should familiarise themselves with the operation of the secure file

¹¹⁵ Note that as per paragraph 3.68 any updated Phase 1 Application Documentation will need to be submitted in hardcopy in person, consistent with the Phase 1 Application Form process.

¹¹⁶ Interested Parties are reminded that these dates are subject to the outcome of an appeal of Decision D11/20.

transfer protocol and should ensure that they give themselves sufficient time to upload all required documentation by 17:30 hours on the Phase 2 Application Date, bearing in mind that upload speeds vary. It is not advisable to wait until the last moment to upload documents in case of connection difficulties, slow upload speed or other technical problems. It is the responsibility of Applicants to ensure that their Phase 2 Application Documentation are submitted to and reach ComReg on time and ComReg bears no responsibility in this regard.

- 3.152 Similarly, ComReg is not responsible for corruption in documents. Applicants must ensure that documents are not corrupt or otherwise illegible or inaccessible. All Phase 2 Application Documentation submitted must be compiled such that they can be downloaded and read immediately using PDF or Microsoft Office format readers.
- 3.153 On the submission of a second or subsequent Phase 2 Application Documentation prior to the Phase 2 Application Date, the Applicant must, as part of submission of same, confirm that the earlier Phase 2 Application Documentation have been superseded. ComReg will not evaluate any such superseded Phase 2 Application Documentation.

Submission of documents in hardcopy

- 3.154 Where an Applicant chooses (as required to be indicated on its Phase 1 Application Form) not to submit Phase 2 Application Documentation electronically, then the same process as per the Phase 1 Application Form applies. In particular, the Applicant must make an appointment with ComReg to submit same. To make an appointment for submission of Phase 2 Application Documentation, an Applicant must contact **Mr Joseph Coughlan or Mr. Patrick Bolton** by telephone between **10:00 to 13:00 and 14:00 to 16:00 hours (Irish time)** on Working Days between **Thursday 29 July and Thursday 5 August 2021**.
- 3.155 The number for telephoning Mr. Coughlan or Mr. Bolton is: **+353 (0)1 804 9761**. ComReg will record all phone calls made or received during the Award Process in order to manage technical issues and risks arising, and to ensure the integrity and administrative efficiency of the Award Process. These recordings, which shall be stored securely, shall be retained and used only for these purposes. In the event of a dispute arising ComReg may seek to rely on the contents of these recordings.
- 3.156 All submitted Application documents will be date and time stamped upon being received by ComReg.
- 3.157 An Applicant must submit five identical paper copies of each of the above

documents. The original documents should be identified as such.

- 3.158 The container(s) in which the above paper documentation are submitted must not in any way disclose the identity of the Applicant.

Submission of a second or subsequent Application documents during phase 2 of the Application Stage

- 3.159 Phase 2 Application Documentation can be replaced at any time up to 17:30 hours (Irish time) on the Phase 2 Application Date, **Friday 6 August 2021**. In the event that an Applicant submits more than one version of Phase 2 Application Documentation prior to 17:30 hours on the Phase 2 Application Date, only the latest Phase 2 Application Documentation received from that Applicant will be taken into consideration.
- 3.160 Where an Applicant has chosen to submit its initial Phase 2 Application Form in hardcopy, it must do so again for any second or subsequent Phase 2 Application Documentation submitted prior to the Phase 2 Application Date. On doing so, the Applicant must return the receipt for the prior Phase 2 Application Documents to ComReg. This receipt will be endorsed to indicate that the earlier Phase 2 Application Documentation has been superseded and will not be evaluated. However, any superseded Phase 2 Application Documentation will not be returned and will be securely destroyed.
- 3.161 If an Applicant has opted to submit its initial Phase 2 Application Form electronically using electronic signatures, if and when submitting any second or subsequent Phase 2 Application Documentation it must confirm that the earlier Phase 2 Application Documentation have been superseded. ComReg will not evaluate any such superseded Phase 2 Application Documentation.
- 3.162 No Phase 2 Application Documentation will be opened by ComReg before 17:30 hours on the Phase 2 Application Date. All Phase 2 Application documents will be opened at the same time and place and in the presence of an independent auditor.
- 3.163 The deadline for receipt of all Deposits, in cleared funds, will be **23:59 hours (Irish time)** on the Phase 2 Application Date.
- 3.164 As noted at Section 3.3.1 above, ComReg will facilitate the submission of questions regarding the Award Process prior to the Phase 1 Application Date and Phase 2 Application Date. Following the latter date, and onwards through to the conclusion of the Notification and Grant Stage, no questions will be accepted from Applicants or Interested Parties, save for those that would qualify as permitted communications of the type set out in Section 4.1.4 of this

document (Communicating with ComReg) and save for those communications and responses which are specifically requested by ComReg or its agents in accordance with the IM.

3.165 Once Applications have been submitted, they constitute binding offers to purchase the Lots applied for on the Initial Bid Form. However, an Applicant may withdraw its Application on or before **Friday 13 August 2021** without forfeiture or partial forfeiture of Deposits, subject to that Applicant's compliance with the Award Rules.

3.166 However, if a Bidder were to opt to not bid during the Main Stage of the Auction, its Initial Bid would still be included in the set of Bids considered in the determination of Winning Bidders and Base Prices.

3.4 Qualification Stage

3.4.1 Process for approval of Applications

3.167 Once each of the Application Dates has passed, ComReg will evaluate all Application documentation received within the specified time window on or before the Application Dates. After the Phase 1 Application Date ComReg will evaluate whether the Phase 1 Application Documentation for each Applicant is valid¹¹⁷ and similarly, after the Phase 2 Application Date will evaluate whether the Phase 2 Application Documentation for each Applicant or any updated documentation is valid. Following this ComReg will assess Aggregate Demand. Applicants that submit valid Applications at the Application Stage (both Phase 1 and Phase 2 Documentation with associated Deposit) which are approved by ComReg become Bidders.

3.168 Upon completion of its assessment of Phase 2 Application Documentation, ComReg will:

- inform each Applicant whether or not it has been approved by ComReg to become a Bidder;
- inform each Bidder whether an Auction is required and, if so, whether a Main Stage of the Auction is required; and
- in the event that a Main Stage of the Auction is required, inform each Bidder of its Initial Eligibility.

3.169 The start date of the Auction will be notified to Bidders with at least ten clear

¹¹⁷ Details of what constitutes a valid Application is set out in Section 3.3 above.

Working Days prior notice.

- 3.170 ComReg will not inform Bidders about the identity of other Bidders, the Initial Bids made by other Bidders or the Initial Eligibility of other Bidders. ComReg will not inform Bidders about unsuccessful Applicants who fail to become Bidders or Applicants who withdraw an Application.
- 3.171 Applicants are reminded that, even if they are unsuccessful in becoming Bidders or withdraw their Application, they remain bound by the Award Rules on release of Confidential Information until the public announcement on the final outcome of the Award Process by ComReg.

3.4.2 Assessment of Applications

During the Qualification Stage

- 3.172 If an Applicant fails to ensure that ComReg receives the full Deposit for the Lots for which the Applicant has applied (in its Initial Bid Form) by the specified deadline date and time, ComReg, at its discretion, may decide that the Applicant's Application is not valid and that the Applicant is not eligible to participate as a Bidder in the Award Process. Alternatively, ComReg may at its discretion provide a short additional period of time for the full amount of the required Deposit to be paid by the Applicant.
- 3.173 If any aspect of an Application is found to be incomplete, unclear or otherwise invalid, ComReg has the discretion to decide what measures to take, reflecting the nature of the ambiguity, omission or invalidity. These measures include seeking clarification or verification of information already provided, requesting further information from the Applicant or deeming that Application invalid.
- 3.174 However in the event that an Application is in any material way incomplete, inaccurate, invalid, or untrue, ComReg reserves the right to directly and immediately exclude the Applicant concerned from becoming a Bidder i.e. ComReg may do so without providing the Applicant with an opportunity to clarify or correct its Application.
- 3.175 In the case where an Applicant is declared unsuccessful in its Application or withdraws its Application, any Deposit which it has paid will be returned to it in accordance with the Award Rules and the timeline for the return of Deposits set out in Table 17 of Chapter 3 above.

Subsequent to the Qualification Stage

- 3.176 If, having determined that an Applicant may participate in the Award Process as a Bidder, ComReg should subsequently become aware that the Bidder's original

Application was incomplete, inaccurate, invalid, or untrue, ComReg may, at its discretion, allow the Bidder opportunity to clarify or correct the information already provided.

- 3.177 In the event that any material inaccuracy or untruth in an Application is identified, ComReg reserves the right to exclude the Bidder directly without providing opportunity for the Bidder to clarify or correct the information already provided.
- 3.178 If such a Bidder cannot provide correction or clarification to ComReg's satisfaction, within the time limit specified by ComReg, that Bidder may be excluded from the Award Process with return of all, part, or none of its Deposit depending on the nature and seriousness of the inaccuracy or untruth in its Application.
- 3.179 Where a Bidder is informed that it cannot participate further in the Award Process, ComReg will endeavour to return part or all of its Deposit within one week of the Bidder being notified.
- 3.180 Applicants and Bidders have an on-going obligation to inform ComReg of any material changes to information provided in their Applications. If an Applicant/Bidder becomes aware of any material error, omission, or inaccuracy in its Application, the Applicant/Bidder shall inform ComReg of the same as soon as reasonably possible. This obligation shall remain in effect for the duration of the Award Process and for the duration of any Licence granted on foot of the Award Process.
- 3.181 For the avoidance of doubt, the options available to ComReg outlined above are without prejudice to any other appropriate action that ComReg may take in accordance with its statutory objectives and duties.

3.4.3 Progress of the Award Process

- 3.182 Based on ComReg's assessment of Aggregate Demand for each Lot Category as expressed in the Initial Bids of Bidders, the Award Process will progress in one of the following ways:
- a Main Stage and an Assignment Stage will be held, followed by a Notification and Grant Stage;
 - a Main Stage will be held, followed by a Notification and Grant Stage;
 - an Assignment Stage will be held, followed by a Notification and Grant Stage; or

- only a Notification and Grant Stage will be held.

3.183 A Main Stage of the Auction is required if, for one or more Lot Categories, the total number of Lots in that Lot Category specified in Bidders' Initial Bids exceeds the number of Lots available in the Lot Category, i.e. if there is at least one Lot Category for which Aggregate Demand exceeds supply.

3.184 If a Main Stage of the Auction is required:

- all Lot Categories will be included in the Main Stage of the Auction, regardless of whether there was excess demand in the respective Lot Category expressed in the Initial Bids of Bidders;
- ComReg will inform each Bidder of its Initial Eligibility to Bid for Lots in each Time Slice in the first Primary Bid Round; and
- each Bidder's Initial Bid will be included in the set of Bids considered when determining the Winning Bids and associated Base Prices for the Main Stage.

3.185 If a Main Stage is not required, each Bidder will automatically become a Winning Bidder and will be awarded the Lots it applied for with its Initial Bid.

3.186 At the end of the Main Stage, or the Qualification Stage if a Main Stage is not required, the Award Process will progress to the Assignment Stage, if required. The need for an Assignment Round is as set out in Section 4.3.2.

3.187 The purpose of the Assignment Stage is to determine the specific frequencies to be assigned to the Winning Bidders of (frequency-generic) B-Lots and any Additional Prices they will have to pay, if required. If there is more than one feasible frequency assignment for at least one Winning Bidder (in accordance with the rules for determining Assignment Options), the Assignment Stage will include a process (the Assignment Round) in which Winning Bidders are able to express their preferences for specific frequencies (potentially competing with other Winning Bidders where there might be competing demands for particular frequencies). Following an Assignment Round, the Assignment Stage will include a Negotiation Phase, during which Winning Bidders are given the opportunity to negotiate between themselves an alternative frequency assignment to that established in the Assignment Round (subject to a number of constraints and approval from ComReg).

3.188 If only A-Lots are to be awarded in accordance with the outcome of the Main Stage, or the Qualification Stage if a Main Stage is not required, an Assignment Stage is not required as the frequencies for A-Lots are fixed.

3.189 Following completion of the Assignment Stage (if required), the Award Process will progress to the Notification and Grant Stage.

3.5 Main stage

3.5.1 General

3.190 This section outlines the key features of the Main Stage. The detailed Auction Rules applying to the Main Stage are provided in Chapter 4 (Section 4.2). For completeness and transparency, ComReg has set out the details of how the Auction and Auction Rules will work, much of which involves complex Auction theory. Interested Parties are assured, however, that, in practice, the EAS that will be used by Bidders to submit Bids in the Auction will only permit the submission of a Bid that complies with the detailed Auction Rules.

3.191 The function of the Main Stage is to determine how many Lots each Bidder will be awarded in each of the available Lot Categories, and the price to be paid by each Winning Bidder (its Base Price). Specific frequency assignments for Winning Bidders of frequency-generic B-Lots will be determined subsequently in the Assignment Stage.

3.192 The Main Stage will follow a Combinatorial Clock Auction (CCA) format and will progress in discrete Rounds, consisting of:

- one or more **Primary Bid Rounds**;
- followed by one further round of bidding – the **Supplementary Bids Round**.

3.193 The open, multiple Round, structure of the Primary Bid Rounds is intended to allow Bidders to learn about Aggregate Demand for Lots and to provide an opportunity for Bidders to revise their assessment of the value of Lots in light of this information.

3.194 All Bids in the Main Stage are for Packages of Lots (i.e. a package of one or more Lots). A Bid for a Package of Lots will not be subdivided by the Auctioneer, so a Bidder will only win an entire Package of Lots it has bid for, or nothing. As a result, Bidders do not face risks associated with winning some, but not all, of the Lots within a Package of Lots for which they have bid.

3.5.2 Primary Bid Rounds

3.195 The Primary Bid Rounds follow a clock auction format. Bidding proceeds in discrete Rounds, with all Bidders invited to submit Bids within the same fixed

time window (subject to the provisions for Extensions, described further below).

- 3.196 Before the start of each Primary Bid Round, ComReg will announce a price per Lot for each Lot Category in that Round (the 'Round Prices').
- 3.197 In any given Primary Bid Round, each Bidder can submit at most one Primary Bid for a single Package of Lots, where the Bidder specifies the number of Lots it wishes to acquire in each Lot Category. The Bid Amount for this Package of Lots is determined automatically as the sum total of the prevailing Round Prices for the Lots included.

Round Prices

- 3.198 For the first Primary Bid Round, the Round Price per Lot in each Lot Category for which there was no excess demand¹¹⁸ on the basis of Initial Bids will be the Reserve Price per Lot in the Lot Category. The Round Price per Lot in each Lot Category for which there was excess demand on the basis of Initial Bids will be the Reserve Price per Lot in the Lot Category plus a Price Increment determined by ComReg.
- 3.199 For subsequent Primary Bid Rounds, Round Prices are increased (relative to previous Round Prices) for all Lot Categories for which there was excess demand in the previous Round. The magnitude of the Price Increment applicable to each Lot Category will be determined by ComReg, taking into account factors such as the level of excess demand in the previous Round (for that or other Lot Categories). In the case where there was no excess demand in a Lot Category at previous Round Prices, no Price Increment shall be applied to Lots in that Lot Category.

Activity Rules

- 3.200 Primary Bids are subject to Activity Rules that may limit the composition of the Package of Lots a Bidder may bid for in a Round, depending on the Primary Bids submitted in previous Rounds by that Bidder. The Activity Rules are used to ensure that Bidding is progressive, with Bidders reducing demand as prices increase, and to prevent Bidders from only revealing their true demand for Lots late in the Auction. Activity in the Auction is measured in Eligibility Points for each Time Slice. Each Lot has been assigned a number of Eligibility Points (set out in Table 15 and Table 16).
- 3.201 A Bidder starts each Primary Bid Round with a number of Eligibility Points for each Time Slice (the Bidder's 'Eligibility'). Each Package of Lots has an

¹¹⁸ Excess demand for a Lot Category is defined as the aggregate demand for Lots in the Lot Category less the number of Lots available in that Lot Category.

associated Eligibility, calculated separately for each Time Slice as the sum of the Eligibility Points of the Lots pertaining to that Time Slice included in the Package of Lots¹¹⁹. The Activity of a Primary Bid in a Primary Bid Round is the Eligibility of the Package of Lots subject to the Bid (and is also determined separately for each Time Slice).

3.202 The Initial Eligibility of each Bidder in each Time Slice will be the sum of the Eligibility Points associated with the Lots selected in its Application Form in that Time Slice (where any 700 MHz Duplex Lots count towards the Initial Eligibility in both Time Slices).

3.203 In subsequent rounds, the Eligibility of each Bidder in a Time Slice will be equal to the smaller of:

- (i) the Bidder's Eligibility in that Time Slice¹²⁰ at the start of the preceding Round; and
- (ii) the Eligibility of the Package of Lots subject to its Primary Bid in that Time Slice¹²¹ in the preceding Round.

Therefore, a Bidder's Eligibility in a Time Slice can never increase during the Main Stage.

3.204 In any Primary Bid Round, a Bidder may submit a Primary Bid for any Package of Lots with an Eligibility that does not exceed the Bidder's Eligibility at the start of the Round in either Time Slice. This means that a Bidder can always switch its demand to Packages of Lots with Eligibility no greater than its Eligibility at the start of the Round. For instance, a Bidder may be able to reduce demand in one Lot Category and use the associated Eligibility to increase its demand in other Lot Categories. For the avoidance of doubt, however, Eligibility is not transferrable across Time Slices, so a Bidder cannot reduce its demand in one Time Slice and use the associated Eligibility to bid for Lots in the other Time Slice.

3.205 Under certain conditions, a Bidder may be able to submit a Primary Bid for a Package of Lots with an Eligibility that exceeds its Eligibility at the start of the Round in one or both Time Slices. Such Bids are termed Relaxed Primary Bids, and are allowed only in the specific circumstances where such a Bid is consistent with the preferences implied by the Bidder's previous bidding

¹¹⁹ Note that any 700 MHz Duplex Lots included in the Package of Lots contribute to the Eligibility of the Package of Lots in both Time Slices.

¹²⁰ For the avoidance of doubt, the eligibility associated with the 700 MHz Duplex would be counted in that Time Slice if a Bidders Package of Bids includes the 700 MHz Duplex.

¹²¹ Ibid.

behaviour¹²².

- 3.206 The possibility of submitting Relaxed Primary Bids provides an opportunity for Bidders to respond to the changing relative prices of Lots in different Lot Categories, consistently with the Bidder's implied preferences across various Packages of Lots¹²³. Without Relaxed Primary Bids, Bidders would only be able to switch back and forth between Packages of Lots with exactly the same Eligibility. However, by using Relaxed Primary Bids, a Bidder may be able to switch back and forth between Packages of Lots with different Eligibility.
- 3.207 For instance, suppose that a Bidder starts by Bidding for Package A, but at some point Package A becomes too expensive relative to an alternative Package B that has a smaller Eligibility and so the Bidder switches to Bidding on Package B. Without the provisions for submitting Relaxed Primary Bids, the Bidder would not be able to switch back to submitting Primary Bids for Package A, even if Package A again became relatively cheap when compared with Package B. The facility to make Relaxed Primary Bids allows the Bidder to bid again for Package A, provided certain conditions are met to ensure bidding for Package A is consistent with Bids submitted in earlier Primary Bid Rounds. See Annex 6 for an example of how to submit a Relaxed Primary Bid.
- 3.208 In some cases, to submit a Relaxed Primary Bid for Package A that is consistent with the preferences implied by the Bidder's previous Primary Bids, it might be necessary to submit a new Bid for some Package B that the Bidder bid for in a previous Primary Bid Round, with a Bid Amount above the Bidder's previous Bid for Package B. Such a Bid is called a "Chain Bid". Chain Bids are additional Bids on certain Packages of Lots that have already been the subject of Bids submitted by the Bidder¹²⁴. Where Chain Bids are required, these Chain Bids are at the minimum amount necessary to ensure consistency with the Bids made for Packages of Lots in Primary Bid Rounds where the Bidder dropped Eligibility.
- 3.209 If a Bidder were to select a Relaxed Primary Bid within the EAS during a Primary Bid Round, the EAS would provide details of any Chain Bid(s) required and the associated Bid Amounts that would need to be submitted alongside the Relaxed Primary Bid¹²⁵. Therefore, making a Relaxed Primary Bid simply requires the

¹²² Strictly, this consistency is only required in respect of the Bidder's Initial Bid and Bids made for Packages of Lots submitted in Primary Bid Rounds where the Bidder dropped Eligibility.

¹²³ A worked example of the Activity Rules for the Primary Bid Rounds and caps on Supplementary Bids is set out in Annex 6 of this document.

¹²⁴ These will be either the Package of Lots subject to the Bidder's Initial Bid or a Package of Lots subject to a Primary Bid in an earlier Primary Bid Round when the Bidder reduced Eligibility.

¹²⁵ In practice, there would typically be only a small number of such Chain Bids needed.

selection of the Package of Lots by the Bidder. Bid Amounts for the Relaxed Primary Bid and any associated Chain Bids would be non-discretionary and calculated by the EAS.

Restrictions on the submission of certain Primary Bids

3.210 In the 2.6 GHz Band, as the fixed frequency A-Lots are best utilised by Bidders also obtaining 2.6 GHz TDD Generic Frequency Lots, a Bidder will be prevented from submitting a Bid for a Package of Lots which includes both the 2.6 GHz TDD Fixed Frequency Lot (Lower) and the 2.6 GHz TDD Fixed Frequency Lot (Upper) in a given Time Slice unless the Bidder also places a bid for all Lots in the 2.6 GHz TDD Band in the same Time Slice.

End of the Primary Bid Rounds

3.211 The Primary Bid Rounds will end following the first Primary Bid Round in which there is no excess demand for any Lot Category at the prevailing Round Prices¹²⁶.

3.5.3 Supplementary Bids Round

3.212 The Supplementary Bids Round consists of a single Round of bidding in which Bidders may submit a number of Bids (Supplementary Bids) for Packages of Lots across all Lot Categories, subject to certain constraints (discussed further below).

3.213 The Supplementary Bids Round provides an opportunity for Bidders to:

- submit Bids for Packages of Lots they are allowed to bid for under the Auction Rules and Bidding Constraints, but for which they did not Bid in the Primary Bid Rounds; and/or
- increase their Bids for Packages of Lots that they Bid for in the Primary Bid Rounds.

3.214 Bidders are not required to submit any Bids during the Supplementary Bids Round if they do not wish to do so.

3.215 Supplementary Bids submitted for any Package of Lots must satisfy the Bidding Restrictions set out in Section 4.1.3.

3.216 Unlike in the Primary Bid Rounds, Bid Amounts are discretionary and can be freely chosen by the Bidder, subject to constraints on the minimum and

¹²⁶ Subject to certain provisions for exceptional circumstances (see Section 4.1.5).

maximum amounts allowed and Bids being a multiple of EUR 1000. If a Bidder submitted a Primary Bid for a non-empty Package of Lots in the final Primary Bid Round (the Final Primary Package), the maximum Bid Amount associated with a Supplementary Bid for this Package of Lots is unrestricted.

3.217 For all other Packages of Lots, there are restrictions on the Bid Amounts that can be specified for Supplementary Bids that arise due to the Bids previously submitted during the Primary Bid Rounds. All Supplementary Bid Amounts are subject to a floor. The restrictions on Supplementary Bid amounts, together with the Activity Rules for the Primary Bid Rounds, aim to ensure that Bidders are not able to conceal their true demand for Lots in early Primary Bid Rounds only to reveal this demand later on¹²⁷.

Floors on Supplementary Bids

3.218 Where a Bidder has submitted a Bid for a Package of Lots in the Primary Bid Rounds, this represents a floor on the Bid Amount that the Bidder can submit for the same Package of Lots in the Supplementary Bids Round. Where a Bidder has submitted multiple Bids for a Package of Lots during the Primary Bid Rounds (for example, by submitting a Bid for the same Package of Lots in consecutive Rounds), the applicable floor for the Supplementary Bid amount on this Package of Lots will be the highest Bid Amount for that Package of Lots submitted by the Bidder during the Primary Bid Rounds.

3.219 Therefore, Supplementary Bids can only increase the highest Bid made so far for a Package of Lots (which might have been submitted as a standard Primary Bid, a Relaxed Primary Bid or a Chain Bid during the Primary Bid Rounds).

3.220 Where a Bidder has not submitted a Bid for a particular Package of Lots during the Primary Bid Rounds, the floor on the Bid Amount that the Bidder may submit for that Package of Lots during the Supplementary Bids Round will be equal to the sum of the Reserve Prices associated with the Lots included in the Package of Lots.

Caps on Supplementary Bids

3.221 Supplementary Bid amounts may be subject to two caps:

- a Relative Cap; and

¹²⁷ Note that the EAS will not allow Bidders to submit invalid Supplementary Bids, and will provide assistance with identifying Bids that violate the constraints. Nevertheless, it is the sole responsibility of Bidders to ensure that the Bids they submit are valid and compliant with the Auction Rules.

- a Final Price Cap¹²⁸.

- 3.222 The caps work in conjunction with the Activity Rules for the Primary Bid Rounds, and have been designed to encourage Bidders to submit Primary Bids for the Package of Lots that they prefer at the prevailing Round Prices¹²⁹. In essence, the caps on Supplementary Bid amounts prevent a Bidder from submitting Supplementary Bids that are not consistent with the preferences implied by their Primary Bids.
- 3.223 The **Relative Cap** limits the Bid Amount that a Bidder can submit during the Supplementary Bids Round for any package of Lots which the Bidder did not have sufficient Eligibility to bid for in the final Primary Bid Round.¹³⁰ This is intended to ensure that the preferences across different packages expressed by a Bidder's Bids submitted during the Supplementary Bids Round are consistent with the Bids that the Bidder submitted during the Primary Bid Rounds. This mechanism is intended to provide incentives for straightforward bidding during the Primary Bid Rounds.
- 3.224 The Relative Cap limits the Bid Amount of a Supplementary Bid for a package of Lots X relative to the highest Bid Amount submitted for its **Constraining Package** of Lots bid for in the **Constraining Round**. The procedure for defining the applicable Constraining Package and Constraining Round is described in Section 4.2.2.
- 3.225 The **Final Price Cap** is similar to the Relative Cap, but arises in the last Primary Bid Round (the final Primary Bid Round), and applies to the Bid Amount for any Package of Lots, except for the Final Primary Package. The Bid Amount for any Package of Lots subject to the Final Price Cap will be capped at the highest Bid Amount that the Bidder makes for its Final Primary Package plus the difference

¹²⁸ Bids for any Package of Lots other than the Final Primary Package will be subject to a Final Price Cap. Supplementary Bids for Packages of Lots with an associated Eligibility greater than the Bidder's Eligibility in the final Primary Bid Round (including the Final Primary Package if the Bid submitted by the Bidder in the final Primary Round was a Relaxed Primary Bid) will be subject to a Relative Cap. Therefore, a Supplementary Bid may be subject to both a Final Price Cap and a Relative Cap.

¹²⁹ The caps are based on the idea of revealed preference. Suppose that in a given Round Package X is more expensive than Package Y. If a Bidder Bids for Y instead of X, then it implicitly indicates that it is not willing to pay the extra cost for X, and so any additional value it may place on X over Y cannot exceed the difference in the prevailing Round Prices.

¹³⁰ The Relative Cap and the Final Price Cap coincide for Packages that the Bidder is eligible to Bid for in the final Primary Round. Therefore, the relative cap can be ignored for such packages.

in the price of the two Packages of Lots in the final Primary Bid Round¹³¹.

3.226 A detailed description of the caps is provided in Section 4.2.3. Annex 8 provides examples of how the caps are calculated and Annex 7 discusses the practical implications of the Final Price Cap.

3.5.4 Winner and Base Price determination

3.227 Following the Supplementary Bids Round, all valid Initial Bids, Primary Bids (including Relaxed Primary Bids and Chain Bids) and Supplementary Bids received from Bidders are then considered together to determine:

- the Winning Bids in the Main Stage; and
- the Base Prices to be paid by the Winning Bidders (see Section 4.2.5).

3.228 The set of Winning Bidders (and Winning Bids) will be determined by selecting the combination of Bids that has the greatest total value, such that:

- in each Lot Category, no more Lots are awarded than are available in that Lot Category; and
- at most one Bid is accepted from each Bidder.

3.229 This process of selecting the Winning Bids on the basis of optimisation is called Winner Determination.

3.230 ComReg will determine the Base Price payable by each Winning Bidder in respect of its Winning Bid in the Main Stage. These Base Prices will be determined using the Opportunity Cost pricing methodology set out in Chapter 4 (Section 4.2.5). In overview, each Winning Bidder will be required to pay a sufficient amount such that there is no other Bidder, or group of Bidders, that would be prepared to pay more for the Lots awarded to the Winning Bidder, based on the Bids submitted by all Bidders. In addition, each and every subset of Winning Bidders will be required to collectively pay a sufficient amount such that there is no other Bidder, or group of Bidders, that would be prepared to pay more for the Lots awarded to the subset of Winning Bidders.

3.231 Annex 11 sets out the formal mathematical description of the process of winner and price determination that will be used. Annex 9 provides a simple example.

¹³¹ Note that this difference is negative for those Packages of Lots that were cheaper than the Final Primary Package in the Final Primary Bid Round, and so the Bid Amount for these Packages of Lots must be lower than the Bid Amount for the final Primary Package.

3.232 Bidders will be provided, well in advance of the Auction, with access to a standalone version of the winner and price determination software that can be used to process test cases. This should help Bidders with understanding the mechanics of the winner and price determination procedure, and to verify the algorithm used.

3.6 Assignment Stage

3.233 The purpose of the Assignment Stage is to determine the specific frequencies to be assigned to each Winning Bidder awarded B-Lots following the Main Stage (or the Qualification Stage if a Main Stage is not required) across all relevant bands. As the frequencies associated with A-Lots are fixed, they are not affected by the Assignment Stage.

3.234 Participants in the Assignment Stage are referred to as 'Assignment Bidders'. At the start of the Assignment Stage, ComReg will, for each band, determine the set of feasible frequency assignments for each Assignment Bidder which is to be awarded B-Lots in accordance with the outcome of the Main Stage (or Qualification Stage if a Main Stage is not required) ("Assignment Options").

3.235 The methodology for generating Assignment Options is set out in Annex 12.

3.236 The outcome of the Assignment Round, if required, will form the Provisional Assignment Plan, setting out frequency assignments within the frequency range in each band for each Assignment Bidder. However, if there is only one possible frequency assignment for every Assignment Bidder in every band, an Assignment Round is not required and the Provisional Assignment Plan will consist of each Assignment Bidder's unique frequency assignment(s) across all bands.

3.237 Following the determination of the Provisional Assignment Plan for each band, there will be a Negotiation Phase during which Assignment Bidders will be given a period of ten Working Days to negotiate and submit a request to ComReg for a reassignment of the frequencies they were assigned in the Provisional Assignment Plan.

3.238 The Assignment Round and Negotiation Phase are discussed in more detail below.

3.6.1 Assignment Round

3.239 If there is more than one feasible frequency assignment identified for any given Assignment Bidder in any band, it will be necessary to determine which options will form the Provisional Assignment Plan. In this case, an Assignment Round

will be run to determine, for the relevant band(s), a frequency assignment for each Assignment Bidder that is compatible with the frequency assignments for all other Assignment Bidders.

3.240 The Assignment Round consists of a single Round in which, for any given band where there is more than one feasible frequency assignment for at least one Assignment Bidder:

- Assignment Bidders whose preferred frequency assignment might conflict with the preferred assignment of at least one other Assignment Bidder¹³² are able to submit Bids ('Assignment Bids') to express their preferences over their possible assignments. The potential conflicts are resolved, and frequency assignments determined, on the basis of these Assignment Bids. Assignment Bidders may be required to pay an additional amount on top of their Base Price (an 'Additional Price') for their specific frequency assignment; and
- Assignment Bidders whose feasible frequency assignments do not conflict with the feasible frequency assignments for any other Assignment Bidder¹³³ in any band will be able to choose their preferred option from amongst the set of frequency assignments presented to them.

Winner and Additional Price determination

3.241 For a given band, the Winning Combination of Assignment Bids in the Assignment Stage will be the combination of valid Assignment Bids submitted during the Assignment Round that has the highest total value of Assignment Bid amounts, and is compatible with none of the distinct frequency assignments allocated to each Assignment Bidder overlapping.

3.242 Depending on the outcome of the Assignment Round and the Assignment Bids submitted, Assignment Bidders may be required to pay an additional amount on top of their Base Price for the specific frequencies to be assigned to them. ComReg will determine the amounts (Additional Prices) payable by the relevant Assignment Bidders according to an Opportunity Cost pricing rule (Opportunity Cost is described in paragraph 4.165). The key features of this rule are similar to those set out in relation to determination of the Base Prices to be paid by

¹³² This will be the case for any Assignment Bidder awarded B-Lots in at least one band in which another Assignment Bidder has been awarded B-Lots.

¹³³ This will be the case if there is no other Winner of B-Lots in any band in which that Bidder won B-Lots in the Main Stage. The Bidder may, however, still have alternative feasible frequency options that meet the relevant requirements, and it will have to choose between them.

Winning Bidders in the Main Stage.

3.243 Winning Assignment Bidders and Additional Prices are determined independently for each band. A Winning Assignment Bidder will be required to pay the sum of its Additional Prices for each band in its assignment.

3.6.2 Negotiation Phase

3.244 Following the Assignment Round and the determination of the Provisional Assignment Plan for each band, Assignment Bidders will be permitted a period of ten clear Working Days in which they may communicate with each other to negotiate a re-organisation of the Provisional Assignment Plan and notify ComReg of any revised frequency assignments. Negotiations are only over the location of frequencies associated with the B-Lots. Winners of fixed frequency lots cannot swap those frequencies or swap their B-Lots so that they are no longer contiguous with their A-Lot(s).

3.245 Any such re-organisation is subject to all Assignment Bidders receiving blocks of spectrum in accordance with the amount of spectrum awarded to them in each band in the Main Stage (or Qualification Stage).

3.246 The rules relating to the negotiation of alternative frequency assignments are further set out in Chapter 4.

3.247 In order to provide a starting point for the Negotiation Phase, following the completion of the Assignment Round, ComReg will inform Winning Bidders of the Provisional Assignment Plan (i.e. the frequencies to be assigned to each Assignment Bidder in each of the bands and time slices) and any Additional Prices to be paid.

3.248 If Bidders are able to successfully negotiate and agree on an alternative frequency plan for a band and notify ComReg within the ten Working Day period, ComReg will consider and, at its discretion, adopt that frequency plan as the Final Assignment Plan for that band.

3.249 If Bidders are unable to come to an alternative configuration of frequency assignments for a band, ComReg will treat the Provisional Assignment Plan for that band as the Final Assignment Plan for that band.

3.250 Following receipt of any requests for alternative frequency assignments, ComReg will determine the Final Assignment Plan, setting out the specific frequencies to be assigned to all Winning Bidders in each band.

3.251 Note that ComReg reserves the right to refuse any request for a reassignment

of frequencies between two or more Winning Bidders. In this case the frequencies involved will be assigned according to the Provisional Assignment Plan. In particular, and without prejudice to the generality of the foregoing, revised frequency assignments proposed by Assignment Bidders may be rejected if such assignments would result in non-contiguous unsold spectrum in a band.

Post-Auction frequency reassignment

3.252 ComReg notes that some Winning Bidders may have a preference for an alternative frequency plan that was not possible to establish under the rules of the Assignment Stage. In particular, this may involve the location of any unsold frequencies.

3.253 In this case, one or more Licensees may submit an application to ComReg, following the completion of the Award Process, to request a reassignment of the frequencies assigned. For example, this could involve:

- a swap of frequencies between two Licensees; and/or
- a swap of frequencies assigned to a Licensee for unsold spectrum.

3.254 Frequency reassignment requests are strictly subject to the approval of ComReg.

3.255 In accordance with standard procedure for frequency reassignment, ComReg will consider each request on a case-by-case basis and in light of its statutory functions, objectives and duties, including public consultation on the matter as appropriate.

3.256 ComReg reserves the right to refuse any request to reassign frequencies, and to assign unused frequencies in any other way, if it considers appropriate in order to meet its statutory functions, objectives and duties.

3.7 Notification and Grant Stage

3.257 Once ComReg has determined the Base Prices for Winning Bids and Additional Prices to be paid for specific frequency assignments have been determined in the Assignment Stage, ComReg will notify each Bidder in writing whether or not it has been successful in acquiring Lots in the Award Process.

3.258 In the case of Bidders who do not win any Lots in the Award Process, ComReg

will return the relevant amount of their Deposit to them¹³⁴ (less any Deposit forfeiture imposed in accordance with the Auction Rules) within approximately two weeks of this notification.

- 3.259 In the case of Winning Bids, ComReg will notify the Winning Bidders of their Winning Bids and their entitlement to apply for a MBSA2 Preparatory Licence and a MBSA2 Liberalised Use Licence, subject to compliance with certain upfront obligations, as set out in the paragraphs of this subsection below.
- 3.260 The SAF to be paid by each Winning Bidder prior to the receipt of a MBSA2 Liberalised Use Licence or a MBSA2 Preparatory Licence is the sum of its Base Price and its Additional Price.
- 3.261 The notification to the Winning Bidder will specify the date for the payment of the SAF and first SUF (the "Payment Deadline"), and this date will be approximately two weeks after the release of the results of the Assignment Stage to Bidders. The payment of each Winning Bidder's SAF and first SUF is a prior condition to that Winning Bidder being entitled to apply for a MBSA2 Liberalised Use Licence.
- 3.262 If the total amount of a Winning Bidder's SAF and first SUF is more than the amount of its Deposit, then the net amount of funds due must be received by ComReg in the relevant bank account as cleared funds no later than 23:59 hours (Irish time) on the date of the Payment Deadline. If the total amount of a Winning Bidder's SAF and first SUF, less any applicable rebates, is less than the amount of its Deposit, the relevant amount of its Deposit¹³⁵ will be returned to this Winning Bidder by ComReg by the same date as the Payment Deadline (less any Deposit forfeiture imposed in accordance with the Auction Rules).
- 3.263 In respect of a MBSA2 Preparatory Licence, the notification will state that, upon grant of such a Licence, the Winning Bidder is obliged to comply with the terms and conditions associated with the MBSA2 Preparatory Licence (as detailed in draft form in the MBSA2 Licence Regulations) and will, among other things, specify the due date by which the Winning Bidder shall pay the Licence fee associated with the MBSA2 Preparatory Licence.
- 3.264 Where the Winning Bidder has submitted the SAF along with the Licence fee associated with the MBSA2 Preparatory Licence, and submitted a valid application for same (as determined by ComReg), ComReg will issue a MBSA2

¹³⁴ This would include any associated interest earned on the NTMA Exchequer Notes, whether positive or negative, if applicable.

¹³⁵ This would include any associated interest earned on the NTMA Exchequer Notes, whether positive or negative, if applicable.

Preparatory Licence to the Winning Bidder.

3.265 In respect of a MBSA2 Liberalised Use Licence, the notification will state that, upon grant of such a Licence, the Winning Bidder is obliged to comply with the terms and conditions associated with the MBSA2 Liberalised Use Licence (as detailed in draft form in Annex 2 and as described in Section 2.3 this Information Memorandum) and will, among other things:

- specify the Spectrum Blocks to be included in the MBSA2 Liberalised Use Licence in accordance with the Lots awarded to the Winning Bidder in the Award Process;
- specify the expected MBSA2 Liberalised Use Licence commencement date and the commencement date of each Spectrum Block in the MBSA2 Liberalised Use Licence notwithstanding the possibility for the commencement date of the Licence and the Spectrum Blocks in a MBSA2 Liberalised Use Licence to be delayed beyond the expected start date;
- specify the expiry date of each Spectrum Block in the MBSA2 Liberalised Use Licence and the expiry date of the MBSA2 Liberalised Use Licence;
- note that the Winning Bidder is required to pay the SUF associated with the MBSA2 Liberalised Use Licence in advance of the issue of its MBSA2 Liberalised Use Licence;
- specify the expected date on which ComReg will issue an invoice to the Winning Bidder in respect of the SUF to be paid in connection with the grant of its MBSA2 Liberalised Use Licence, noting the possibility for the commencement date of Spectrum Blocks and a MBSA2 Liberalised Use Licence to be delayed beyond the expected commencement date;
- specify the information required by ComReg to populate Part 2 and Part 3 of the MBSA2 Liberalised Use Licence and state that the Winning Bidder is obliged to provide such information to ComReg in advance of the commencement date of its MBSA2 Liberalised Use Licence; and
- note that the Winning Bidder is required to comply with Transition Rules as set out in Section 3.8 in order to be entitled to the grant of a MBSA2 Liberalised Use Licence.

3.266 Where the Winning Bidder has submitted the SAF and first SUF by the Payment Deadline and complies with the conditions set out in paragraph 3.265 above, ComReg will issue a MBSA2 Liberalised Use Licence to the Winning Bidder.

3.267 ComReg may, at its discretion, extend the time limit in order for Bidders to fulfil these obligations. If a Winning Bidder does not comply with the conditions relating to an Application for a MBSA2 Preparatory Licence or the MBSA2 Liberalised Use Licence as set out in this Section, including those relating to the payment of the SAF and first SUF, it may forfeit its Deposit and entitlements to a MBSA2 Liberalised Use Licence and a MBSA2 Preparatory Licence, without prejudice to ComReg's entitlement to recover the full amount due in respect of all Lots won as a simple contract debt.

3.268 Once a MBSA2 Liberalised Use Licence has been issued to a Winning Bidder, ComReg will publish on its website the text of the MBSA2 Liberalised Use Licence and subsequent amendments to same.

3.8 Transition Rules

3.269 As explained in Chapter 9 of ComReg Document 20/122, the Existing 2.1 GHz Band Licensees, the Existing 2.3 GHz Band Licensee and Winning Bidders may be required to make adjustments to their networks ('Transition Activities') in order to comply with the outcome of the Award Process.

3.270 Three separate Transitions may be required, being a Transition for:

- i. the Existing 2.1 GHz Band Licensees **in advance of the commencement date for Time Slice 1 for the 2.1 GHz Band**. This is because any new 2.1 GHz Band spectrum rights of use won in Time Slice 1 may be different, in terms of frequency location and/or quantum of spectrum, to the 2.1 GHz Band spectrum rights of use of Existing 2.1 GHz Band Licensees (and any spectrum rights of use that may be granted in a 2.1 GHz Band Interim Licence);
- ii. the Existing 2.1 GHz Band Licensee with a 2027 expiry date¹³⁶ and Winning Bidders **in the 2.1 GHz Band, 2.3 GHz Band and/or 2.6 GHz Band in advance of the commencement date of Time Slice 2**. This is because any new 2.1 GHz Band, 2.3 GHz Band and/or 2.6 GHz Band rights of use won in Time Slice 2 may be different, in frequency location and/or quantum of spectrum, to the spectrum rights of use in Time Slice 1; and
- iii. the Existing 2.3 GHz Band Licensee **in the 2.3 GHz Band**. This is because the Existing 2.3 GHz Band Licensee may apply for, and be granted, a MBSA2 2.3 GHz Band Transition Licence in order to provide for the orderly migration of its RurTel Services out of the 2.3 GHz Band.

¹³⁶ Meteor is the only Existing 2.1 GHz Band Licence with a 2027 expiry date.

3.271 All Winning Bidders, Existing 2.1 GHz Band Licensees¹³⁷, and applicants for a MBSA2 2.3 GHz Band Transition Licence¹³⁸ are obliged to abide by the Transition Rules as set out in this IM, including the Transition Plan(s).

3.8.1 Transition in the 2.1 GHz Band in advance of Time Slice 1

3.272 Upon completion of the Assignment Stage, ComReg will issue a notification to Winning Bidders of Lots in the 2.1 GHz Band and Existing 2.1 GHz Band Licensees informing them of the specific frequency assignments resulting from the Assignment Stage.

3.273 In addition, this notification will require Winning Bidders and Existing 2.1 GHz Band Licensees to formulate Transition Plan Proposals, and to submit them to ComReg. Each such party may formulate its own individual Transition Plan Proposal or any number of such parties may collaborate to formulate a common Transition Plan Proposal.

3.274 The Transition Plan Proposals, and the Transition Plan as subsequently adopted by ComReg, should identify and consider all the Transition Activities required by the Existing 2.1 GHz Licensees.

3.275 The deadline for the submission of Transition Plan Proposals will be set at 4 weeks from the above notification, although ComReg reserves the right to specify a different date.

3.276 Transition Plan Proposals are to be submitted to ComReg for its consideration (including the consideration of any of its agents or servants) and the consideration of other Winning Bidders and Existing 2.1 GHz Band Licensees.

3.277 A Transition Plan Proposal should address, to ComReg's satisfaction, at least the following matters:

- the identification of all Transition Activities to be undertaken by Existing 2.1 GHz Band Licensees and the order in which each activity would be taken;
- the setting of milestone dates for each Transition Activity. Unless otherwise identified by ComReg in determining the Transition Plan, all Transition Activities are to be completed sufficiently prior¹³⁹ to the

¹³⁷ See first bullet of paragraph 8.11 of Document 19/124. *"an obligation that all participants (including existing licensees) in the Proposed Award would agree to abide by the transition rules;"*

¹³⁸ See paragraphs 3.15.13 and 3.15.14 of the Decision in Chapter 10 of ComReg Document 20/122.

¹³⁹ This is to facilitate Transition within the licensing framework of the Existing 2.1 GHz Band Licences and 2.1 GHz Band Interim Licences.

commencement date of Time Slice 1 for the 2.1 GHz Band, and Transition Plan Proposal(s) will be required to ensure same;

- where the Transition Activities of one Existing 2.1 GHz Band Licensee are dependent upon the Transition Activities of another, this will be clearly identified in the Transition Plan Proposal such that any consequential delays by one party due to the delay of another party can be clearly attributable to the responsible party;
- a robust and transparent mechanism to allow ComReg (including any of its agents or servants), Existing 2.1 GHz Band Licensees, Winning Bidders and other Interested Parties to monitor compliance with the Transition Activity milestones and deliverable dates (subject to non-disclosure of Confidential Information);
- the completion of Transition Activities prior to the deadline dates as determined by ComReg in the Transition Plan; and
- attribution and acceptance of liability for liquidated damages that may be payable by the Existing 2.1 GHz Band Licensee(s) in the event of non-compliance with the Transition Activity milestones identified in the Transition Plan, where such Existing 2.1 GHz Band Licensee(s)' actions or omissions caused the non-compliance with the relevant milestone.

3.278 Following receipt of Transition Plan Proposals, ComReg will progress the matter in consultation with Winning Bidders and Existing 2.1 GHz Band Licensees with a view to finalising a Transition Plan¹⁴⁰. This may take the form of written consultation and/or multilateral and/or bilateral meetings with same.

3.279 In the event that any parties bound by the Transition Rules are unable or unwilling to submit a Transition Plan Proposal by the stipulated time, ComReg will formulate and implement a Transition Plan, following appropriate consultation or discussion with Winning Bidders and Existing 2.1 GHz Band Licensees. In any case, ComReg will take appropriate and effective measures to ensure that there is no undue delay in the availability of new spectrum rights of use.

3.280 ComReg reserves the right to make a final and binding decision on any and all

¹⁴⁰ As set out in paragraph 9.33 of Document 19/59R, principles that would guide ComReg in setting out a final transition plan include:

- the minimisation of the potential for significant disruption to existing consumer services; and
- the commencement of new spectrum rights as soon as practicable, thereby not unnecessarily delaying the delivery of new services to end users.

matters pertaining to Transition Rules, including the Transition Plan, following appropriate consultation.

3.281 Once the Transition Plan is finalised, it may be published on ComReg's website, having regard to the provisions of ComReg's guidelines on the treatment of Confidential Information as set out in ComReg Document 05/24. ComReg reserves and retains the discretion to vary the Transition Plan as appropriate.

3.8.2 Transition in advance of Time Slice 2

3.282 A similar Transition process may be adopted by ComReg in respect of Time Slice 2 where it appears possible that delays may be caused to the commencement date of Lots in Time Slice 2 by the Transition activities of the Existing 2.1 GHz Band Licensee with an expiry date of 2027 or Winning Bidders of Lots in Time Slice 1.

3.283 Depending upon the nature and extent of Transition activities required between Time Slice 1 and Time Slice 2, ComReg reserves the right to apply the Transition Rules set out in Section 3.8.1 above to the Existing 2.1 GHz Band Licensee and Winning Bidders.

3.284 If it is necessary to adopt such a Transition process, it will be based upon the Transition Rules set out in Sections 3.8.1 with the exception that:

- the deadline for the completion of all Transition activities is 11 March 2027;
- in order to ensure that Transition Activities are given the fullest consideration, the deadline for the submission of Transition Plan Proposals for Time Slice 2 will be:
 - one year in advance of 11 March 2027 for Transition Scenario A¹⁴¹;
 - two years in advance of 11 March 2027 for Transition Scenario B¹⁴²; and

¹⁴¹ Transition Scenario A refers to the scenario where an Existing 2.1 GHz Band Licensee or a Winning Bidder of Lots in Time Slice 1 wins an equal or greater amount of new spectrum rights in the same band in Time Slice 2 but these spectrum rights are in a different frequency location.

¹⁴² Transition Scenario B refers to the scenario where an Existing 2.1 GHz Band Licensee or a Winning Bidder of Lots in Time Slice 1 wins a reduced amount of new spectrum rights in the same band in Time Slice 2.

- three years in advance of 11 March 2027 for Transition Scenario C¹⁴³.

3.8.3 Transition of RurTel Services from the 2.3 GHz Band

3.285 Upon completion of the Assignment Stage or earlier should it be required, ComReg will issue a notification to the Existing 2.3 GHz Band Licensee:

- confirming that its Existing 2.3 GHz Band Licence will expire on the commencement date of Time Slice 1 for the 2.3 GHz Band (or some other date as may be determined by ComReg); and
- requesting that it submit an application for a MBSA2 2.3 GHz Band Transition Licence in advance of the commencement date of Time Slice 1 (see Section 2.3.3 above) should it wish to continue to provide RurTel Services in the 2.3 GHz and 2.4 GHz Bands¹⁴⁴.

3.286 Following receipt of any application for a MBSA2 2.3 GHz Band Transition Licence, ComReg will issue a notification to the MBSA2 2.3 GHz Band Transition Licensee requiring it to, if it has not done so already, to formulate Transition Plan Proposals, and to submit them to ComReg.

3.287 The Transition Plan Proposals, and the Transition Plan as subsequently adopted by ComReg, should identify and consider all the Transition Activities required by the MBSA2 2.3 GHz Band Transition Licensee in order to transition RurTel Services out of the 2.3 GHz and 2.4 GHz Bands.

3.288 The deadline for the submission of Transition Plan Proposals will be set at 4 weeks from the above notification, although ComReg reserves the right to specify a different date.

3.289 Transition Plan Proposals are to be submitted to ComReg for its consideration (including the consideration of any of its agents or servants) and the consideration of other Winning Bidders and MBSA2 2.3 GHz Band Transition Licensee.

3.290 A Transition Plan Proposal should address, to ComReg's satisfaction, at least the following matters:

¹⁴³ Transition Scenario C refers to the scenario where an Existing 2.1 GHz Band Licensee or a Winning Bidder of Lots in Time Slice 1 wins no new spectrum rights in the same band in Time Slice 2.

¹⁴⁴ ComReg observes that other licensing options (e.g. spectrum leasing) may also be available.

- the identification of all Transition Activities to be undertaken by the MBSA2 2.3 GHz Band Transition Licensee and the order in which each activity will be taken;
- the setting of milestone dates for each Transition Activity identified;
- a robust and transparent mechanism to allow ComReg (including any of its agents or servants), Winning Bidders and other Interested Parties to monitor compliance with the Transition Activity milestones and deliverable dates (subject to non-disclosure of Confidential Information)¹⁴⁵; and
- the completion of Transition Activities prior to the deadline dates as determined by ComReg in the Transition Plan. Based on current information and noting the rural locations of the existing RurTel customers, this could be informed by the ability of these customers to avail of the services that would be provided via the National Broadband Plan (NBP), the availability of sufficiently comparable voice services provided by Eir on an alternative platform/s and/or by alternative providers.

3.291 Following receipt of Transition Plan Proposals ComReg will progress the matter in consultation with Winning Bidders and the MBSA2 2.3 GHz Band Transition Licensee with a view to finalising a Transition Plan¹⁴⁶. This may take the form of written consultation and/or multilateral and/or bilateral meetings with same.

3.292 In the event that any parties bound by the Transition Rules are unable or unwilling to submit a Transition Plan Proposal by the stipulated time, ComReg will formulate and implement a Transition Plan, following appropriate consultation or discussion with Winning Bidders and the MBSA2 2.3 GHz Band Transition Licensee. In any case, ComReg will take appropriate and effective measures to ensure the migration of RurTel Services to alternative platform(s) in a timely, efficient and orderly manner.

3.293 ComReg reserves the right to make a final and binding decision on any and all

¹⁴⁵ For Transition of RurTel Services from the 2.3 GHz Band, ComReg envisages the submission of regular progress reports and the holding of regular progress meetings.

¹⁴⁶ As set out in paragraph 9.52 of Document 19/59R, ComReg observes that the following transition principles would appear relevant to the Transition of RurTel Services from the 2.3 GHz Band:

- minimise the potential for disruption to existing consumer services;
- introduce new rights of use in the 2.3 GHz Band as soon as possible without unnecessarily delaying the delivery of future liberalised services;
- maximise benefits to end-users; and
- ensuring the efficient use of spectrum during the Transition period.

matters pertaining to Transition Rules following appropriate consultation.

- 3.294 Once the Transition Plan is finalised, it may be published on ComReg's website, having regard to the provisions of ComReg's guidelines on the treatment of Confidential Information as set out in ComReg Document 05/24. ComReg reserves and retains the discretion to vary the Transition Plan as appropriate.

3.8.4 Liquidated Damages

- 3.295 An essential part of ensuring that Existing 2.1 GHz Band Licensees and Winning Bidders are appropriately incentivised to complete their respective Transition Activities in an effective and timely manner, is the identification of, and agreement to pay, liquidated damages to ComReg where such Existing 2.1 GHz Band Licensee or Winning Bidder fails to discharge its obligations in accordance with the milestones and deadlines set out in the Transition Plan.
- 3.296 The total amount of liquidated damages payable by these Existing 2.1 GHz Band Licensee or Winning Bidders will be based on the refunds or adjustments of Licence fees that ComReg pre-estimates that it may have to make to the Winning Bidders in the event that it is unable to make Spectrum Blocks available for use due to the delays caused by the completion of Transition Activities in the Transition Plan.
- 3.297 Section 2.3.7 of this document contains details of the nature of refunds or adjustments payable by ComReg and shall be used by ComReg in pre-estimating the payable liquidated damages pursuant to the Transition Plan. These liquidated damages are payable immediately on request and are non-refundable.

Chapter 4

4 The Auction Rules

4.1 General

4.1.1 The Electronic Auction System

- 4.1 Both the Main Stage (including the Primary Bid Rounds and the Supplementary Bids Round) and the Assignment Round will be run using an Electronic Auction System (“EAS”). Bidders will use the EAS to submit Bids and any decisions on preferred frequency assignments, where applicable.
- 4.2 For completeness and transparency, ComReg has set out the details of how the Auction and Auction Rules will work, much of which involves complex economic auction theory. As noted in Chapter 3, however, Interested Parties are assured that, in practice, the EAS will be relatively simple to use as it will automatically work out the application of rules during the Auction for Bidders. For example, the EAS will allow Bidders to determine which Bids Bidders can and cannot make under the Auction Rules.
- 4.3 Bidders will be able to access the EAS over the internet using a web-browser. There will be no onerous technical requirements for accessing the system.
- 4.4 Bidders are recommended to have back-up bidding facilities in place, including alternative computers and internet connections, to ensure that they can access the EAS reliably. ComReg is not able to provide specific advice on this matter, as this depends on the systems in use by any particular Bidder. Bidders should perform their own review of their bidding facilities prior to the start of the Auction.
- 4.5 Bidders may not submit Bids through any means other than the EAS, other than in exceptional circumstances and only then with the explicit permission of ComReg. In particular, before granting permission for Bids to be made through other means, ComReg must be satisfied that a Bidder was unable to access the EAS due to circumstances beyond its reasonable control. Procedures for the submission of Bids other than through the EAS are described in paragraph 4.11 below. It is in Bidders’ own interests to submit Bids using the EAS as the EAS provides facilities for checking the compatibility of Bids with the Auction Rules prior to submission of Bids.
- 4.6 Bidders have a limited number of Extension rights, which will automatically grant them additional time for submitting their Bids in the event that they do not make

a submission before the scheduled end of a Round as notified by ComReg. The Extension rights provide Bidders with an opportunity to, for example, switch to back-up bidding facilities and to submit their Bids through the EAS in the event that they experience technical difficulties and are unable to make their submission within the scheduled Round time.

- 4.7 In the event that a Bidder perceives an error in the functioning of the EAS it is obliged to contact¹⁴⁷ ComReg immediately. ComReg may, at its discretion, suspend or continue the Auction while investigating any such concerns.

4.1.2 Bid Submission

- 4.8 The process for submitting Bids in each of the Primary Bid Rounds, the Supplementary Bids Round and the Assignment Round is described in the relevant sections below. In each case, Bid submission involves a two-step process in which Bidders must first check their Bids and then confirm them:

- in the first step, Bidders enter their Bid(s) on the relevant Bid form provided by the EAS for that Round, and submit that form to the EAS for checking; and
- in the second step, which is only available if the Bid(s) submitted in the first step are valid according to the Auction Rules, Bidders must verify the Bid(s) checked by the EAS and confirm them (or alternatively revert to the Bid form if they wish to make any amendments).

- 4.9 A Bid is only valid if it is submitted in accordance with the process outlined above and received by the EAS before the deadline for Bid(s) submission (taking into account any Extension rights, as explained below).

- 4.10 Bidders should be aware that the transmission of Bid data from a client computer to the EAS will take a short, but material, time. Submissions can only be accepted if they are received by the EAS before the relevant deadline, regardless of the time at which they are sent from the Bidder's computer. Therefore, data transmission delays could lead to a Bidder missing the deadline for making a submission (which might trigger an Extension right, or prevent the Bidder from making a submission in the Round). Bidders are responsible for making their own assessments of such risks and ensuring that they have access to the necessary infrastructure and equipment to allow reliable and timely submission.

- 4.11 Once a confirmation has been received by the EAS it is irrevocable. Upon

¹⁴⁷ See Section 4.1.4 of this document (Communicating with ComReg).

receipt of a Valid Bid(s), the EAS will provide an acknowledgement page with details of the Bid(s) submitted. It is the responsibility of the Bidder to check this acknowledgement page, and to alert ComReg if technical problems are suspected to have prevented successful submission. If a Bidder is unable to submit its Bid(s) using the EAS, then it should immediately notify ComReg and seek permission to make a submission using an alternative channel. Such permission will usually not be given if ComReg has been notified of difficulties in making a submission after the deadline for submissions has expired. Where notification of such difficulties is received before the deadline for submissions, ComReg may, at its absolute discretion, grant permission to make submissions using an alternative channel for one or more Rounds, and will provide directions to the relevant Bidder on how to make such submissions. Bidders must follow the express directions of ComReg for making submissions by alternative channels, such as email or telephone; otherwise ComReg will consider that no submission has been made.

4.1.3 Bidding Restrictions in Main Stage

4.12 During the Main Stage of the Auction, several constraints will apply to the Bids that Bidders will be allowed to submit. These Bidding Restrictions will be in the form of:

- Competition Caps, that restrict the amount of spectrum Bidders can win rights of use for in the Award Process; and
- constraints on the combinations of fixed frequency and frequency-generic Lots in the 2.6 GHz TDD Band that a Bidder can submit Bids for.

Competition Caps

4.13 All Bids in the Main Stage are subject to an Overall Competition Cap and a Sub-1 GHz Competition Cap that will apply to spectrum holdings immediately following the Award Process and therefore limit the rights of use that Bidders may bid for/acquire in the Award Process. These Competition Caps are evaluated separately for each Time Slice, and include spectrum associated with existing licences held during the relevant time period(s). For the avoidance of doubt, these Competition Caps only apply for the duration of the Award Process. They do not affect the transfer of rights thereafter, for instance pursuant to spectrum leasing.

4.14 **Sub-1 GHz Competition Cap:** no Bidder may bid for/acquire spectrum rights of use in the Award Process that would result in it holding total spectrum rights of use for more than 70 MHz (2 × 35 MHz) of spectrum across the 700 MHz

Duplex, 800 MHz and 900 MHz Bands at any time during either of the two Time Slices.

- 4.15 **Overall Competition Cap:** no Bidder may bid for/acquire spectrum rights of use in the Award Process that would result in it holding total spectrum rights of use for more than 375 MHz across the 700 MHz Duplex, 800 MHz, 900 MHz, 1800 MHz, 2.1 GHz, 2.3 GHz, 2.6 GHz and 3.6 GHz Bands¹⁴⁸ at any time during either of the two Time Slices.

Restrictions relating to fixed frequency Lots

- 4.16 A Bidder will be prevented from submitting a Bid for a Package of Lots which includes both the 2.6 GHz TDD Fixed Frequency Lot (Lower) and the 2.6 GHz TDD Fixed Frequency Lot (Upper) in a given Time Slice unless that Bid also includes all of the 2.6 GHz TDD Generic Frequency Lots in the same Time Slice.

4.1.4 Communicating with ComReg

- 4.17 The EAS will provide a one-way messaging system, which will be used as the primary method for ComReg to communicate with Bidders during the Auction.
- 4.18 Bidders may contact ComReg by telephone, using designated telephone numbers, only to report technical problems or to report potential breaches of the Award Rules. In certain exceptional circumstances, Bidders may be given permission to submit Bid(s) through alternative means, such as email or telephone. Where ComReg has expressly granted permission to a Bidder, such a Bidder may submit Bids only by the means agreed with ComReg.
- 4.19 Contact details for ComReg and guidelines on the submission of Bids in exceptional circumstances will be made available to Bidders in advance of the Auction. ComReg may take steps to verify the authenticity of any communications from a Bidder using one-time passwords provided to the Bidder prior to the start of, or during, the Auction, or by other means as considered necessary by ComReg.

4.1.5 Exceptional Circumstances

- 4.20 If exceptional circumstances arise during any stage of the Auction, ComReg has the discretion to:
- postpone the scheduled start of a Round;

¹⁴⁸ In the 3.6 GHz Band, the highest spectrum holding of a Bidder in any 3.6 GHz Band Region is used for the purposes of the Overall Competition Cap.

- postpone the end of a Round in progress or the release of results of a Round;
- postpone the scheduling of further Rounds;
- cancel a Round that has been scheduled, but not yet started;
- cancel a Round that is either underway or which has finished but for which Round results have not yet been released, and re-schedule that Round;
- void all Bids received in the Auction, and either suspend the Auction or restart the Auction;
- end the Primary Bid Rounds early (i.e. while there is still excess demand in one or more Lot Categories), and proceed directly to the Supplementary Bids Round; and/or
- take any other steps or measures in running the Award Process which are appropriate and proportionate to the exceptional circumstances which have arisen and which further the objectives of the Award Process.

4.21 ComReg, at its absolute discretion, will determine whether a situation of exceptional circumstances has arisen. Exceptional circumstances could include, for example, widespread technical failure or material concern about collusion amongst some Bidders or other material breaches of the Award Rules.

4.22 In the event that a Bidder is excluded from the Auction and its Bids made so far are deemed invalid, ComReg would typically expect not to exercise any of the above powers. However, ComReg would consider all of the circumstances in determining whether to exercise its powers in this regard.

4.1.6 Applicant and Bidder Behaviour

4.23 Applicants and Bidders are reminded that the Award Process and Award Rules prohibit Applicants and Bidders from, among other things:

- coordinating bidding decisions with other Applicants or Bidders; and
- sharing information with other Applicants or Bidders that could affect their bidding decisions.

4.24 Such behaviours may also be illegal under EU and Irish competition law. These prohibitions apply throughout the Award Process. ComReg also reminds all

Interested Parties of their obligations under Irish and EU competition law noting that certain behaviours prior to the submission of an Application may be in breach of same.

4.2 The Main Stage

4.25 This section provides a detailed description of the rules applying to the Main Stage of the Auction¹⁴⁹.

4.2.1 Information made available to Bidders before the start of the Main Stage

4.26 Before the start of the Main Stage, ComReg will announce to all Bidders:

- the Round Price per Lot for each Lot Category in the first Primary Bid Round;
- Aggregate Demand for each Lot Category, based on Initial Bids; and
- the provisional Round Schedule for the first few days of the Auction (that is, the scheduled start time and end time of Rounds, assuming no Extension rights are used).

4.27 ComReg will also inform each Bidder of its own Initial Eligibility in each Time Slice (as determined by its Initial Bid).

4.2.2 Primary Bid Rounds

Schedule for Primary Bids Rounds

4.28 Primary Bid Rounds are scheduled at ComReg's discretion.

4.29 There is no minimum or maximum length for a Primary Bid Round. However, ComReg does not anticipate scheduling Primary Bid Rounds with a Round duration of less than 30 minutes or greater than two hours. Subject to the constraints of the notification requirements below, the time between Primary Bid Rounds is discretionary and a matter for ComReg to determine Round-by-

¹⁴⁹ Interested Parties should note that ComReg reserves the right to make amendments to the Auction Rules after the finalisation of this Information Memorandum to correct any errors therein, or to further clarify matters, whether identified by ComReg, its consultants or Interested Parties, where such amendments are necessary or appropriate to ensure that the Auction Rules and the EAS operate in the manner intended by ComReg. ComReg will promptly bring any such amendments to the attention of Interested Parties. Interested Parties are reminded that they are obliged to bring any errors to ComReg's attention promptly.

Round. Nevertheless, each Working Day prior to an Auction Day, ComReg would typically expect to issue a notice of its indicative plans with regard to the number of Rounds of the Auction to be run the following Auction Day. However, this will be issued as guidance only and will not be binding on ComReg. Due to the provisions for Extensions of Rounds and the potential for exceptional circumstances to arise, it is not possible to guarantee the start and end times of each Round in advance. The actual start time of a Round will be notified after the completion of the preceding Round, in line with the notice requirements.

- 4.30 All Primary Bid Rounds will be scheduled to run between 09:00 and 17:00 Irish time on Working Days¹⁵⁰, assuming that no Extension rights are used. For the avoidance of doubt, no specific times for scheduled breaks (for example lunch) will be set aside.
- 4.31 There will be a minimum of 30 minutes between Primary Bid Rounds.
- 4.32 Bidders will be notified of the Round Schedule for a Primary Bid Round via the EAS at least 15 minutes in advance of the scheduled start time of the Round.
- 4.33 Upon announcement of the start time of the next Primary Bid Round, each Bidder will also be informed about:
- the scheduled duration and end time for the next Primary Bid Round;
 - the Round Price per Lot for each Lot Category in the Round;
 - the Bidder's Eligibility to bid in the Round; and
 - the number of Extension rights the Bidder has remaining.
- 4.34 If no Extension rights are used, a Primary Bid Round will end at the scheduled end time. Under normal circumstances, Primary Bid Rounds will not end before their scheduled end time, even if all Bidders have already made their submissions for the Round.

Round Prices

- 4.35 For each Primary Bid Round, ComReg will specify a Round Price per Lot for each Lot Category.
- 4.36 For the first Primary Bid Round, the Round Price per Lot in each Lot Category for which there was no excess demand on the basis of Initial Bids will be the Reserve Price per Lot in the Lot Category. The Round Price per Lot in each Lot

¹⁵⁰ Saturdays, Sundays and public holidays in Ireland will be treated as non-Working Days.

Category for which there was excess demand on the basis of Initial Bids will be the Reserve Price per Lot in the Lot Category plus a Price Increment.

- 4.37 In subsequent Primary Bid Rounds, for each Lot Category the Round Price will be increased if in the previous Round there was excess demand in that Lot Category.
- 4.38 Excess demand in a Lot Category exists where the total number of Lots in that Lot Category included in all Valid Bids submitted in the Round is greater than the number of Lots available in that Lot Category.
- 4.39 For Lot Categories where there was no excess demand in a given Round, the Round Price per Lot for that Lot Category will remain unchanged for the following Round.
- 4.40 For the avoidance of doubt, it is not possible for the Round Price for any Lot Category to fall during the Primary Bid Rounds.
- 4.41 For each Lot Category, the amount by which the Round Price is increased in the case of excess demand is set at ComReg's discretion, and may vary across Lot Categories and across Primary Bid Rounds.
- 4.42 In any case, the Round Price for any Lot Category will not increase by more than 20% from one Primary Bid Round to the next.
- 4.43 Round Prices will be in multiples of EUR 1000.

Primary Bid Submission

- 4.44 During a Primary Bid Round, a Bidder may submit a Primary Bid for at most one Package of Lots. A Primary Bid is made by specifying the number of Lots in each of the Lot Categories that a Bidder wishes to acquire at the prevailing Round Prices. A Package of Lots may include any combination of Lots, subject to the constraints arising from the application of the Bidding Restrictions, and the Activity Rules described below.
- 4.45 The price offered for the Package of Lots subject to a Primary Bid (the Bid Amount) is determined as follows:
- for each Lot Category, the number of Lots in that Lot Category included in the Package of Lots subject to the Primary Bid is multiplied by the relevant Round Price for that Lot Category; and
 - these values are summed across all Lot Categories.

- 4.46 It is not possible for a Bidder to subsequently amend the Bid Amount for a Primary Bid.
- 4.47 Bid submission follows the two-step check and confirm process described in Section 4.1.2.
- 4.48 A Primary Bid is a binding offer to buy the selected Package of Lots for any price not exceeding the Bid Amount. Each Primary Bid will be considered in its entirety and will not be sub-divided (i.e. into its component Lots).
- 4.49 During the Primary Bid Rounds, Bidders have the option to submit a Zero Bid, i.e. to bid for zero Lots in all of the available Lot Categories with a Bid Amount of zero. If a Bidder submits a Zero Bid in a Primary Bid Round, it will not be possible for the Bidder to submit any further Bids during subsequent Primary Bid Rounds. A Bidder that submits a Zero Bid during the Primary Bid Rounds may still submit Supplementary Bids in the Supplementary Bids Round, subject to the Final Price Cap and Relative Caps detailed in Section 4.2.3.
- 4.50 In some cases, as explained further below, a Bidder may be able to submit a so-called Relaxed Primary Bid. The EAS will assist Bidders in determining whether it is possible to make a Relaxed Primary Bid on particular Packages of Lots of interest.
- 4.51 The submission of a Relaxed Primary Bid may require that the Bidder also submits so-called Chain Bids at the same time. However, Bidders that wish to submit a Relaxed Primary Bid only need to select the Package of Lots subject to the Relaxed Primary Bid on their Bid form; any necessary Chain Bids will be identified and notified to the Bidder by the EAS. Provided that the Bidder can make these Bids in accordance with the Auction Rules, it will then be given the opportunity to submit the Relaxed Primary Bid and any necessary Chain Bids simultaneously.
- 4.52 If a Bidder fails to submit a Bid before the scheduled end of a Primary Bid Round or subsequent Extension period (if the Bidder had Extension rights remaining), the EAS will automatically enter a Zero Bid on the Bidder's behalf.

Activity and Bidder Eligibility

- 4.53 Each Lot available in the Auction is assigned a number of Eligibility Points, as set out in Table 15 and Table 16.
- 4.54 The **Eligibility of a Package of Lots** is determined independently for each Time Slice. Therefore, a Package of Lots has two Eligibility scores.
- 4.55 For each Time Slice, the associated Eligibility of a Package of Lots is equal to:

- the sum of the Eligibility Points of Lots in the 2.1 GHz, 2.3 GHz and 2.6 GHz bands in that Time Slice included in the Package of Lots; plus
- the sum of the Eligibility Points of the 700 MHz Duplex Lots included in the Package of Lots¹⁵¹.

4.56 A Bidder starts each Primary Bid Round with a number of Eligibility Points for each Time Slice; this is the Bidder's **Eligibility** for that Round.

4.57 A Bidder is eligible to bid for a Package of Lots if:

- the Eligibility of the Package of Lots for Time Slice 1 is less than or equal to the Bidder's current Eligibility for Time Slice 1; *and*
- the Eligibility of the Package of Lots for Time Slice 2 is less than or equal to the Bidder's current Eligibility for Time Slice 2.

4.58 The **Activity** of a Bid is also determined independently for each Time Slice. For each Time Slice, the Activity associated with a Primary Bid is equal to the Eligibility of the Package of Lots that the Bidder bid for in the corresponding Time Slice.

4.59 In any Primary Bid Round, each Bidder may submit a Primary Bid with Activity less than or equal to its Eligibility in each Time Slice at the start of the Round, provided that the Bid satisfies the Bidding Restrictions.

4.60 Under certain conditions, a Bidder may submit a Primary Bid with Activity strictly greater than its Eligibility at the start of the Round in one or both of the Time Slices. Such a Bid is called a Relaxed Primary Bid. Such Bids are permitted where they express preferences that are consistent with earlier Bids made by the Bidder. The specific requirements for submission of a Relaxed Primary Bid are detailed below.

4.61 The Eligibility of a Bidder for the first Primary Bid Round (its Initial Eligibility) is equal to the Activity of its Initial Bid. For the avoidance of doubt, a Bidder may submit Bids (either as Primary Bids or Supplementary Bids) for Packages of Lots with Eligibility exceeding its Initial Eligibility (in one or both of the Time Slices), provided this is compatible with the Activity Rules. In the case of a Primary Bid, this would need to be by means of a Relaxed Primary Bid.

4.62 For each subsequent Primary Bid Round, a Bidder's Eligibility in a Time Slice is

¹⁵¹ The 700 MHz Duplex is not subject to Time Slicing. Therefore, 700 MHz Duplex Lots count towards the Eligibility of the Package of Lots in both Time Slices.

set to the lesser of:

- the Bidder's Eligibility in that Time Slice at the start of the preceding Primary Bid Round; and
- the Activity in that Time Slice of the Bid submitted by the Bidder in the preceding Primary Bid Round.

4.63 Note that as a result of this rule, submission of a Relaxed Primary Bid does not increase the Bidder's Eligibility in the Time Slice(s) where the Bidder's Activity exceeds its Eligibility. Thus, over successive Primary Bid Rounds, a Bidder's Eligibility in each Time Slice could stay the same (if it Bids for a Package of Lots with Eligibility equal to its current Eligibility in that Time Slice, or makes a Relaxed Primary Bid for a Package of Lots with Eligibility exceeding its current Eligibility in that Time Slice) or fall (if it Bids for a Package of Lots with Eligibility strictly less than its current Eligibility in that Time Slice), but can never increase.

4.64 A Primary Bid which leads to a reduction in the Bidder's Eligibility in either of the two Time Slices is an Eligibility-reducing Primary Bid. In the case that a Bidder submits a Relaxed Primary Bid with Activity that strictly exceeds the Bidder's current Eligibility in one Time Slice but is strictly less than the Bidder's current Eligibility in the other Time Slice, its Eligibility in the former Time Slice will be maintained and its Eligibility in the latter Time Slice will be reduced for the subsequent Primary Bid Round. This is referred to as an Eligibility-reducing Relaxed Primary Bid. Note that an Eligibility-reducing Relaxed Primary Bid is a special case of Eligibility-reducing Primary Bid.

4.65 The EAS will warn a Bidder if it specifies a Primary Bid that would result in a reduction of Eligibility for the next Primary Bid Round.

4.66 The EAS will not allow any Bidder to submit a Bid that violates the Bidding Restrictions. Further, the EAS will not permit a Primary Bid with Activity greater than the Bidder's Eligibility at the start of the Round, unless it is compatible with the Activity Rules under the provisions for submitting Relaxed Primary Bids (discussed below). If a Bidder checks a Primary Bid that is invalid, the EAS will require the Bidder to revise the Bid and resubmit this for checking. The EAS will only allow confirmation of Bids that have satisfied the checking step.

Relative Caps

4.67 A Relative Cap on any Package of Lots X is defined by reference to the **Constraining Round** applying to X . Let Round R be the Constraining Round for X , when the Bidder bid for Package of Lots Y (referred to as the **Constraining Package** for X). The Relative Cap limits any Bid Amount that the

Bidder may subsequently submit for *X* to:

- the highest Bid submitted by the Bidder for the Constraining Package *Y*; plus
- the difference in price between *X* and *Y* at the Round Prices prevailing in Round *R*.

4.68 This condition requires the Bidder to respect the preferences revealed by the choice it made in the Constraining Round, when it chose to bid for the Constraining Package in preference to *X* at prevailing Round Prices.

Relative Caps resulting from Eligibility-reducing Primary Bids

4.69 The submission of Eligibility-reducing Primary Bids will result in a Relative Cap being created on certain Packages of Lots that the Bidder could have Bid for in that Round, but chose not to. Specifically, when a Bidder submits an Eligibility-reducing Primary Bid *Z*, then:

- a) this will set a Relative Cap with respect to that Round on any Packages of Lots with Eligibility greater than the Activity of *Z* in either of the Time Slices and which were not yet subject to a Relative Cap; and
- b) if the Bidder had already submitted any Eligibility-reducing Primary Bids in earlier Rounds, then this will set a Relative Cap for one of the Packages of Lots for which the Bidder has already submitted an Eligibility-reducing Primary Bid – specifically the Package of Lots for which the Bidder submitted its most recent Eligibility-reducing Primary Bid (prior to *Z*) out of those Packages of Lots for which the Bidder would have been able to submit a Primary Bid (Relaxed or ordinary) in the Round in which the Bidder submits a Bid for *Z*.

4.70 If the Package of Lots identified in part b) of paragraph 4.69 above is already subject to a Relative Cap (set by an Eligibility-reducing Primary Bid submitted in an earlier Round), that pre-existing Relative Cap is replaced by the new Relative Cap created by the Eligibility-reducing Primary Bid for *Z*.

4.71 For any Package of Lots for which a Relative Cap is created as a result of an Eligibility-reducing Primary Bid for *Z*:

- *Z* is the Constraining Package; and
- the Round in which the Eligibility-reducing Primary Bid for *Z* is submitted is the Constraining Round.

4.72 The Relative Caps that apply for a Bidder must be respected when submitting Supplementary Bids and also when submitting Relaxed Primary Bids, as explained below. Specifically, the potential need for Chain Bids associated with a Relaxed Primary Bid arises from the requirement that Relative Caps already in force are respected throughout the Primary Bid Rounds.

Relaxed Primary Bids and Chain Bids

4.73 Under certainions, a Bidder will be permitted to make a Primary Bid with Activity greater than the Bidder's Eligibility in one or both Time Slices at the start of the Round. This is called a Relaxed Primary Bid. See Annex 8 for a worked example of Relaxed Primary Bids.

4.74 As for all Primary Bids, the Bid Amount for a Relaxed Primary Bid is determined by the Round Prices applied to the Package of Lots selected. The Bidder is not able to amend the Bid Amount associated with a Relaxed Primary Bid.

4.75 A Bidder cannot submit a Relaxed Primary Bid if its Eligibility at the start of the Round is zero in both Time Slices.

4.76 To make a Relaxed Primary Bid on some Package of Lots X at the current Round Prices, Chain Bids may be required on one or more Packages of Lots (other than X) that the Bidder bid for in previous Primary Bid Rounds (as specified below), if the Relaxed Primary Bid would not already be consistent with preferences expressed by the Bidder through its previous Bids.

4.77 Chain Bids may be required on the Packages of Lots which were subject to Bids submitted by the Bidder in a Primary Bid Round in which the Bidder reduced its Eligibility in one or both Time Slices, and/or the Package of Lots included in the Bidder's Initial Bid.

4.78 Let Primary Bid Round M_1 be the Constraining Round for X . A Chain Bid may be required on the Constraining Package Z_1 that was subject to a Bid in Primary Bid Round M_1 unless the Bidder has already made a Bid of a sufficiently large amount for the Constraining Package Z_1 . The amount of the required Chain Bid for Package of Lots Z_1 is equal to:

- a) the Bid Amount associated with the Relaxed Primary Bid for X (i.e. the price of Package of Lots X at current Round Prices); minus
- b) the difference in price between Package of Lots X and Package of Lots Z_1 at the Round Prices in Primary Bid Round M_1 .

4.79 Where the Bidder has submitted a Bid for Z_1 prior to the current Primary Bid

Round with a Bid Amount that is at least this level, no Chain Bid for Z_1 is required in this Round in support of the Relaxed Primary Bid for X .

- 4.80 If the Bidder is currently eligible to bid for Z_1 , then no other Chain Bids are required in order to submit a Relaxed Primary Bid for X .
- 4.81 Conversely, if the Bidder is not currently eligible to bid for Z_1 , let M_2 be the Constraining Round for Z_1 . A Chain Bid may be required on the Constraining Package Z_2 that was subject to a Primary Bid in Round M_2 , unless the Bidder has already made a Bid of a sufficiently large amount for the Constraining Package Z_2 . The amount of this Chain Bid for Package of Lots Z_2 is equal to:
- a) the amount of the required Chain Bid for Z_1 (determined above);
minus
 - b) the difference in price between Z_1 and Z_2 at the Round Prices in Round M_2 .
- 4.82 Where the Bidder has submitted a Bid for Z_2 in a previous Primary Bid Round with a Bid Amount of at least this level, no Chain Bid for Z_2 is required in this Round.
- 4.83 If the Bidder is currently eligible to bid for Z_2 , then no further Chain Bids are required.
- 4.84 Conversely, if the Bidder is not currently eligible to bid for Z_2 then at least one further Chain Bid may be required. The further Chain Bids required are defined sequentially in the same manner as follows.
- 4.85 Assume that the Bidder is not eligible to bid for a previously defined Package of Lots, Z_k , that is subject to a required Chain Bid. Let M_{k+1} be the Constraining Round for Z_k . A Chain Bid may be required for Package of Lots Z_{k+1} that was subject to a Primary Bid in round M_{k+1} unless the Bidder has already made a Bid of a sufficiently large amount for the Constraining Package Z_{k+1} . The amount of this Chain Bid for Z_{k+1} is equal to:
- a) the amount of the required Chain Bid for Z_k (previously determined);
minus
 - b) the difference in price between Z_k and the Z_{k+1} at the Round Prices in Round M_{k+1} .
- 4.86 Where the Bidder has submitted a Bid for Z_{k+1} in a previous Primary Bid Round

with a Bid Amount of at least this level, no Chain Bid is required for Z_{k+1} in this Round.

- 4.87 If the Bidder is currently eligible to bid for Z_{k+1} then no further Chain Bids are required. Otherwise, repeat the procedure set out above.
- 4.88 For the Bidder to be permitted to make a Relaxed Primary Bid for Package of Lots X , it is necessary that none of the required Chain Bids defined above exceed the price of the Package of Lots subject to the Chain Bid at current Round Prices.
- 4.89 If any of the associated Chain Bids exceeds the price of the Package of Lots subject to the Chain Bid at current Round Prices, then it is not possible to make a Relaxed Primary Bid for Package of Lots X in the current Primary Bid Round. For the avoidance of doubt, this does not rule out the possibility that a Relaxed Primary Bid might be possible for X in some later Primary Bid Round, depending on the subsequent evolution of Round Prices.
- 4.90 When making a Relaxed Primary Bid, it is only necessary for a Bidder to enter a single Package of Lots that is the subject of its Bid into the Bid Form provided by the EAS. The associated Chain Bids that need to be made together with the Relaxed Primary Bid will be automatically identified by the EAS and notified to the Bidder when the Package of Lots is selected on the Bid Form. On submission of a Relaxed Primary Bid, any required Chain Bids will also be submitted by the EAS.

Validity of Primary Bids

- 4.91 All Bids submitted during the Primary Bid Rounds (including Primary Bids, Relaxed Primary Bids and Chain Bids) in accordance with the Auction Rules are Valid Bids. A Valid Bid represents a binding commitment to:
- buy the specified Package of Lots at any price not exceeding the specified Bid Amount; and
 - pay the appropriate SUFs over the duration of the Licence.
- 4.92 In respect of Bidders other than Winning Bidders, this commitment remains in force until ComReg announces the conclusion of the Award Process as specified in Section 5.2.10 of this document. In respect of Winning Bidders, this commitment remains in force in line with the terms and conditions as set out in this document.
- 4.93 A Bid will remain valid for the duration of the Award Process unless it is replaced

by a Bid for the same Package of Lots by the same Bidder with a higher Bid Amount in a subsequent Primary Bid Round or in the Supplementary Bids Round, or it is voided by ComReg pursuant to the Auction Rules.

Extension rights for the Primary Bid Rounds

- 4.94 An Extension right allows a Bidder additional time in which to submit a Bid during a Primary Bid Round. Each Bidder starts the Primary Bid Rounds with two Extension rights for the duration of the Primary Bid Rounds.
- 4.95 Additional Extension rights for the Primary Bid Rounds may be granted either to all Bidders or to individual Bidders at the absolute discretion of ComReg. Additional Extension rights can only be granted in the Primary Bid Rounds. Additional Extension rights cannot be granted during a Primary Bid Round.
- 4.96 In the event that a Bidder with non-zero Eligibility in one or both Time Slices and at least one remaining Extension right fails to submit a Bid during a Primary Bid Round:
- the EAS will automatically extend the time within which the Bidder can submit a Bid by 30 minutes from the scheduled end of the Round; and
 - one of the Bidder's remaining Extension rights will be deducted.
- 4.97 The Extension will end 30 minutes after the scheduled end of the Round, or once all Bidders who are using Extensions have successfully submitted Bids, whichever occurs earlier.
- 4.98 Bidders that have already submitted a Bid during the Primary Bid Round cannot take any further action during the Extension; they will be informed that the Round has been extended and should wait for the announcement that the Round has ended.
- 4.99 Bidders that have not submitted a Bid during a Primary Bid Round and have no Extension rights remaining will not be able to submit a Bid during the Extension, and a Zero Bid will be entered automatically on their behalf.
- 4.100 Extension rights are provided to Bidders in order to protect them from unforeseen circumstances that would prevent them from submitting a Bid they would otherwise have submitted during a Round. Extensions are intended to provide a safeguard against technical failures, rather than to provide Bidders with extra time to consider their Bidding decisions.
- 4.101 Note that if a Bidder has exhausted its Extension rights and runs into technical difficulties during a Round, no additional Extension right will be granted at that

point. Any Bidder seeking additional Extension rights, having exhausted its allowance, should contact ComReg prior to the start of the next Round. ComReg will not grant additional Extension rights unless it is satisfied that the Bidder has taken all reasonable steps to avoid missing the Round deadlines and that previous Extensions were triggered through circumstances beyond the Bidder's reasonable control. However, even where there is evidence to support a case to grant additional Extension rights to a Bidder (or Bidders), ComReg retains its absolute discretion to extend a Round or to take alternative action in the event of significant technical difficulties.

- 4.102 A Bidder may notify ComReg, during a Primary Bid Round and through the telephone number specified in paragraph 3.136, that it is unable to submit a Bid during that Round and is likely to require use of an Extension; notification is not mandatory, but would assist administration of the Auction.

Deposit Calls during Primary Bid Rounds

- 4.103 During the Primary Bid Rounds, ComReg may give notice to one or more Bidders requiring them to increase their Deposits (a Deposit Call) to an amount specified by ComReg.
- 4.104 Where a Bidder's Deposit falls below 50% of its highest Bid made so far in the Auction, ComReg reserves the right to require the Bidder to increase its Deposit to at least 50% and not more than 100% of its highest Bid. ComReg will specify a deadline not less than three Working Days from giving notice by which time the required funds must have been received in ComReg's Nominated Bank Account (details of which are provided in Annex 3).
- 4.105 In the case of a Bidder that is in the course of a restructuring process, ComReg reserves the right to make such Deposit Calls as it deems appropriate.
- 4.106 ComReg reserves the right to not schedule Primary Bid Rounds in the period between giving notice of a Deposit Call to one or more Bidders and the deadline for the receipt of funds or the actual receipt of cleared funds, whichever occurs earlier.
- 4.107 In the event that a Bidder fails to meet the Deposit Call requirement, ComReg may, among other things, restrict the Bidder's ability to make further Bids and/or remove some or all of the Bids already submitted by the Bidder from the winner and price determination process.

Information available during Primary Bid Rounds

- 4.108 Before the start of the first Primary Bid Round, each Bidder will be informed of:

- its own Initial Eligibility in each Time Slice;
- the number of Extension rights it has for the Primary Bid Rounds;
- the Aggregate Demand for Lots in each Lot Category (based on all Initial Bids); and
- the Round Price per Lot for each Lot Category in the first Primary Bid Round.

4.109 Information about the Eligibility of other Bidders will not be displayed.

4.110 At the end of a Primary Bid Round, each Bidder will be informed of:

- the Aggregate Demand for Lots in each Lot Category in the most recently completed Round;
- its own Bid(s) during the Round;
- its Eligibility in each Time Slice for the next Primary Bid Round; and
- the number of Extension rights it has remaining.

4.111 No information will be released to any Bidder about the Bids submitted by other Bidders during the Primary Bid Rounds.

4.112 The EAS will include the functionality to view and download information on Round Prices, Aggregate Demand and the Bidder's own demand in previous Primary Bid Rounds.

Discounts and Exposure Prices

4.113 A Bidder's '**Discount**' in a given Primary Bid Round is, for any Package of Lots on which the Bidder is eligible to Bid in that Round, the greater of zero and:

- the price of that Package of Lots at current Round Prices; less
- the maximum Base Price the Bidder would be required to pay for the Package of Lots it wins, under the assumption that the Primary Bid Rounds hypothetically finish at the end of the current Primary Bid Round with demand equal to supply¹⁵².

4.114 Note that a specific Bidder's Discount in a particular Primary Bid Round is the

¹⁵² Where demand is based on the Lots included in the Primary Bids submitted by all Bidders in the current Primary Bid Round.

same for all Packages of Lots, but:

- for a given Bidder, the Discount may vary across Primary Bid Rounds;
- in any given Primary Bid Round, the Discount may vary across Bidders; and
- where a Bidder makes a Bid for a Package of Lots that contains a sufficiently small number of Lots in one or more Lot Categories, this may be incompatible with the assumption that supply and demand would be exactly equal in the current Primary Bid Round, making the Bidder's Discount inapplicable (see Annex 10 for a detailed explanation and consideration of the case in which one or more Lots may be unallocated in the final Primary Bid Round).

4.115 A Bidder's "**Exposure Price**" for a Package of Lots in a given Primary Bid Round is equal to the price of the Package of Lots at current Round Prices, less the Bidder's Discount in the Round. This is the maximum amount that the Bidder would need to pay for that Package of Lots on the assumptions that:

- the current Primary Bid Round is the final Primary Bid Round; and
- there would be no unallocated Lots in this Primary Bid Round.

4.116 The Exposure Price arises because of the limitations on what rival Bidders can bid given their history of Primary Bids and the Activity Rules governing their Supplementary Bids (see Annex 10 for details)

4.117 During each Primary Bid Round, the EAS will inform each Bidder of its own Discount for that Round. Discounts are reported to Bidders to provide additional information that may assist with their bidding decisions and internal governance. However, Bidders must make their own judgments over how to best utilise this information and any associated risks. A Bidder's Discount may increase, decrease or stay the same from one Primary Bid Round to the next.

4.118 For the avoidance of doubt, in the event that at least one further Primary Bid Round is required or that the Primary Bid Rounds end with excess supply, there is no guarantee that the Bidder will not ultimately need to pay more for a Package of Lots than the Exposure Price resulting from the Discount reported in the current Round (see Annex 10 for details).

End of the Primary Bid Rounds

4.119 The Primary Bid Rounds will end following a Round in which there was no excess demand for Lots in any Lot Category. At this point, ComReg will

announce that the Primary Bid Rounds have ended and that the Auction will progress to the Supplementary Bids Round.

- 4.120 Alternatively, following the close of a Primary Bid Round, ComReg may at its absolute discretion announce that it is ending the Primary Bid Rounds early (i.e. while demand is still above supply in at least one Lot Category). In this case, the Auction will proceed directly to the Supplementary Bids Round, and there will be no further Primary Bid Rounds.
- 4.121 ComReg will only terminate the Primary Bid Rounds early if it believes that proceeding directly to the Supplementary Bids Round at that time is in the general interest of running an efficient Award Process.

4.2.3 The Supplementary Bids Round

Schedule for the Supplementary Bids Round

- 4.122 The start time and duration of the Supplementary Bids Round will be announced by ComReg following the completion of the Primary Bid Rounds.
- 4.123 There will be at least three clear Working Days between the last Primary Bid Round and the start of the Supplementary Bids Round.
- 4.124 ComReg has discretion over the Round Schedule and duration of the Supplementary Bids Round. However, ComReg anticipates that the Supplementary Bids Round will take place between 09:00 and 18:00 hours on a single Working Day.
- 4.125 A single Extension right will be available to all Bidders in the Supplementary Bids Round. Extension rights in the Supplementary Bids Round will operate in the same way as Extension rights in the Primary Bid Rounds, except that there is no scope for additional Extensions rights to be granted. The Extension of the Supplementary Bids Round will be no longer than 30 minutes. For the avoidance of doubt, the Extension right available for the Supplementary Bids Round is distinct from the Extension rights available during the Primary Bid Rounds and no Extension rights can be carried over from the Primary Bid Rounds.

Supplementary Bids submission

- 4.126 When the Supplementary Bids Round is in progress, Bidders may submit Supplementary Bids for multiple Packages of Lots using the EAS.
- 4.127 Each individual Supplementary Bid specifies a Package of Lots (the number of Lots in each Lot Category that a Bidder wishes to acquire) and a Bid Amount for that Package.

4.128 The interface of the EAS will provide functionality for Bidders to:

- generate and amend a list of Packages of Lots for which the Bidder wants to submit Supplementary Bids (subject to the requirement that Packages of Lots Bid for in Bidders' Initial Bids and during the Primary Bid Rounds must all be included in the list); and
- specify the Bid Amount for each of the Packages of Lots in the list.

4.129 The EAS will also report the value of any unsold Lots in the final Primary Bid Round at final Primary Bid Round prices and at Reserve Prices to Bidders in order to assist with any Bids that a Bidder wishes to make in line with Annex 8.

4.130 The Bid Amount for each Supplementary Bid is discretionary, subject to the restrictions set out in the sections below.

4.131 A Supplementary Bids list may contain Bids for up to 1,000 Packages of Lots. This limit includes the Bidder's Initial Bid and all Packages of Lots for which the Bidder submitted Bids during the Primary Bid Rounds.

4.132 Bid submission will follow the two-step process described in Section 4.1.2.

4.133 The EAS will prevent a Bidder from submitting a Supplementary Bids list that contains invalid Bids. If a Supplementary Bids list is rejected by the EAS, the Bidder will be able to revise its set of Supplementary Bids; any necessary revisions must be completed within the time limits set for the Supplementary Bids Round (including any Extension as appropriate).

Restrictions on Bid Amounts for Supplementary Bids

4.134 Bid Amounts for Supplementary Bids must be specified in multiples of EUR 1000.

4.135 The Bid Amount for a Package of Lots must not be less than the sum of the Reserve Prices for all Lots included in the Package.

4.136 The Bid Amount for a Package of Lots for which the Bidder has made a Primary Bid must not be less than the highest Bid Amount submitted for the Package of Lots in the Primary Bid Rounds (regardless of whether this is a standard Primary Bid, Relaxed Primary Bid or Chain Bid).

4.137 Each Bidder has a Final Primary Package; this is the Package of Lots it Bid for in the final Primary Bid Round. If the Bidder submitted a Zero Bid in the Primary Bid Rounds (either during the final Primary Bid Round or in an earlier Round), the Final Primary Package is the Zero Package consisting of no Lots in any Lot

Category (for which the Bid Amount is zero and cannot be changed). Bidders may submit a Supplementary Bid for any Package of Lots except the Zero Package (i.e. the Package of Lots consisting of no Lots in any Lot Category) subject to not breaching the Bidding Restrictions.

- 4.138 All Supplementary Bids for Packages of Lots other than the Final Primary Package are subject to a Final Price Cap (see below), which is a Relative Cap with respect to the final Primary Bid Round.
- 4.139 For all Packages of Lots with Eligibility greater than the Bidder's Eligibility at the start of the final Primary Bid Round in one or both Time Slices, the Bid Amount is also subject to a Relative Cap (see below)¹⁵³.
- 4.140 As a consequence of the rules above, if a Bidder's Final Primary Package contains at least one Lot and the Bidder did not submit a Relaxed Primary Bid in the final Primary Bid Round, there is no cap on the Supplementary Bid Amount that can be submitted for the Final Primary Package.

Final Price Cap

- 4.141 For any Package of Lots X other than the Final Primary Package, the Supplementary Bid Amount for X may not exceed:
- the Bidder's highest Bid for the Final Primary Package (which may be a Primary Bid, Relaxed Primary Bid or a Supplementary Bid); plus
 - the difference between the price of X and the Final Primary Package at the Round Prices in the final Primary Bid Round.

Relative Caps

- 4.142 Supplementary Bids for Packages of Lots that the Bidder was not eligible to bid for at the start of the final Primary Bid Round are subject to any Relative Caps that arose from the submission of Eligibility-reducing Primary Bids.

How caps apply to the Final Primary Package

- 4.143 If a Bidder's Final Primary Package is the Zero Package, then the Final Price Cap means that all Supplementary Bids are constrained to be at most the price of the corresponding Package of Lots in the final Primary Bid Round.
- 4.144 Otherwise, there are two cases to consider, depending on whether or not the

¹⁵³ This means that if the Bid submitted in the Final Primary Round is a Relaxed Primary Bid, the Bid Amount for the Final Primary Package is subject to a Relative Cap in the Supplementary Bids Round.

Bidder made a Relaxed Primary Bid in the final Primary Bid Round:

- If a Bidder did not submit a Relaxed Primary Bid in the final Primary Bid Round, then there is no limit on the Supplementary Bid that can be submitted for the Final Primary Package;

4.145 If the Bidder submitted a Relaxed Primary Bid in the final Primary Bid Round, the Supplementary Bid for the Final Primary Package is subject to a Relative Cap, as the Eligibility of the Final Primary Package is strictly greater than the Bidder's Eligibility in one or both of the Time Slices at the start of the final Primary Bid Round. The effect of this rule is that increasing the Bid Amount for the Final Primary Package in the Supplementary Bids Round may require also increasing the Bid Amounts for the Packages of Lots subject to Eligibility-reducing Primary Bids (Constraining Packages) with Eligibility strictly less than the Eligibility of the Final Primary Package (in one or both Time Slices).

4.146 Examples of this situation is discussed in Annex 6, which includes a comprehensive worked example.

Validity of Supplementary Bids

4.147 Each Supplementary Bid submitted in accordance with the Auction Rules is considered to be a Valid Bid. A Valid Bid represents a binding commitment to:

- buy the specified Package of Lots at a price not exceeding the specified Bid Amount; and
- pay the appropriate SUFs over the duration of the Licence.

4.148 In respect of Bidders other than Winning Bidders, this commitment remains in force until ComReg announces the conclusion of the Award Process as specified in Section 5.2.10 of this document. In respect of Winning Bidders this commitment remains in force in line with the terms and conditions as set out in this document.

4.149 A Valid Bid will remain valid for the duration of the Award Process, unless it is voided by ComReg pursuant to the Auction Rules.

4.2.4 Deposit Calls following the Supplementary Bids Round

4.150 At the end of the Supplementary Bids Round, and prior to the notification to Bidders of the outcome of the Main Stage, ComReg may give notice to one or more Bidders that they need to increase their Deposits to an amount specified by ComReg.

- 4.151 ComReg reserves the right to issue a Deposit Call of up to 100% of a Bidder's highest Bid at this point.
- 4.152 If a Deposit Call is issued, ComReg will specify a deadline not less than three Working Days from giving notice by which time the required funds must have been received as cleared funds in ComReg's Nominated Bank Account (details of which are provided in Annex 3).
- 4.153 ComReg will not notify the outcome of the Main Stage in the period between issuing notice of a Deposit Call to one or more Bidders and the deadline for the receipt of funds or the actual receipt of cleared funds, whichever occurs earlier.
- 4.154 In the event that ComReg issues a Deposit Call following the completion of the Main Stage of the Auction, but before the results of the Main Stage have been announced to Bidders, and one or more Bidders do not provide their required funds by the deadline set by ComReg, ComReg may at its sole discretion:
- exclude the Bidder(s) from the Award Process and re-run the Winner and Price Determination algorithm (described below) voiding all Bids submitted during the Award Process by that excluded Bidder(s); or
 - re-run the Winner and Price Determination algorithm voiding some Bids submitted during the Award Process by that Bidder(s), without excluding the Bidder(s) from the Award Process.

4.2.5 Winner and Base Price Determination

- 4.155 Following the close of the Supplementary Bids Round, ComReg will determine the combination of Winning Bids, and the prices (the Base Prices) to be paid by Winning Bidders.
- 4.156 Only Valid Bids will be considered when determining the Winning Bidders and Base Prices. For the avoidance of doubt, any Bids that have been voided by ComReg pursuant to the Auction Rules will not be considered Valid Bids, and will not be included in the Winner and Base Price determination process.
- 4.157 Hereafter, within this section any reference to 'Bid' or 'Bids' is solely to Valid Bids.

Winner Determination

- 4.158 A Feasible Combination of Bids is one in which:
- in each Lot Category, no more Lots are awarded than are available in that Lot Category; and

- at most one Bid is accepted from each Bidder.

- 4.159 The value of a Feasible Combination of Bids is equal to the sum of Bid Amounts for all Bids in the combination, plus the Reserve Price of any Lots that would remain unsold if only the Bids in the combination are accepted.
- 4.160 The Winning Combination of Bids is a Feasible Combination of Bids that has the greatest value across all Feasible Combinations of Bids, considering all the Bids submitted in the Auction (including Initial Bids, standard and Relaxed Primary Bids, Chain Bids and Supplementary Bids).
- 4.161 If there are multiple Feasible Combinations of Bids with equal greatest value that meet the conditions above, the Winning Combination of Bids will be the Feasible Combination of Bids amongst these tied scenarios with greatest total price for the assigned Lots valued at Reserve Prices.
- 4.162 In the unlikely event that the rules outlined at paragraphs 4.159 – 4.161 do not identify a unique Feasible Combination of Bids, then the Winning Combination of Bids will be selected at random from all combinations of Bids that satisfy these rules.

Base Price determination

- 4.163 For each Winning Bid (and thus for each Winning Bidder), ComReg will determine a Base Price that must be paid by the Bidder. This is an overall price for the entire Package (i.e. the combination of Lots included in the Winning Bid).
- 4.164 Base Prices are the minimum amounts that each Winning Bidder, and each group of Winning Bidders jointly, could have bid without changing the outcome of the winner determination process, and are based on the concept of Opportunity Cost.
- 4.165 The Opportunity Cost of a Bidder, or a group of Bidders, is defined to be the difference between:
- the value of the hypothetical winning assignment in a scenario where all Bids from the Bidder(s) in question were excluded; and
 - the value of the original winning assignment less the total Bid Amount from all Winning Bids from the Bidder(s) in question.

As above, the value of a winning assignment is the total of the winning Bid Amounts plus the value of any unsold Lots at corresponding Reserve Prices.

- 4.166 Base Prices are determined jointly for all Winning Bidders in a single calculation.

A unique set of Base Prices is found by applying the following requirements:

- First requirement: the Base Price of a Winning Bid must be greater than or equal to the total Reserve Prices of the Lots in the Package associated with that Winning Bid, but less than or equal to the winning Bid Amount.
- Second requirement: the set of Base Prices must be sufficiently high such that the sum of prices to be paid by each possible subset of Winning Bidders must be at least their joint Opportunity Cost. If there is only one set of Base Prices that meets the first and second requirements, this determines the Base Prices for the Main Stage.
- Third requirement: If there are multiple sets of Base Prices that fulfil the first and second requirements, the set(s) of Base Prices that minimise(s) the sum of Base Prices across Winning Bidders is selected. If there is only one set of Base Prices satisfying the first, second and third requirements, this determines the Base Prices for the Main Stage.
- Fourth requirement: If there are multiple sets of Base Prices that satisfy the first three requirements, the set of Base Prices that minimises the sum of squares of differences between the Base Prices for each Winner and the individual Opportunity Cost for that Winner is selected.

4.167 These conditions characterise a unique Base Price for each Winning Bidder that is no more than their Winning Bid and is at least the Reserve Price for the Package of Lots assigned to the Bidder. Finally, if these Base Prices are not in multiples of EUR 1000 they are rounded up to the nearest multiple of EUR 1000.

4.2.6 End of the Main Stage

4.168 Once ComReg has determined the Winning Bids and the Base Prices, and any Deposit Calls issued have been fulfilled, the outcome of the Main Stage will be announced to Bidders.

4.169 All Bidders will be informed of the number of Lots won by each Bidder in each Lot Category.

4.170 Each Winning Bidder will be told the Base Price that applies to its own Winning Bid. This information will not be released to other Bidders at this stage.

4.3 The Assignment Stage

4.171 The purpose of the Assignment Stage is to determine the specific frequencies

to be assigned to:

- Winning Bidders in the Award Process in relation to the frequency-generic B-Lots won in the Main Stage; and
- Eir in relation to its existing 2.1 GHz Band holdings in Time Slice 1¹⁵⁴.

4.172 A frequency band will be included in the Assignment Stage if there are any winners of frequency-generic B-Lots in the band based on the outcome of the Main Stage. This means that:

- the 700 MHz Duplex will be included if any Winning Bidder wins at least one 700 MHz Duplex Lot; and
- for the other bands (2.1 GHz, 2.3 GHz, 2.6 GHz TDD and 2.6 GHz FDD), the band will be included in the Assignment Stage if any Winning Bidder wins at least one frequency-generic B-Lot in any of these bands in at least one Time Slice.

4.173 For the purpose of the Assignment Stage, Eir's existing 2.1 GHz Band holdings will be treated in the same way as Lots included in a Winning Bid in this Award Process (i.e. as if Eir had won three frequency-generic 2 × 5 MHz Lots in the 2.1 GHz Band in Time Slice 1, in addition to any other Lots it wins as part of the Winning Combination of Bids) unless no Winning Bidders win new 2.1 GHz Band rights of use in the Main Stage.

4.174 The frequencies associated with the fixed frequency A-Lots in the 2.3 GHz and 2.6 GHz TDD bands are already specified and therefore do not need to be determined in the Assignment Stage. However, if a Bidder wins frequency-generic Lots in the 2.3 GHz Band or the 2.6 GHz TDD Band, the specific frequencies it could be assigned in relation to those frequency-generic B-Lots may be affected by whether or not it also wins any of the fixed frequency A-Lots in the corresponding band.

4.175 The term '**Assignment Bidder**' refers to the Winning Bidders that win at least one B-Lot in the Main Stage and, in the case that at least one Winning Bidder wins new rights of use in the 2.1 GHz Band, Eir (irrespective of whether it wins additional rights of use in the Main Stage).

4.176 The specific frequency assignments will be determined independently (but simultaneously) for each band. This may require an **Assignment Round**, in

¹⁵⁴ Given the outcome of the Main Stage (or the Qualification Stage where there is no Main Stage and the Award Process progresses directly from the Qualification Stage to the Assignment Stage).

which Assignment Bidders are able to express their preferences over various possible frequency assignments available to them (their '**Assignment Options**') in each band.

4.177 The Assignment Options for each Assignment Bidder are established in accordance with the methodology set out in Annex 12. For a given band, the process establishes one or more '**Candidate Frequency Plan(s)**'. Each Candidate Frequency Plan for a band comprises an assignment of frequencies across all Assignment Bidders and both Time Slices in that band that meets the criteria set out in Section 4.3.2 below. The Assignment Options for an Assignment Bidder in a band corresponds to the combination of:

- the set of frequency ranges that the Assignment Bidder could be assigned in any of the Candidate Frequency Plans for that band; and
- for Bidders that have not won any of the fixed frequency A-Lots (if applicable) in the band, the set of frequency ranges that any other Assignment Bidder winning the same number of frequency-generic Lots (and no fixed frequency A-Lots) in the band as that Assignment Bidder in both Time Slices could be assigned in any of the Candidate Frequency Plans for that band.

4.178 An Assignment Round is required if multiple Assignment Options are identified for at least one Assignment Bidder for at least one band. Assignment Bidders with multiple Assignment Options for at least one band are then able to express preferences over their Assignment Options, as described in Sections 4.3.5 and 4.3.6 below. The specific frequencies assigned to each Assignment Bidder are determined on the basis of these preferences, and in accordance with the Winner Determination process set out in Section 4.3.9.

4.179 Assignment Bidders may be required to pay an amount (the '**Additional Prices**') for the specific frequencies assigned to them. Additional Prices are calculated separately for each band and determined by applying the requirements set out in Section 4.3.9 below.

4.180 For a given band, the specific frequencies to be assigned to Assignment Bidders as a result of the Assignment Option generation process and the outcome of an Assignment Round (if required) give the **Band Frequency Plan** for that band. There will be a Band Frequency Plan for each band included in the Assignment Stage (i.e. there may be up to five Band Frequency Plans¹⁵⁵).

¹⁵⁵ One for each of the bands, 700 MHz Duplex, 2.1 GHz Band, 2.3 GHz Band, 2.6 GHz FDD Band, and 2.6 GHz TDD Band.

- 4.181 The Band Frequency Plan(s) established are then combined to give a **Provisional Assignment Plan**. This will comprise a specific frequency assignment for each Winning Bidder in each band in each Time Slice.
- 4.182 Following the determination of the Provisional Assignment Plan, Assignment Bidders will be given a period of ten clear Working Days (the **Negotiation Phase**) in which they may negotiate between themselves and agree on an alternative assignment of the frequencies within the frequency-ranges associated with frequency-generic Lots in one or more of the bands.
- 4.183 The frequency assignments established following the Negotiation Phase would form the **Final Assignment Plan**.

4.3.1 Time Slice 2 (“TS2”) Notional Winner

- 4.184 For any given band, if there are unsold Time Slice 2 Lots, these are treated as if won by a single Bidder. This Bidder is referred to as the TS2 Notional Winner.
- 4.185 The TS2 Notional Winner is treated as an Assignment Bidder for the purposes of Assignment Option generation, Winner Determination, and Additional Price determination.

4.3.2 Need for an Assignment Round

- 4.186 Following the Main Stage (or Qualification Stage if a Main Stage is not required), ComReg will establish the ways in which specific frequencies can be assigned to Assignment Bidders that won B-Lots in each band included in the Assignment Stage, subject to the requirements set out below.
- 4.187 For the 700 MHz Duplex, the alternative ways of assigning specific frequencies to an Assignment Bidder that won frequency-generic Lots in the band will be established subject to the requirements that:
- each Assignment Bidder is awarded a contiguous block of spectrum in the band, in accordance with the number of 700 MHz Duplex Lots it won;
 - any option for assigning frequencies to a particular Assignment Bidder is consistent with all other Assignment Bidders each receiving contiguous spectrum in the band;

- a winner of more than 2×10 MHz and less than 2×30 MHz is not assigned the lowest 2×5 MHz block, provided no other Assignment Bidder has won more than 2×10 MHz in the 700 MHz Duplex.¹⁵⁶; and
- any unsold 700 MHz Duplex Lots will form a contiguous block of spectrum starting at 703/758 MHz.

4.188 For any of the other bands (2.1 GHz, 2.3 GHz, 2.6 GHz TDD or 2.6 GHz FDD), the alternative ways of assigning specific frequencies to an Assignment Bidder that won frequency-generic B-Lots in the band will be subject to the requirements that:

- for each Time Slice in which the Assignment Bidder won B-Lots in the band, the Assignment Bidder is awarded a contiguous block of spectrum in that Time Slice, in accordance with the number of B-Lots it won in that Time Slice;
- any option for assigning frequencies to a particular Assignment Bidder is consistent with all other Assignment Bidders each receiving contiguous spectrum in each Time Slice in the band according to the number of B-Lots they won;
- in the event that at least one Winning Bidder wins 2.1 GHz Band Lots in either Time Slice, Eir's current holdings in Time Slice 1 will be included in the Assignment Option generation process and may be repositioned within the band, subject to the requirement that it forms a contiguous block of spectrum with any 2.1 GHz Band Lots won by Eir in Time Slice 1;
- for each of the 2.1 GHz Band and 2.6 GHz FDD Band (which have no fixed frequency Lots), any Assignment Bidder¹⁵⁷ that wins exactly the same number of frequency-generic Lots in the band in both Time Slices will be awarded the same frequencies in that band in each Time Slice;
- for the 2.6 GHz TDD Band, for a given Time Slice, if the Assignment Bidder wins a single fixed frequency A-Lot in the band¹⁵⁸, any frequency-generic B-Lots won by that Assignment Bidder in the same

¹⁵⁶ If two Bidders won greater than 2×10 MHz (i.e. each bidder won 2×15 MHz) an Assignment Round would determine which Bidder obtained the lowest frequency block.

¹⁵⁷ This may include Eir in relation to its existing 2.1 GHz holdings in Time Slice 1.

¹⁵⁸ Interested Parties are reminded of the Bidding Restriction that applies in respect of the 2.6 GHz TDD Band (See Section 4.1.3).

band and Time Slice are positioned next to the single fixed frequency Lot won;

- for the 2.6 GHz TDD Band:
 - if just one of the fixed frequency A-Lots in Time Slice 2 is unsold, any unsold 2.6 GHz TDD B-Lots in Time Slice 2 will be positioned next to that unsold A-Lot;
 - if both of the fixed frequency A-Lots in Time Slice 2 are unsold and some, but not all, of the 2.6 GHz TDD frequency generic B-Lots in Time Slice 2 are unsold, the unsold B-Lots will be positioned next to one of the unsold A-Lots.
- for the 2.3 GHz Band:
 - any frequency-generic B-Lots won by Eir in either Time Slice will form a contiguous block of spectrum starting at 2300 MHz, irrespective of whether Eir also wins the 2.3 GHz fixed frequency A-Lots in one or both Time Slices;
 - for a given Time Slice, if an Assignment Bidder other than Eir wins the single fixed frequency A-Lot in the band, any frequency-generic B-Lots also won by that Assignment Bidder in the same band and Time Slice will be next to the fixed frequency A-Lot;
 - if the fixed frequency A-Lot in Time Slice 2 is unsold, any unsold 2.3 GHz B-Lots in Time Slice 2 will be positioned next to that A-Lot;
- ensures that any unsold B-Lots in a band in Time Slice 2, form a contiguous block of spectrum, and where feasible, that unsold Time Slice 2 Lots are kept together as far as possible;
- subject to the previous requirements being satisfied, for Assignment Bidders that win frequency-generic Lots in the band in both Time Slices, the options generated will be those that maximise the extent to which the same frequencies are assigned in each Time Slice¹⁵⁹; and

¹⁵⁹ This is implemented through the procedure presented in Annex 12.

- subject to the previous requirements being satisfied, the extent to which unsold B-Lots in Time Slice 1 can be combined into the fewest number of contiguous blocks is maximised¹⁶⁰.

4.189 In accordance with these principles, ComReg will establish the feasible frequency assignments for each band through the procedure set out in Annex 12. This procedure ensures that, where possible and subject to the requirements set out above, Assignment Bidders are offered alternative positions within each relevant band.

4.190 An Assignment Round is required if, for at least one band, there are multiple options for assigning specific frequencies to at least one Assignment Bidder (other than the TS2 Notional Winner, if required) that satisfy the criteria above.

4.3.3 Assignment Options

4.191 For a given band with multiple options for assigning specific frequencies to at least one Assignment Bidder (other than the TS2 Notional Winner, if required) that meet the criteria above, for each Assignment Bidder that has won frequency-generic Lots in the band, the set of Candidate Frequency Plans identified has an associated set of unique frequency assignments that could be assigned to that Assignment Bidder.

4.192 An Assignment Bidder's 'Assignment Options' for a band then comprise¹⁶¹:

- the set of frequency assignments that would be assigned to that Assignment Bidder under the Candidate Frequency Plans identified for the band; combined with
- for Assignment Bidders that have not won any of the fixed frequency A-Lots (if applicable) in the band, the set of frequency assignments that would be assigned under the Candidate Frequency Plans identified for the band to any other Assignment Bidder that won the same number of frequency-generic Lots (and no fixed frequency A-Lots) in the band in each Time Slice as the Assignment Bidder in question.

4.193 An Assignment Option specifies a specific frequency range within the band in each Time Slice.

¹⁶⁰ The unassigned B-Lots in Time Slice 1 may be used to improve the alignment of frequencies assigned to Winning Bidders across the two Time Slices, and as such may be split into multiple non-contiguous blocks.

¹⁶¹ Note that the symmetrisation procedure is intended to avoid unnecessary differences between frequency options to Bidders in equivalent situations.

4.194 During the Assignment Round, for a given band an Assignment Bidder with multiple Assignment Options will be invited to either:

- submit Assignment Bids for its Assignment Options in the case where Assignment Options for an Assignment Bidder could conflict (i.e. are in common with) with the Assignment Options of another Assignment Bidder;¹⁶² or
- select its most preferred frequency assignment from amongst the Assignment Options available to it, in the case that its choice of option cannot conflict with the choice of option of another Assignment Bidder (if any).¹⁶³

4.195 In the case that only one Assignment Option is available for an Assignment Bidder for a given band, that Assignment Bidder will simply be assigned the corresponding frequencies and will not participate in the Assignment Round for that band.

4.196 Winners of specific Assignment Options and Additional Prices to be paid for these specific frequencies is determined on a band-by-band basis to determine the Band Frequency Plans. However, for each band, both Time Slices will be considered jointly.

4.3.4 Schedule for the Assignment Round

4.197 The Round Schedule and duration of the Assignment Round will be announced by ComReg after the completion of the Main Stage (or after the completion of the Qualification Stage if the Award progresses directly from the Qualification Stage to the Assignment Stage).

4.198 Upon scheduling of the Assignment Round, the EAS¹⁶⁴ will display for each

¹⁶² For example, if Bidder A and Bidder B together win all of the B-Lots in a given Time Slice in a given band (and suppose they only win Lots in that Time Slice), one Bidder's frequency assignment would be positioned at the top of the available frequencies, with the other Bidder's assignment in the frequencies below. If both Bidders would prefer the lower frequencies, there is a conflict in their demand. The two Bidders will then be able to submit Assignment Bids for the two possible frequency assignments and the winner of the lower frequencies will be determined on the basis of these Assignment Bids.

¹⁶³ Suppose a Bidder is the only winner of B-Lots in a Time Slice in a band and there are no unsold B-Lots in the other Time Slice. The Assignment Option ultimately assigned to that Bidder has no effect on other Bidders' chances of being awarded their preferred frequencies, and so it is allowed to simply choose whether its Lots are positioned either at the top or at the bottom of the associated frequency-range (note that the provisions for contiguity of unsold B-Lots would prevent the Bidder from being given additional options).

¹⁶⁴ Additionally, in exceptional circumstances, ComReg reserves the right to run the Assignment Round via other means (e.g. sealed envelopes).

Assignment Bidder its Assignment Options for each band, if applicable.

- 4.199 There will be at least two clear Working Days between the notification of the Assignment Options to Assignment Bidders and the start of the Assignment Round.
- 4.200 ComReg has discretion over the Round Schedule and duration of the Round. However, ComReg anticipates that this Round will take place between 09:00 and 18:00 hours on a single Working Day, and last for at least 2 hours.
- 4.201 A single Extension right will be available to each Assignment Bidder in the Assignment Round. The Extension right in the Assignment Round will operate in the same way as Extension rights in the Primary Bid Rounds and Supplementary Bids Round except that, unlike for the Primary Bid Rounds, there is no scope for additional Extension rights. The Extension of the Assignment Round, where relevant, will not be longer than 30 minutes. For the avoidance of doubt, the Extension right in the Assignment Round is distinct from the Extension rights in the Main Stage and no Extension rights can be carried over from the Main Stage.

4.3.5 Selection of Assignment Option without Bidding

- 4.202 When the Assignment Round is in progress, a participating Assignment Bidder with the option to select a frequency assignment from amongst the Assignment Options presented to it for any given band will be able to do so using the EAS.
- 4.203 The EAS will provide each relevant Assignment Bidder with the functionality to choose its preferred Assignment Option and submit the decision.
- 4.204 Submission of the decision in the Assignment Round follows a two-step process, similar to the Bid submission process described in Section 4.1.2. The Assignment Bidder must first check its decision, and then confirm the decision.
- 4.205 If an Assignment Bidder fails to submit a decision during the Assignment Round (or during the associated Extension), the Assignment Option it is awarded will be determined through random selection and depending on the Assignment Bids submitted by other Assignment Bidders.
- 4.206 No Additional Price will be applicable to an Assignment Option selected in this manner.

4.3.6 Assignment Bid Submission

- 4.207 When the Assignment Round is in progress, a participating Assignment Bidder

with the option to submit Assignment Bids may do so.

- 4.208 The EAS will provide each relevant Assignment Bidder with the functionality to check and confirm Assignment Bids through a two-step submission process.
- 4.209 For each Assignment Bidder, the Bid Form available on the EAS will provide a list of all of the Assignment Options available to it for each band in which it has been assigned frequency-generic Lots and for which Assignment Bids are possible. For any given band, an Assignment Bidder may submit an Assignment Bid for all, some, or none of its Assignment Options.
- 4.210 The Bid Amount associated with each Assignment Bid is discretionary. Assignment Bids must be in multiples of whole euros. The minimum Bid Amount for each Assignment Option is zero. There is no upper limit on the Bid Amount for Assignment Options.
- 4.211 Note that all Assignment Bidders are guaranteed to be assigned the amount of spectrum in each band that they were assigned in the Main Stage. Assignment Bids will only affect which of the possible Assignment Options will be awarded, and any Additional Prices to be paid.
- 4.212 Assignment Bids for different Assignment Options with the same Bid Amount indicate that the Assignment Bidder is indifferent between these options. It is recommended (but not obligatory) that Assignment Bidders submit an Assignment Bid of zero euros for their least favoured option(s) in each band for which they can submit Assignment Bids.
- 4.213 If an Assignment Bidder submits Assignment Bids for some, but not all, of its Assignment Options, it will be deemed to have submitted a Bid Amount of zero for those Assignment Options for which it did not submit an Assignment Bid.
- 4.214 If an Assignment Bidder fails to submit Assignment Bids during the Assignment Round (or during the associated Extension), it will be deemed to have submitted a Bid Amount of zero for every Assignment Option.

4.3.7 Validity of Bids in the Assignment Round

- 4.215 Each Assignment Bid submitted in accordance with the Auction Rules is considered to be a Valid Bid.
- 4.216 Each Valid Bid represents a binding commitment to pay an Additional Price for the corresponding Assignment Option that is less than or equal to the Bid Amount submitted for that Assignment Option.

4.217 An Assignment Bid submitted during the Assignment Round and identified as valid under Section 4.1.2 remains valid unless voided by ComReg pursuant to the Award Rules. Assignment Bids may be voided, and no longer considered to be Valid Bids, if:

- an Assignment Bidder fails to provide the required funds to ComReg within the set deadline following a Deposit Call, in which case, at ComReg's absolute discretion, some or all of the Assignment Bidder's Assignment Bids may be voided;
- an Assignment Bidder is excluded from the Auction, pursuant to the Award Rules, in which case all of that Assignment Bidder's Assignment Bids will be voided; or
- ComReg voids the Assignment Round or all Bids submitted in the Auction (as set out in Section 4.1.5), in which case all Assignment Bids submitted by every Assignment Bidder may be voided.

4.3.8 Deposit Call following the Assignment Round

4.218 At the end of an Assignment Round, and prior to the notification to Assignment Bidders of the outcome of the Assignment Round, ComReg may give notice to one or more Assignment Bidders that they need to increase their Deposit to an amount specified by ComReg. ComReg reserves the right to issue a Deposit call of up to 100% of the amount required¹⁶⁵ to ensure that the Assignment Bidder's Deposit is equal to its Base Price plus the sum of the highest Assignment Bids it submitted for each band it had Assignment Options for in the Assignment Round.

4.219 If a Deposit Call is issued, ComReg will specify a deadline of not less than three Working Days from giving notice by which time the required funds must have been received as cleared funds in ComReg's Nominated Bank Account (details of which are provided in Annex 3).

4.220 ComReg will not notify the outcome of the Assignment Round in the period between issuing notice of a Deposit Call to one or more Assignment Bidders and the deadline for the receipt of funds or the actual receipt of cleared funds, whichever occurs earlier.

4.221 In the event that ComReg issues a Deposit Call following the completion of the

¹⁶⁵This Deposit Call may reflect the fact that monies held by ComReg could be subject to either negative or positive interest rates. Any such increase would reflect the surplus/deficit in the Deposit held by ComReg which would otherwise result from a positive/negative interest rate applied to Exchequer Notes held by ComReg. See Section 3.3.4 above.

Assignment Round but before the results of the Assignment Round have been announced to Bidders, and one or more Assignment Bidders do not provide their required funds by the deadline set by ComReg, ComReg reserves the right to void some or all of the Assignment Bidder's Assignment Bids before running the winner and price determination algorithm¹⁶⁶.

4.3.9 Winner and Additional Price Determination

Winner Determination

- 4.222 Following the end of the Assignment Round, ComReg will determine the Assignment Option awarded to each Assignment Bidder for each band, based on Assignment Bids submitted during the Assignment Round.
- 4.223 The Winner Determination process is carried out independently for each band.
- 4.224 For the purpose of Winner Determination, for a given band, the TS2 Notional Winner (if required) is assumed to have submitted Assignment Bids with a Bid Amount of zero for all specific frequency assignments it could be allocated following the generation of Assignment Options. The TS2 Notional Winner is then included in the set of Assignment Bidders for determining the winning Assignment Bids.
- 4.225 For a given band, the winning Assignment Bids are the combination of valid Assignment Bids (including Assignment Bids deemed to have been made at a Bid Amount of zero for an Assignment Option for which the Assignment Bidder did not submit an Assignment Bid) of greatest total value amongst all valid Assignment Bids submitted (including Assignment Bids assumed to have been submitted by the TS2 Notional Winner, where required), subject to the conditions that:
- exactly one Assignment Bid is accepted from each Assignment Bidder; and
 - the frequency ranges assigned by the accepted Assignment Bids from distinct Assignment Bidders do not overlap.
- 4.226 In the unlikely event that more than one combination of Assignment Bids meeting the conditions above have equal highest total value, one combination

¹⁶⁶ The Assignment Bidder will still be awarded spectrum in accordance with the Lots won in the Main Stage and one of the frequency assignments available to it, but any preferences it has expressed for specific frequencies through the submission of Assignment Bids will not be taken into account when determining the Provisional Assignment Plan.

will be selected at random.

4.227 Each Assignment Bidder will have exactly one winning Assignment Bid in each band in which they won Lots in the Main Stage. This may be an automatically-generated Assignment Bid of zero euros for an Assignment Option on which the Bidder did not submit an Assignment Bid.

Additional Price Determination

4.228 For each band in which the preferences expressed by two or more Assignment Bidders over the Assignment Options available to them could conflict, Additional Prices will be determined.

4.229 Additional Prices are calculated separately for each band and are based on the principle of Opportunity Cost.

4.230 For the purpose of Additional Price determination, for a given band, the TS2 Notional Winner (if required) is assumed to have submitted Assignment Bids with a Bid Amount of zero for all specific frequency assignments it could be allocated following the generation of Assignment Options. The TS2 Notional Winner is then included in the set of Assignment Bidders for determining Additional Prices.

4.231 For a given band, the Opportunity Cost of an Assignment Bidder, or a group of Assignment Bidders, is defined to be the difference between:

- the total amount of all winning Assignment Bids in a hypothetical scenario in which all the Assignment Bids of the Assignment Bidder(s) in question were set to zero; less
- the total amount of the original winning Assignment Bid(s) less the total amount of the winning Assignment Bid(s) from the Assignment Bidder(s) in question.

4.232 For each band, Additional Prices are determined jointly for all Assignment Bidders in a single calculation. A unique set of Additional Prices for a band is determined by applying the following requirements:

- First requirement: the Additional Prices are required to be positive or zero, and no greater than the Bid Amount of the winning Assignment Bid.
- Second requirement: the set of Additional Prices must be sufficiently high such that the sum of Additional Prices to be paid by each possible subset of Assignment Bidders is at least their Opportunity Cost. If there

is only one set of Additional Prices that satisfies the first two requirements, this determines the Additional Prices.

- Third requirement: if there are multiple sets of Additional Prices that fulfil the first and second requirements, the set(s) of Additional Prices that satisfy the first two requirements and minimise(s) the sum of Additional Prices across all Assignment Bidders is selected. If there is only one set of Additional Prices satisfying these three requirements, this determines the Additional Prices.
- Fourth requirement: If there are multiple sets of Additional Prices that satisfy the first three requirements, the set of Additional Prices that satisfies the first three requirements and minimises the sum of squares of differences between the Additional Prices for each Assignment Bidder and the Opportunity Cost for that Assignment Bidder is selected.

4.233 These requirements characterise a unique Additional Price for each Assignment Bidder for a band that is no more than their winning Assignment Bid for that band. Finally, if these Additional Prices are not amounts in whole euros, they are rounded up to the nearest whole euro.

4.234 An Assignment Bidder will be required to pay the sum of its Additional Prices for each band.

4.3.10 End of the Assignment Round

4.235 Once ComReg has determined specific frequency assignments for all Winning Bidders (whether an Assignment Round was required or not) and any Additional Prices, these will form the Provisional Assignment Plan.

4.236 Winning Bidders will be informed of the identity of other Winning Bidders and the specific frequency ranges assigned to each Winning Bidder in each band and, where relevant, in each Time Slice, according to the Provisional Assignment Plan.

4.237 Each Assignment Bidder will also be told the Additional Price(s) that will apply to its own winning Assignment Bid(s).

4.238 From this point, it is considered that the Negotiation Phase is in progress.

4.3.11 Negotiation Phase

4.239 Following the completion of the Assignment Round and the notification of the Provisional Assignment Plan and associated Additional Prices to be paid,

Assignment Bidders will be allowed a period of ten clear Working Days (the Negotiation Phase) in which they may communicate with each other to negotiate a reorganisation of the frequency assignments within the frequency ranges associated with frequency-generic Lots in one or more of the bands.

4.240 Any alternative frequency assignment proposed to ComReg is subject to all Winning Bidders receiving contiguous spectrum within the frequency-ranges associated with frequency-generic Lots, in accordance with the number of frequency-generic Lots awarded to them in each Time Slice in each band in the Main Stage.

4.241 For the avoidance of doubt, Assignment Bidders will be required to pay the Additional Prices calculated as a result of Assignment Bids submitted in the Assignment Round, regardless of the outcome of the Negotiation Phase.

Negotiation of alternative frequency assignment

4.242 All Assignment Bidders will have the opportunity to agree amongst themselves an alternative configuration of the frequency assignments within the frequency-ranges associated with frequency-generic Lots in the relevant frequency bands (relative to the Provisional Assignment Plan) within each Time Slice.

4.243 Specifically, two or more Assignment Bidders awarded frequency-generic Lots for a given band (and where applicable in a particular Time Slice) may agree on a re-organisation of the frequencies assigned to them in the band (and Time Slice), provided that:

- following the re-organisation, each of the parties involved is assigned the same total amount of contiguous frequency-generic spectrum within the band (in that Time Slice) as was won by them in the Main Stage; and
- the specific frequencies assigned to all other Assignment Bidders are unaffected by the re-organisation.

4.244 For the avoidance of doubt:

- Assignment Bidders will not be allowed to 'swap' frequencies across Time Slices or frequency bands;
- Assignment Bidders will only be allowed to 'swap' their frequencies (associated with the frequency-generic Lots won) in a given band/Time Slice as a whole; and

- Winners of the fixed frequency Lots in the 2.3 GHz and 2.6 GHz TDD bands will not be allowed to 'swap' any of the frequencies associated with the fixed frequency Lots.

4.245 If Assignment Bidders are able to successfully negotiate and agree on an alternative frequency plan for one or more bands, a request for the changes must be submitted to ComReg before the end of the Negotiation Phase. ComReg will assess each request received before deciding on the frequency reassignments it will allow. Successful requests will be adopted for the Final Assignment Plan.

4.246 ComReg reserves the right to refuse any or all requests for amendments to frequency assignments, relative to the Provisional Assignment Plan.

4.247 If Winning Bidders do not submit a request for an alternative configuration of frequency assignments, ComReg will rely on the Provisional Assignment Plan.

4.3.12 End of the Assignment Stage

4.248 Once ComReg has determined the Final Assignment Plan, the outcome of the Assignment Stage (that is, the outcome of the Assignment Round or the outcome of the Negotiation Phase) will be notified to Bidders. The following information will be released:

- each Bidder will be informed of the specific frequency ranges assigned to each Assignment Bidder in each band and Time Slice (where applicable); and
- each Assignment Bidder will be informed of the Additional Prices that will apply to its own winning Assignment Bid. This information will not be released to other Bidders at this point in the process.

4.4 End of Auction

4.249 Once ComReg has determined the Winning Bids and frequency assignments to be assigned to Winning Bidders, the outcome of the Award Process will be made public.

4.250 The following information will be released:

- a) the identities of the Winning Bidders and the specific frequencies awarded to each Winning Bidder in each band and in each Time Slice (where applicable);

- b) the Base Price to be paid by each Winning Bidder; and
- c) any Additional Prices for specific frequency assignments to be paid by each Winning Bidder.

4.4.1 Spectrum Access Fees

4.251 The SAF for each Winning Bidder will be the sum of their Base Price plus any Additional Prices for the specific frequencies assigned to them (in the Assignment Stage).

4.252 Each Winning Bidder must pay its SAF in accordance with the Notification and Grant Stage as set out in Section 3.7.

Chapter 5

5 Legal Terms and Conditions

5.1 Important Notice

- 5.1 This Information Memorandum is being made available by ComReg solely for the purposes of assisting Interested Parties in deciding whether they wish to proceed to participate in the Award Process in accordance with the terms of this Information Memorandum and to assist them in understanding, preparing for and participating in the Award Process. This Information Memorandum may not be used for any other purpose and, when using it for the purposes stated above, Interested Parties are strictly subject to the terms and conditions set out in this Information Memorandum.
- 5.2 To the extent permitted by law, no representation or warranty or undertaking (express or implied) is or will be made by ComReg or its personnel or agents and no liability or responsibility is or will be accepted by ComReg or its personnel or agents as to:
- i. the adequacy, accuracy or completeness of the information, opinions or statements (or the basis on which they are premised) contained in this Information Memorandum or in any of the documents referred to herein;
 - ii. any omissions, errors or misstatements contained in this Information Memorandum or in any documents referred to herein;
 - iii. the software used to implement the Award Process' electronic Auction system; and
 - iv. the contents of any written or oral information made available by ComReg or its personnel or agents to Interested Parties or any third party relating to the Award Process.
- 5.3 To the extent permitted by law, any liability and/or loss of any nature arising from this Information Memorandum and its use by Interested Parties is expressly disclaimed.
- 5.4 Without prejudice to the foregoing and to the extent permitted by law, ComReg's aggregate liability for all losses or damages of any nature arising from delayed access to Lots is expressly limited to the refunds or adjustments of Licence Fees as set out in Section 2.3.7 of this Information Memorandum.
- 5.5 To the extent permitted by law, Interested Parties shall not be entitled to rely on the contents of this Information Memorandum to argue that they have rights or

expectations, pursuant to legitimate expectation, estoppel or other related legal arguments, that:

- i. ComReg will not exercise any of its rights reserved in Section 5.2.6 of this Chapter 5;
- ii. they will be granted any spectrum rights of use at the end of the Award Process;
- iii. Bidding in any particular manner will, of itself, guarantee success in the Award Process;
- iv. ComReg will, during the term of any Licence granted pursuant to the Award Process, modify the terms of such Licence, or the regulations affecting such Licence, in any manner and, without prejudice to the generality of the foregoing, that ComReg will permit the use of any particular new technologies in the spectrum rights of use licensed pursuant to the Award Process; or
- v. ComReg will reassign rights of use of spectrum licensed pursuant to the Award Process in any particular way at the termination of any Licences granted pursuant to the Award Process.

5.6 While ComReg, its personnel and agents intend to implement the Award Process, ComReg, its personnel and agents give no indication or commitment and make no statements as to the possible outcomes of this Award Process.

5.7 In accessing this Information Memorandum, Interested Parties acknowledge that they will be solely responsible for their own assessment of any matter connected with the Award Process to which the Information Memorandum relates. Interested Parties are responsible for forming their own views, deciding if they will partake in the Award Process, completing the relevant Application Forms and calculating any Bids.

5.8 All dates in this Information Memorandum are, unless specifically stated to the contrary, target or indicative dates only and may be subject to change at the sole discretion of ComReg acting in line with its statutory functions, objectives and duties.

5.9 Whilst the information in this Information Memorandum has been provided in good faith, it does not purport to be comprehensive nor to have been independently verified. Interested Parties should form their own views. ComReg reserves the right to amend this Information Memorandum and any information or documents contained or referred to herein in accordance with paragraph 5.31 of this Chapter 5.

- 5.10 Nothing in this Information Memorandum is, or should be relied upon as, a promise or representation as to ComReg's ultimate decision in relation to the award of a Licence or Licences. ComReg reserves the right to suspend or not to proceed with the Award Process or any part thereof and may terminate the Award Process or any part thereof at any time and, in such event, ComReg shall not be liable, howsoever, to any Interested Party save for ComReg's obligation to return Deposits in certain circumstances. ComReg also reserves the right, in accordance with law, to change any procedure in relation to the Award Process. ComReg reserves the right to reject any and all Applications received as part of the Award Process or not to select any Applicant for the grant of a Licence. It is recommended that Interested Parties seek their own financial, legal and technical advice at their own cost in relation to the Award Process. The publication of this Information Memorandum or any information made available in connection with the Award Process does not constitute nor is to be taken as constituting the giving of financial, legal, technical or investment advice by ComReg, its personnel or agents.
- 5.11 Any conflict of interest or potential conflict of interest – including but not limited to any conflict arising under the rules set out in Sections 3.3.5 and 3.3.6 of this Information Memorandum – must be disclosed to ComReg by any Interested Party as soon as such conflict of interest or potential conflict of interest becomes apparent. The appropriate course of action to be taken in such event shall be decided upon by ComReg, at its discretion acting in line with its statutory functions, objectives and duties.
- 5.12 This Information Memorandum should be read and construed in accordance with the previous documentation issued by ComReg as part of this process including:
- Consultation 14/101 (insofar as relevant to this Award Process);
 - Consultation 18/60;
 - Information Notice 18/103;
 - Consultation and Further Consultation 19/59R;
 - Response to Consultation and Draft Decision 19/124;
 - Information Notice 20/56; and
 - Response to Consultation and Decision 20/122,
- along with the associated consultants' reports and other relevant ComReg documents which are available on ComReg's website (the "Consultation Process Documents"). Noting that the consultation process has been complex and the views of ComReg and the respondents have evolved over time, in the

event of any conflict between the views expressed in any of the Consultation Process Documents, the view expressed in the later document shall take precedence. Where any draft document, for instance a draft statutory instrument, draft decision or draft Information Memorandum has been supplanted by a finalised document, the draft document should be discounted entirely. In the event of any conflict or inconsistency between the Consultation Process Documents and this Information Memorandum, this Information Memorandum shall take precedence.

- 5.13 No legal obligations on the part of ComReg to grant any Licences will arise unless and until the granting and commencement of a Licence or Licences by ComReg following the completion of the Award Process.
- 5.14 The legal and contractual obligations described in this Chapter of the Information Memorandum are imposed on Interested Parties who are furnished with or who download this Information Memorandum and ComReg reserves the right to enforce such obligations. Copyright (and any other intellectual property rights) in this Information Memorandum vest and remain in ComReg and its licensors, and recipients of this document, including Interested Parties, shall not use or copy this Information Memorandum other than in pursuit of the purposes described in paragraph 5.1 above, without the permission of ComReg. Applicants who submit Applications to enter the Award Process shall be obliged to express their acceptance to the provisions of this Chapter as part of the Application process (see Section 3.3 and Annex 3 of this Information Memorandum).
- 5.15 This Information Memorandum and all matters arising out of or in connection with or in any way related to this Information Memorandum shall be governed and construed in accordance with the laws of Ireland and shall be subject to, and Interested Parties hereby expressly submit to, the exclusive jurisdiction of the Irish courts.

5.2 Additional Conditions

5.2.1 Open Applications

- 5.16 All Applications (including Applications which do not ultimately become qualifying Applications) by Applicants comprise offers which must remain open and valid for six (6) months from the date of submission with the exception that an Applicant may withdraw its Application on or before **13 August 2021**. Applications are contractually binding offers and the submission of an Application shall mean the Applicant unconditionally offers to agree to:

- i. the provisions of this Chapter;
- ii. the Applicant Declaration which forms part of the Application (see Annex 3 of this Information Memorandum); and
- iii. the Award Rules.

5.17 Offers shall be deemed to be accepted (meaning that an agreement covering (i), (ii) and (iii) above has been formed between the Applicant and ComReg) once they are submitted to ComReg in accordance with the Information Memorandum and an acknowledgment of receipt has been issued by ComReg even if they subsequently do not become qualifying Applications.

5.18 All Applications will be assessed in accordance with Section 3.4 of this Information Memorandum.

5.19 For the avoidance of doubt, the contract described in this Section 5.2.1 is in addition to and not in substitution for the contract described in paragraph 5.14 of this Chapter 5 which binds all parties in receipt of this Information Memorandum to the provisions of this Chapter. In the event that an Applicant withdraws its Application on or before **13 August 2021**, such Applicant will remain bound by the contract described in paragraph 5.14 of this Chapter 5.

5.2.2 Canvassing

5.20 Interested Parties must not canvass directly or indirectly any staff or the Commissioners of ComReg or any person associated in any way with the Award Process. Failure to comply with this requirement may result in an Application being deemed invalid or disqualification from the Award Process. This does not restrict an Applicant from making any representations through the communications channels specified in this Information Memorandum.

5.2.3 Award Rules / Improper Influence

5.21 The Award Rules described in this Information Memorandum and its Annexes shall form part of the agreement between ComReg and Applicants described in Section 5.2.1 of this Chapter 5 and, by submitting an Application, the Applicant agrees to be bound by and to comply with the Award Rules. Without prejudice to the detailed Award Rules around Bidder behaviour and for the avoidance of doubt, any attempt by Interested Parties to improperly influence, in any way, the Award Process, may result in the disqualification of that/those Interested Parties or, where the party engaging in such behaviour is an agent, that agent's principal. Non-exhaustive examples of such improper influence are collusion, price fixing, Bid rigging, Bid rotation, market division or breach of Award Process confidentiality.

5.2.4 Publicity / Information Disclosure

- 5.22 No publicity whatsoever regarding this Information Memorandum and/or Award Process is permitted until the public announcement on the outcome of the Award Process by ComReg, unless and until ComReg has consented in writing, at its discretion, to the relevant communication. For the avoidance of doubt, this publicity prohibition shall prevent Interested Parties and/or their agents from making any public statements or statements likely to be made public whatsoever concerning the Award Process and/or this Information Memorandum.
- 5.23 ComReg may issue such communications and generate such publicity in relation to the Award Process as it considers appropriate and without notice to Interested Parties. ComReg, subject to its guidelines on the treatment of confidential information¹⁶⁷, in particular, has the right to publicise or otherwise disclose any information regarding the Award Process, the identity of Applicants (including the identity of their members, sub-contractors and agents), successful Bidders or the granting of a related Licence or Licences at any time.
- 5.24 Before, during or after the Award Process ComReg may receive a request made pursuant to applicable law (including the Freedom of Information Act 2014) to disclose particular information. ComReg is not liable or responsible under any circumstances for any losses, claims or damages of any kind incurred as a result of the good faith disclosure of any information purportedly pursuant to law, which occurs before, during or after the Award Process. It is the sole responsibility of an Interested Party to determine if any of the information it supplies in the course of the Award Process should not be disclosed because of its sensitivity.

5.2.5 Errors

- 5.25 If Interested Parties discover any error or omission or lack of clarity in this Information Memorandum, such Interested Parties must immediately notify ComReg in writing (to the address of ComReg staff as per paragraph 3.46 of this Information Memorandum) of such error, omission or lack of clarity which will be resolved by ComReg in such manner as it considers appropriate.

5.2.6 No Warranty and Termination

- 5.26 The publication of this Information Memorandum does not warrant or imply that any Interested Party will be awarded a Licence or Licences.
- 5.27 ComReg will act at all times to a standard expected of a public body and in line with its statutory functions, objectives and duties. ComReg reserves the right,

¹⁶⁷ ComReg Guidelines on the treatment of confidential information, Document 05/24.

for any reason whatsoever at its discretion:

- to reject Applications which do not comply with the Award Rules;
- not to proceed with any part of the Award Process described in this Information Memorandum;
- not to provide an Interested Party with any additional information;
- not to implement any arrangement contemplated by this Information Memorandum;
- to withdraw from any discussions or consultation which ComReg might engage or have engaged in;
- to suspend the Award Process at any time;
- not to award any Licence or Licences;
- to procure the award of a Licence or Licences by alternative means; and/or
- to terminate the Award Process at any time.

5.2.7 Own Costs

5.28 Each Interested Party shall be fully responsible for the entirety of all expenses and/or costs it incurs in the preparation or submission of an Application or in participating in the Award Process. Save as otherwise expressly stated in this Information Memorandum, ComReg is not responsible for and will not pay for any expense or cost incurred or loss suffered by an Interested Party in the preparation or submission of its Application, its participation in the Award Process (including mock Auctions and workshops) or otherwise. Further, ComReg is not responsible for any travel or accommodation costs incurred by Interested Parties unless previously agreed in writing by ComReg.

5.29 This applies in all cases, including if the Award Process is suspended or terminated for any reason whatsoever.

5.2.8 Waiver

5.30 The failure or neglect by ComReg to enforce any provision of the Information Memorandum is not (and will not be deemed to be) a waiver of that provision and does not prejudice ComReg's right to take subsequent action in respect of such provision.

5.2.9 Amendments

5.31 ComReg reserves, at its discretion, the right, at any time until the conclusion or

termination of the Award Process, to amend or modify this Information Memorandum or Award Process in any respect, including the shortening or extension of any and all timelines, by way of clarification, addition, deletion or otherwise. ComReg will inform Interested Parties of any such amendments or modifications, if appropriate.

5.2.10 Conclusion of Process

- 5.32 The conclusion of the Award Process, as set out in Section 4.4 of this Information Memorandum, shall be without prejudice to the accrued rights and obligations of ComReg and Interested Parties pursuant to this Chapter 5. The provisions of this Information Memorandum shall continue to bind ComReg and/or Interested Parties, to the extent that each of these provisions has become applicable to an Interested Party during the Award Process, after the conclusion of the Award Process.
- 5.33 Additional continuing obligations are imposed on Applicants pursuant to the contract formed by Section 5.2.1 of this Chapter 5.

Annex: 1 Glossary

A1.1 Definitions

A 1.1 The definitions in this glossary shall apply to this IM as a whole save that they shall not apply to the Draft Regulations in Annex 2.

A 1.2 Where a term in this glossary is defined by reference to a definition in a section or paragraph and an explanation of that term is provided in this glossary, the latter explanation is for convenience only and reference should be made to the appropriate part of the document for the definitive meaning of that term in its appropriate context.

A 1.3 Any reference to any provision of any legislation shall include any modification, re-enactment or extension thereof.

A 1.4 Any reference to an Interested Party shall include that Interested Party's successors and assigns.

A 1.5 The headings contained in this IM are inserted for convenience of reference only and shall not in any way form part of or affect or be taken into account in the construction or interpretation of any provision of this IM or the Annexes or Schedules hereto.

A 1.6 Terms defined in this IM shall, unless the context otherwise requires or admits, have the meaning set out below:

1800 MHz Band	Means spectrum in the range 1710 – 1785 MHz paired with spectrum in the range 1805 – 1880 MHz.
1926 Act	The Wireless Telegraphy Act 1926 (No. 45 of 1926) as amended.
2.1 GHz Band	Means spectrum in the range 1920 – 1980 MHz paired with spectrum in the range 2110 – 2170 MHz.
2.1 GHz Band Block	Means a 2 × 5 MHz block of spectrum in the 2.1 GHz Band.

2.1 GHz Lot Time Slice 1 or ("B2.1/1")	Means a 2 × 5 MHz block of spectrum in the 2.1 GHz Band available for award in Time Slice 1, with the specific frequencies of such Lots being determined in the Assignment Stage of the competitive selection procedure described in this IM.
2.1 GHz Lot Time Slice 2 or ("B2.1/2")	Means a 2 × 5 MHz block of spectrum in the 2.1 GHz Band available for award in Time Slice 2, with the specific frequencies of such Lots being determined in the Assignment Stage of the competitive selection procedure described in this IM.
2.1 GHz Band Interim Licence	Means a licence of the type set out in draft form in Schedule 1 or 2 of the 2.1 GHz Band Interim Licence and Early Liberalisation Regulations.
2.1 GHz Band Interim Licence and Early Liberalisation Regulations	Regulations to be made by ComReg, subject to obtaining the prior consent of the Minister, in the form of the Wireless Telegraphy (Third Generation and GSM Licence) (Amendment) and Interim Licensing) Regulations, 2021, as may be amended prior to their entering into force. See Annex 2 of this document for the current draft.
2.3 GHz Band	Means spectrum in the range 2300 – 2400 MHz.
2.3 GHz Band Block	Means a block of spectrum in the 2.3 GHz Band.
2.3 GHz Band Fixed Frequency Block	Means a 1 × 10 MHz block of spectrum from 2390 – 2400 MHz.
2.3 GHz Fixed Frequency Lot Time Slice 1 or ("A2.3/1");	Means a 1 × 10 MHz block of spectrum from 2390 – 2400 MHz available for award in Time Slice 1.

2.3 GHz Fixed Frequency Lot Time Slice 2 or (“A2.3/2”);	Means a 1 × 10 MHz block of spectrum from 2390 – 2400 MHz available for award in Time Slice 2.
2.3 GHz Band Generic Frequency Block	Means a 1 × 5 MHz block of spectrum in the range 2300 – 2390 MHz.
2.3 GHz Generic Frequency Lot Time Slice 1 or (“B2.3/1”)	Means a 1 × 5 MHz block of spectrum in the range 2300 – 2390 MHz available for award in Time Slice 1, with the specific frequencies of such Lots being determined in the Assignment Stage of the competitive selection procedure described in this IM.
2.3 GHz Generic Frequency Lot Time Slice 2 or (“B2.3/2”);	Means a 1 × 5 MHz block of spectrum in the range 2300 – 2390 MHz available for award in Time Slice 2, with the specific frequencies of such Lots being determined in the Assignment Stage of the competitive selection procedure described in this IM.
2.4 GHz Band	Means spectrum in the range 2400 to 2500 MHz.
2.6 GHz Band	Means spectrum in the range 2500 – 2690 MHz.
2.6 GHz Band Block	<p>Means any of the following:</p> <ul style="list-style-type: none"> • a 2.6 GHz Band FDD Block; • the 2.6 GHz Band TDD Fixed Frequency Block (Lower); • the 2.6 GHz Band TDD Fixed Frequency Block (Upper); or • a 2.6 GHz Band TDD Generic Frequency Block.

2.6 GHz FDD Band	Means spectrum in the 2.6 GHz Band FDD Blocks.
2.6 GHz Band FDD Block	Means a 2 × 5 MHz block of spectrum in the range 2500 – 2570 MHz paired with spectrum in the range 2620 – 2690 MHz.
2.6 GHz FDD Lot Time Slice 1 or (“B2.6F/1”)	Means a 2 × 5 MHz block of spectrum in the range 2500 – 2570 MHz paired with spectrum in the range 2620 – 2690 MHz available for award in Time Slice 1, with the specific frequencies of such Lots being determined in the Assignment Stage of the competitive selection procedure described in this IM.
2.6 GHz FDD Lot Slice 2 or (“B2.6F/2”)	Means a 2 × 5 MHz block of spectrum in the range 2500 – 2570 MHz paired with spectrum in the range 2620 – 2690 MHz available for award in Time Slice 2, with the specific frequencies of such Lots being determined in the Assignment Stage of the competitive selection procedure described in this IM.
2.6 GHz TDD Band	Means spectrum in the 2.6 GHz Fixed Frequency Block (Lower), 2.6 GHz Fixed Frequency Block (Upper) and 2.6 GHz Band TDD Generic Frequency Blocks.
2.6 GHz Band TDD Fixed Frequency Block (Lower)	Means a 1 × 5 MHz block of spectrum from 2570 – 2575 MHz.
2.6 GHz TDD Fixed Frequency Lot (Lower)	Means the 2.6 GHz TDD Fixed Frequency Lot (Lower) Time Slice 1 or the 2.6 GHz TDD Fixed Frequency Lot (Lower) Time Slice 2.
2.6 GHz TDD Fixed Frequency Lot (Lower) Time Slice 1 or (“A2.6TL/1”)	Means a 1 × 5 MHz block of spectrum in the 2570 – 2575 MHz range available for award in Time Slice 1.

2.6 GHz TDD Fixed Frequency Lot (Lower) Time Slice 2 or ("A2.6TL/2")	Means a 1 × 5 MHz block of spectrum in the 2570 – 2575 MHz range available for award in Time Slice 2.
2.6 GHz Band TDD Fixed Frequency Block (Upper)	Means a 1 × 5 MHz block of spectrum from 2615 – 2620 MHz.
2.6 GHz TDD Fixed Frequency Lot (Upper)	Means the 2.6 GHz TDD Fixed Frequency Lot (Upper) Time Slice 1 or the 2.6 GHz TDD Fixed Frequency Lot (Upper) Time Slice 2.
2.6 GHz TDD Fixed Frequency Lot (Upper) Time Slice 1 or ("A2.6TU/1")	Means a 1 × 5 MHz block of spectrum in the 2615 – 2620 MHz range available for award in Time Slice 1.
2.6 GHz TDD Fixed Frequency Lot (Upper) Time Slice 2 or ("A2.6TU/2").	Means a 1 × 5 MHz block of spectrum in the 2615 – 2620 MHz range available for award in Time Slice 2.
2.6 GHz Band TDD Generic Frequency Block	Means a 1 × 5 MHz block of spectrum in the range 2575 – 2615 MHz.
2.6 GHz TDD Generic Frequency Lot	Means a 2.6 GHz TDD Generic Frequency Lot Time Slice 1 or a 2.6 GHz TDD Generic Frequency Lot Time Slice 2.
2.6 GHz TDD Generic Frequency Lot Time Slice 1 or ("B2.6T/1");	Means a 1 × 5 MHz block of spectrum in the 2575 – 2615 MHz range available for award in Time Slice 1, with the specific frequencies of such Lots being determined in the Assignment Stage of the competitive selection procedure described in this IM.
2.6 GHz TDD Generic Frequency Lot Time Slice 2 or ("B2.6T/2");	Means a 1 × 5 MHz block of spectrum in the 2575 – 2615 MHz range available for award in Time Slice 2, with the specific frequencies of such Lots being

	determined in the Assignment Stage of the competitive selection procedure described in this IM.
3.6 GHz Band	Means spectrum in the range 3410 – 3435 MHz and 3475 – 3800 MHz.
3.6 GHz Band Liberalised Use Licence	Licences issued under Wireless Telegraphy (3.6 GHz Band Licences) Regulations 2016 (S.I. No. 532 of 2016).
3G	Third Generation Mobile System.
700 MHz Duplex	Means spectrum in the range 703 – 733 MHz paired with spectrum in the range 758 – 788 MHz.
700 MHz Duplex Block	Means a 2 × 5 MHz block of spectrum in the 700 MHz Duplex.
700 MHz Duplex Lot	Means a 2 × 5 MHz block of spectrum in the 700 MHz Duplex available for award, with the specific frequencies of such Lots being determined in the Assignment Stage of the competitive selection procedure described in this IM.
800 MHz Band	Means spectrum in the range 791 – 821 MHz paired with spectrum in the range 832 – 862 MHz.
900 MHz Band	Means spectrum in the range 880 – 915 MHz paired with spectrum in the range 925 – 960 MHz.
Active Antenna Systems or (“AAS”)	Means a Base Station and an antenna system where the amplitude and/or phase between antenna elements is continually adjusted resulting in an antenna pattern that varies in response to short term changes in the radio environment. This excludes long-term beam shaping such as fixed electrical down tilt. In AAS Base Stations, the antenna system is integrated as part of the Base Station system or product.
Activity	The Activity of a Bid is determined independently for each Time Slice. For each Time Slice, the Activity associated with a Primary Bid is equal to the

	Eligibility of the Package of Lots that the Bidder Bid for in the corresponding Time Slice.
Activity Rules	Rules governing the Bids that each Bidder can make in successive Rounds based on Bids submitted by the Bidder in previous Rounds and their associated Activity.
Additional Price	<p>For a given band, the Additional Price for a Winning Bidder, if any, is the price associated with the assignment of specific Lots in the band to this Winning Bidder as determined in the Assignment Stage of this Award Process. This price will be determined using the methodology as detailed in Chapter 4.</p> <p>Winning Bidders are required to pay the sum of their Additional Prices (if any) across all bands.</p>
Aggregate Demand	The sum of demand for Lots in a Lot Category expressed by all Applicants at the Application Stage or by all Bidders in a Primary Bid Round in the Auction.
A-Lot	<p>A single fixed frequency Lot in the:</p> <ul style="list-style-type: none"> • 2.3 GHz Fixed Frequency Lot Time Slice 1 (“A2.3/1”); • 2.3 GHz Fixed Frequency Lot Time Slice 2 (“A2.3/2”); • 2.6 GHz TDD Fixed Frequency Lot (Lower) Time Slice 1 (“A2.6TL/1”); • 2.6 GHz TDD Fixed Frequency Lot (Lower) Time Slice 2 (“A2.6TL/2”); • 2.6 GHz TDD Fixed Frequency Lot (Upper) Time Slice 1 (“A2.6TU/1”); and 2.6 GHz TDD Fixed Frequency Lot (Upper) Time Slice 2 (“A2.6TU/2”).

Annual Coverage Compliance Report	An annual report, as set out in Chapter 2, that a Licensee must submit to ComReg regarding its compliance with its coverage obligations.
Annual QoS Compliance Report	An annual report, as set out in Chapter 2, that a Licensee must submit to ComReg regarding its compliance with its QoS obligations.
Annual Rollout Compliance Report	An annual report, as set out in Chapter 2, that a Licensee must submit to ComReg regarding its compliance with its rollout obligations.
Apparatus	Apparatus for wireless telegraphy as defined in section 2 of the Act of 1926 for terrestrial systems capable of providing Electronic Communications Services in the Award Spectrum.
Applicant	An entity that submits a Phase 1 Application Form to ComReg.
Applicant Declaration	Part 2 of the Application Form.
Application	<p>The Application to participate in the Award Process made by an Applicant and includes both Phase 1 and Phase 2 Application Documentation.</p> <p>A valid Application is a binding commitment to pay the Bid Amount submitted for the Bid specified on the Applicant's Initial Bid Form.</p>
Application Date	Means the Phase 1 Application Date and Phase 2 Application Date.
Application Form	<p>The Application Form, as set out in Annex 3a and 3b of this Document, to be delivered as part of an Application consisting of:</p> <ul style="list-style-type: none"> • Part 1: Administrative Information

	<ul style="list-style-type: none"> • Statement of Intent regarding the submission of Phase 2 Application Documentation • Part 2: Applicant Declaration • Part 3: Initial Bid Form
Application Stage	The stage of the Award Process described in Section 3.3 of this IM, which runs from the day on which the IM is published up to and including the Application Date.
Assignment Bidder	Refers to the Winning Bidders that win at least one B-Lot in the Main Stage and, in the case that at least one Winning Bidder wins new rights of use in the 2.1 GHz Band, Eir (irrespective of whether it wins additional rights of use in the Main Stage).
Assignment Bids	Bids submitted by Assignment Bidders to express their preferences over their possible assignments.
Assignment Option	<p>The set of unique feasible assignments that could be assigned to each Assignment Bidder.</p> <p>The number of Assignment Options available to an Assignment Bidder will be less or equal to the possible number of Candidate Frequency Plans.</p>
Assignment Round	The single Round of bidding in the Assignment Stage, during which Assignment Bidders may submit one or more Assignment Bids to be assigned specific Lots.
Assignment Stage	Determines the specific frequencies to be assigned to each Winning Bidder of frequency-generic B-Lots (i.e. Assignment Bidders) and the Additional Prices to be paid by each Assignment Bidder.
Associate	As defined in Annex 5 of the Information Memorandum.

Associated Bidders	As defined in Annex 5 of the Information Memorandum.
Associated Unsold Allocation ('AUA')	A hypothetical assignment of unsold Time Slice 1 Lots to subsets of winners that achieves the CPS.
Auction	The mechanism, consisting of the Main Stage and Assignment Stage, within the Award Process used to determine Winning Bidders and winning prices in the event that there is insufficient supply in at least one Lot Category to meet the demand expressed by Applicants for Lots, overall and/or for specific Lots, at the stated Reserve Prices at the Application Stage of the Award Process.
Auction Rules	"Auction Rules" shall refer to the rules and procedures relating specifically to the Auction itself, as presented in Chapter 4 only, and to any other material to which the rules in Chapter 4 directly refer.
Auction Day	A day upon which one or more Rounds of the Auction are scheduled to run.
Auction Playground	An environment for allowing Bidders to run their own mock main stage auctions using closely similar software to that which will be used for the actual auction. This allows Bidders to familiarise themselves with the EAS and to test their own IT facilities and procedures. It will be made available from Monday 16 August 2021 and will be taken offline at a time determined by ComReg but in advance of the Auction.
Auctioneer	The Commission for Communications Regulation.
Authorisation Regulations	The European Communities (Electronic Communications Networks and Services) (Authorisation) Regulations, 2011 (S.I. No. 335 of 2011).

Authorised Agent	A person who the Applicant has notified ComReg is entitled to bind an Applicant contractually in relation to the Award Process.
Award Process	The overall process through which it is intended that rights of use of spectrum will be awarded in the Award Spectrum.
Award Rules	Award Rules refers to rules and procedures relating to the Award Process, as presented in Chapters 3 and Chapter 4 of this Information Memorandum, and to any other material to which the rules in Chapters 3 and 4 directly refer.
Award Spectrum	<p>The spectrum in respect of which rights of use are being made available in the Award Process.</p> <p>The Award Spectrum consists of the:</p> <ul style="list-style-type: none"> • 700 MHz Duplex, • 2.1 GHz Band, • 2.3 GHz Band; • 2.6 GHz FDD Band; and • 2.6 GHz TDD Band.
Band Frequency Plan	For a given band, the specific frequencies to be assigned to Assignment Bidders as a result of the Assignment Option generation process and the outcome of an Assignment Round (if required) give the Band Frequency Plan for that band.
Base Price	Base Prices are the minimum amounts that each Winning Bidder, and each group of Winning Bidders jointly, could have bid without changing the outcome of the winner determination process, and are based on the concept of Opportunity Cost.

	<p>The Base Price for a Winning Bidder is determined as follows:</p> <ul style="list-style-type: none"> • where the Main Stage of the Award Process is not required, the Base Price is the sum of the Reserve Prices for all Lots to be included in the Licence; • where the Main Stage of the Award Process is required, the Base Price is determined by the Main Stage of the Auction as detailed in Chapter 4 of this document. The Base Price will be no less than the sum of the Reserve Prices for all Lots to be included in the Licence.
Bid	A binding offer to buy a number of Lots at a price not exceeding a specific monetary amount (the Bid Amount).
Bid Amount	The monetary amount associated with an offer made by a Bidder for a specified Package of Lots.
Bid Form	The Bid Form provided by the EAS for entry of Bids.
Bidder	An Applicant that submitted a valid Application in the Application Stage that was approved by ComReg in the Qualification Stage, qualifying them to bid for Lots in the Award Process.
Bidding Group	A Bidder and its Connected Persons as defined in Annex 5 of the Information Memorandum.
Bidder Materials	Information made available to Bidders regarding the EAS.
Bidding Restrictions	Bidding Restrictions are in the form of:

	<ul style="list-style-type: none"> • Competition Caps, that restrict the amount of spectrum Bidders can win rights of use for in the Award Process; and • constraints on the combinations of frequency-specific and frequency-generic Lots in the 2.6 GHz TDD Band that a Bidder can submit Bids for.
Block Edge Mask or (“BEM”)	An emission mask that is defined as a function of frequency in relation to a ‘block edge’, the latter being the frequency boundary of a spectrum block for which rights of use are assigned to a Licensee. The BEM consists of several elements which are defined for certain measurement bandwidths.
B-Lot	<p>Is a single frequency-generic Lot as follows:</p> <ul style="list-style-type: none"> • 700 MHz Duplex Lots (“B700”); • 2.1 GHz Lots Time Slice 1 (“B2.1/1”); • 2.1 GHz Lots Time Slice 2 (“B2.1/2”); • 2.3 GHz Generic Frequency Lots Time Slice 1 (“B2.3/1”); • 2.3 GHz Generic Frequency Lots Time Slice 2 (“B2.3/2”); • 2.6 GHz FDD Lots Time Slice 1 (“B2.6F/1”); • 2.6 GHz FDD Lots Time Slice 2 (“B2.6F/2”); • 2.6 GHz TDD Generic Frequency Lots Time Slice 1 (“B2.6T/1”); and • 2.6 GHz TDD Generic Frequency Lots Time Slice 2 (“B2.6T/2”).
Candidate Frequency Plans	A frequency plan constructed from the Assignment Bidder orderings and re-arrangements of unsold

	blocks in accordance with the rules on Assignment Option generation.
CCA	Combinatorial Clock Auction.
CEPT	The European Conference of Postal and Telecommunications Administrations.
Chain Bid	A Bid at a non-discretionary level for a Package of Lots previously subject to the Bidder's Initial Bid or a Package of Lots subject to a Primary Bid in a Primary Bid Round where the Bidder dropped Eligibility and which is submitted alongside a Relaxed Primary Bid.
ComReg	The Commission for Communications Regulation.
ComReg's Nominated Bank Account	As specified in the Application Form.
Communications Regulation Act 2002	Communications Regulation Act 2002 (No. 20 of 2002), as amended ¹⁶⁸ .
Competition Act 2002	Competition Act 2002 (No. 14 of 2002), as amended.
Competition Cap	Explicit maximum limits set on the amount of spectrum that any one Bidder can bid for/acquire in the Award Process. All Bidders are subject to a Competition Cap consisting of an Overall Competition Cap and a Sub-1 GHz Competition Cap.
Confidential Information	Details of what may constitute Confidential Information for the purposes of this Award Process are provided in Section 3.3.6 of the IM.

¹⁶⁸ Amendments include but are not limited to those effected by the Communications Regulation (Amendment) act 2007 and the Communications Regulation (Premium Rate Services and Electronic Communications Infrastructure) Act 2010.

Constraining Package	Packages of Lots subject to Eligibility-reducing Primary Bids. Shall have the meaning ascribed to it in Chapter 4 of the Information Memorandum.
Connected Person	As defined in Annex 5 of the Information Memorandum.
Constraining Round	The Primary Bid Round associated with a particular Constraining Package.
Controlled Person	As defined in Annex 5 of the Information Memorandum.
Corrected Partition Score ('CPS')	The lowest value of the Partition Score that can be achieved by hypothetically assigning all of the unsold Lots in the first Time Slice (if any) to winners (in any possible way).
CPI	Consumer Price Index published from time to time by the Central Statistics Office.
CPI Adjustment	Means a negative or positive adjustment to a Spectrum Usage Fee, calculated using the CPI according to the methodology set out in the Information Memorandum.
CSO	Central Statistics Office of Ireland or its successor.
Decision	Refers to ComReg's substantive proposals as set out in its Decision (Chapter 10 of Document 20/122).
Deposit	A monetary amount submitted by an Applicant as part of its Application to be assigned Lots in the Award Process. For an Application to be valid, the amount of an Applicant's Deposit must, at a

	minimum, be equal to the highest Bid Amount specified by the Applicant in its Initial Bid Form.
Deposit Call	A notice given by ComReg to one or more Bidders that they need to increase their Deposits as described in this Information Memorandum.
Discount	As specified in paragraph 4.113.
Draft Regulations	Includes the MBSA2 Licence Regulations, and the 2.1 GHz Band Interim Licence and Early Liberalisation Regulations.
EC	European Commission.
EC Decision 2016/687	Commission Implementing Decision of 28 April 2016 on the harmonisation of the 694 – 790 MHz frequency band for terrestrial systems capable of providing wireless broadband electronic communications services and for flexible national use in the Union.
EC Decision 2012/688	Commission Implementing Decision of 5 November 2012 on the harmonisation of the frequency bands 1920 – 1980 MHz and 2110 – 2170 MHz for terrestrial systems capable of providing electronic communications services in the Union.
EC Decision 2008/477	Commission Decision of 13 June 2008 on the harmonisation of the 2500 – 2690 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Community.
EC Decision 2020/636	Commission Implementing Decision of 8 May 2020 amending Decision 2008/477/EC as regards an

	update of relevant technical conditions applicable to the 2500 – 2690 MHz frequency band.
EC Decision 2020/667	Commission Implementing Decision of 6 May 2020 amending Decision 2012/688/EU as regards an update of relevant technical conditions applicable to the frequency bands 1920 – 1980 MHz and 2110 – 2170 MHz.
ECC	Electronic Communications Committee of CEPT.
ECC Decision 14(02)	Harmonised technical and regulatory conditions for the use of the band 2300 – 2400 MHz for Mobile/Fixed Communications Networks (MFCN).
Edge Lots	Where a Lot Category consisting of frequency-generic Lots has fixed frequency Lots at adjacent frequencies, these fixed frequency Lots are referred to as the Edge Lots associated with that particular Lot Category.
Edge Winner	For a band that has both fixed frequency A-Lots and frequency generic B-Lots, an Edge Winner is a Winning Bidder that has won (in the Main Stage) any fixed frequency Lot in the band as well as at least one frequency generic Lot in the band in either Time Slice.
eIDAS Regulation	eIDAS Regulation means Regulation (EU) No 910/2014 of the European Parliament and of the Council of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC.
Eircode	Ireland's postcode system which identifies every home and business address in the State with a unique code.

Electronic Communications Service (ECS)	Electronic Communications Service as defined under the Framework Regulations.
Electronic Auction System (EAS)	The system used for running the Auction. Specifically, this will be used by Bidders to check and submit Bids during the Assessment Stage (where required) and the Assignment Stage of the Auction (both except in exceptional circumstances).
Eligibility	<p>The extent of a Bidder's capacity to Bid for Lots in the current Round of the Auction.</p> <p>In the first Round, the Bidder's Eligibility is equal to the number of Lots specified in its applicable Initial Bid for the Auction.</p> <p>In subsequent Rounds, the Bidder's Eligibility is equal to its Activity in the previous Round.</p>
Eligibility-reducing Primary Bid	A Primary Bid for a Package of Lots with Eligibility strictly less than the Bidder's Eligibility in one or both Time Slices.
Eligibility-reducing Relaxed Primary Bid	A Primary Bid for a Package of Lots with Eligibility strictly less than the Bidder's Eligibility in one Time Slice and strictly greater than the Bidder's Eligibility in the other Time Slice.
Eligibility Points	The numerical expression of a Bidder's ability to make further Bids.
Eir	Eircom Limited and Meteor Mobile Communications Limited (trading as 'eir' and 'open eir'), collectively referred to as 'eir Group' or 'eir'.
Equivalent Isotropically Radiated Power (EIRP)	Means the product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna.

European Union (Radio Equipment) Regulations 2017	S.I. No. 248/2017 – European Union (Radio Equipment) Regulations 2017.
European Communities (Electromagnetic Compatibility) Regulations 2017	S.I. No. 69/2017 – European Communities (Electromagnetic Compatibility) Regulations 2017.
Exchequer Notes	The Exchequer Note programme is a Euro denominated programme which provides short-term funding with maturities up to 1 year. They are sold directly through the NTMA.
Existing 2.1 GHz Band Licence	Means a licence pursuant to the Wireless Telegraphy (Third Generation and GSM Mobile Telephony Licence) Regulations, 2002 (S.I. No. 345 of 2002), as amended by the Wireless Telegraphy (Third Generation and GSM Mobile Telephony Licence) (Amendment) Regulations, 2003 (S.I. No 340 of 2003), or the 2.1 GHz Band Interim Licence and Early Liberalisation Regulations, as appropriate.
Existing 2.1 GHz Band Licensee	Means a person holding one, or more, Existing 2.1 GHz Licences.
Existing 2.3 GHz Band Licence	Means a licence issued pursuant to the Wireless Telegraphy (Radio Link Licence) Regulations, 2009 (S.I. No 370 of 2009) by which rights of use are assigned within the frequency range 2307 – 2327 MHz.
Existing 2.3 GHz Band Licensee	Means a person holding one, or more, Existing 2.3 GHz Band Licences.
Existing Licensee	Means an Existing 2.1 GHz Band Licensee and/or an Existing 2.3 GHz Band Licensee, as appropriate.

Existing MNO	<p>Means a Winning Bidder that on 1 January 2021 was a holder of one or more of the following licences:</p> <ul style="list-style-type: none"> • a Liberalised Use Licence for terrestrial systems capable of providing Electronic Communications Services under the Wireless Telegraphy (Liberalised Use and Preparatory Licences in the 800 MHz, 900 MHz and 1800 MHz bands) Regulations 2012 (S.I. No. 251 of 2012); and/or • a licence to keep and have possession of apparatus for wireless telegraphy for the purpose of providing 3G and GSM mobile telephony under the Wireless Telegraphy (Third Generation and GSM Mobile Telephony Licence) Regulations, 2002 (S.I. No 345 of 2002), as amended by the Wireless Telegraphy (Third Generation and GSM Mobile Telephony Licence) (Amendment) Regulations, 2003 (S.I. No 340 of 2003) <p>Existing MNOs include only Vodafone Ireland Limited, Three Ireland (Hutchison) Limited and collectively Eircom Limited and Meteor Mobile Communications Limited, or their successors, in relation to these licences.</p>
Existing Operator	<p>Means an Existing Operator (Mobile) or an Existing Operator (Other).</p> <p>Existing Operators include only Dense Air Limited, Imagine Communications Ireland Limited, Vodafone Ireland Limited, Three Ireland (Hutchison) Limited and collectively Eircom Limited and Meteor Mobile Communications Limited, or their successors.</p>
Existing Operator (Mobile)	<p>Means an Existing MNO</p> <p>Existing Operators (Mobile) include only Vodafone Ireland Limited, Three Ireland (Hutchison) Limited and collectively Eircom Limited and Meteor Mobile</p>

	Communications Limited, or their successors in relation to these licences.
Existing Operator (Other)	<p>Means a Winning Bidder that on 1 January 2021 was a holder of a 3.6 GHz Band Liberalised Use Licence for terrestrial systems capable of providing Electronic Communications Services under the Wireless Telegraphy (3.6 GHz Band Licences) Regulations 2016 (S.I. No. 532 of 2016) and is not an Existing Operator (Mobile).</p> <p>Existing Operators (Other) include only Dense Air Limited and Imagine Communications Ireland Limited, or their successors, in relation to these licences.</p>
Exposure Price	A Bidder's Exposure Price for a Package of Lots in a given Primary Bid Round is equal to the price of the Package of Lots at current Round Prices, less the Bidder's Discount in the Round.
Extension	<p>Bidders have a limited number of Extension rights, which will automatically grant them additional time for submitting their Bids in the event that they do not make a submission before the scheduled end of a Round as notified by ComReg</p> <p>An Extension right of a Bidder will be exercised automatically in a Round if the Bidder has at least one Extension right remaining and has not submitted a Bid by the scheduled end time of the Round.</p>
FDD	Frequency Division Duplex.
Feasible Combination of Bids	<p>A Feasible Combination of Bids is one in which:</p> <ul style="list-style-type: none"> • in each Lot Category, no more Lots are awarded than are available in that Lot Category; and

	<ul style="list-style-type: none"> at most one Bid is accepted from each Bidder. <p>The value of a Feasible Combination of Bids is equal to the sum of the Bid Amounts for all Bids in the combination, plus the Reserve Price of any Lots that would remain unsold if only the Bids in the combination are accepted.</p>
Final Assignment Plan	The frequency assignments established following the Negotiation Phase.
Final Price Cap	A cap applying to all Supplementary Bids (except for a Final Primary Package which is non-zero or a Relaxed Primary Bid) limiting the maximum Bid Amount for a Package of Lots to the highest Bid made for the Final Primary Package plus the difference in prices between the Package of Lots in question and the Final Primary Package at the Round Prices in the final Primary Bid Round.
Final Primary Package (FPP)	The Package of Lots Bid for by a Bidder in the final Primary Bid Round.
Framework Regulations	European Communities (Electronic Communications Networks and Services) (Framework) Regulations 2011 (S.I No. 333 of 2011).
Further Temporary ECS Licences (No.2)	Means a licence of the type set out in Schedule 1 to the S.I. No. 137 of 2021.
General Authorisation	An authorisation for an undertaking to provide an electronic communications network or service under and in accordance with Regulation 4 of the Authorisation Regulations.
GSM	Global System for Mobile Communications.

Harmful Interference	Bears the meaning ascribed to it in the Framework Regulations.
Hertz ('Hz')	Unit of Frequency.
Hypothetical Edge Holder	A hypothetical Bidder that is treated as if it had won a single fixed frequency B-Lot (and only that Lot), for the purpose of Assignment Option generation in particular circumstances.
Information Memorandum (IM)	This Information Memorandum including all of the Annexes and Schedules thereto.
Initial Bid	A Bidder's Initial Bid is the Package defined by the Lots specified by the Bidder on its Initial Bid Form and the corresponding Bid Amount calculated as the sum of the Reserve Prices for the Lots specified on the Bidder's Initial Bid Form.
Initial Bid Form	Part 3 of the Application Form.
Initial Eligibility	The number of Eligibility Points that a Bidder has in the first Primary Bid Round. This is based on the number of Eligibility Points associated with the Package of Lots the Bidder specified on its Initial Bid Form, submitted to ComReg at the Application Stage.
Insider	Shall have the meaning ascribed to it in paragraph 3.95
Interested Party	Includes, to the extent that the context requires or admits, any of the following:

	<ul style="list-style-type: none"> (i) a respondent to Consultation Document 14/101, 18/60, 18/103, 19/59R, 19/124, 20/32, 20/56 or 20/78; (ii) a prospective Bidder; (iii) an Applicant; (iv) a Bidder; or an agent of any of the foregoing.
kHz	One kilohertz (kHz) is equal to 1,000 Hertz (Hz).
Lease	Means the assignment by a Licensee (“the Lessor”) of some or all of a right of use for radio frequencies granted under a MBSA2 Liberalised Use Licence for a period less than the remaining duration of the right of use to another party (“the Lessee”), after which the right of use for radio frequencies reverts to the Lessor.
Liberalisation Fee	As detailed in Annex 14 of this IM.
Licence	A MBSA2 Liberalised Use Licence, a MBSA2 Preparatory Licence, a MBSA2 2.3 Band Transition Licence, a MBSA2 Spectrum Lease Licence or an Existing Licence as the case may be and “Existing Licensee” and “Licensee” shall be construed accordingly.
Licensee	Means the holder of a Licence.
Lot	A 2 × 5 MHz block of spectrum, a 1 × 5 MHz block of spectrum, or a 1 × 10 MHz block of spectrum in the 700 MHz Duplex, 2.1 GHz Band, 2.3 GHz Band or 2.6 GHz Band as appropriate and as detailed in section 2.2. of the IM
Lot Category	<p>There are 15 Lot Categories, where A-Lots refer to the fixed frequency Lots, B-Lots refer to the frequency-generic Lots and the suffix “/1” or “/2” indicates the relevant Time Slice.</p> <p>The Lot Categories for the purposes of this Award Process are:</p>

	<ul style="list-style-type: none"> • B700; • B2.1/1; • B2.1/2; • B2.3/1; • B2.3/2; • A2.3/1; • A2.3/2; • B2.6F/1; • B2.6F/2; • A2.6TL/1; • A2.6TL/2; • B2.6T/1; • B2.6T/2; • A2.6TU/1; and • A2.6TU/2.
<p>Lot Types</p>	<p>An A-Lot or B-Lot as appropriate.</p>
<p>LTE</p>	<p>Means the technology defined by 3GPP called Long Term Evolution.</p>
<p>Main Stage</p>	<p>Determines the number of Lots to be awarded to each Bidder in each Lot Category, and the Base Prices that Winning Bidders will have to pay for their Lots. This consists of a number of Primary Bid Rounds, a Supplementary Bids Round, and an announcement to all Bidders of the Winning Bidders and the number of Lots won by each Winning Bidder</p>

	in each Lot Category and, for each Winning Bidder, its own Base Price.
MBSA2 Liberalised Use Licence	A Licence in the form set out in Schedule 1 of the MBSA2 Licence Regulations which will allow a Licensee to keep, possess, install, maintain, work and use Apparatus in the portion of the Award Spectrum assigned thereunder for terrestrial systems capable of providing ECS subject to the terms and conditions set out therein.
MBSA2 Licence Regulations	Regulations to be made by ComReg, subject to obtaining the prior consent of the Minister, in the form of the Wireless Telegraphy (Liberalised Use and Related Licences in the 700 MHz Duplex, 2.1 GHz, 2.3 GHz and 2.6 GHz Bands) Regulations, 2021, as may be amended prior to their entry into force. See Annex 2 for the current draft.
MBSA2 Preparatory Licence	A Licence in the form as set out in Schedule 3 of the MBSA2 Licence Regulations, which will allow the Licensee to install networks and associated equipment in advance of the commencement date of their MBSA2 Liberalised Use Licence, subject to the terms and conditions set out therein, but will not allow any wireless telegraphy transmissions.
MBSA2 Spectrum Lease Licence	A Licence in the form as set out in Schedule 2 of the MBSA2 Licence Regulations, which will allow the Licensee to keep, possess, install, maintain, work and use Apparatus in the portion of the Award Spectrum assigned thereunder for terrestrial systems capable of providing ECS, subject to the terms and conditions set out therein.
MBSA2 2.3 GHz Band Transition Licence	A Licence in the form as set out in Schedule 4 of the MBSA2 Licence Regulations, which will allow the Licensee to keep and have possession of, install, maintain, work and use Apparatus for point to multi-

	point radio links for the provision of RurTel Services in the 2.3 GHz Band, subject to the terms and conditions set out therein.
MFCN	Mobile Fixed Communication Network.
Minister	Means the Minister for the Environment, Climate and Communications.
Mock Auction	A scripted auction (based on a fictional scenario) using the EAS and which is designed to give Bidders exposure to the Auction Rules and experience of how the EAS operates given different circumstances that may arise. A mock auction will be available for all Bidders but will be held separately for each individual Bidder in advance of the Auction.
MoU	Memorandum of Understanding.
MVNO	Mobile Virtual Network Operator. A mobile operator with no spectrum assignment and with, or without, network infrastructure.
Native Wi-Fi	Means a technology which allows mobile phone calls and texts to be made on a device utilising a Wi-Fi connection rather than through the mobile network directly.
NBP	National Broadband Plan.
Negotiation Phase	The two week period allowed after the Assignment Round where Assignment Bidders can attempt to agree an alternative frequency plan.
New Entrant	Means a Licensee that is not an Existing MNO.
New Operator	Means a Winning Bidder that is not an Existing Operator.

New Operator (Mobile)	Means a New Operator which will provide mobile Electronic Communications Services under its MBSA2 Liberalised Use Licence.
New Operator (Other)	Means a New Operator which will provide Electronic Communications Services other than mobile Electronic Communications Service under its MBSA2 Liberalised Use Licence.
Non-Active Antenna Systems or ("non-AAS")	Means a Base Station and an antenna system that provides one or more antenna connectors, which are connected to one or more separately designed passive antenna elements to radiate radio waves. The amplitude and phase of the signals to the antenna elements is not continually adjusted in response to short term changes in the radio environment.
Non-exclusive	Means that ComReg is not precluded from authorising the keeping and having possession by persons other than the Licensee, on a Non-Interference and Non-Protected Basis, of Apparatus on the radio frequency spectrum specified in the Licence.
Non-Interference and Non-Protected Basis	The use of Apparatus is subject to no Harmful Interference being caused to any Radiocommunication Service, and that no claim may be made for the protection of Apparatus used on this basis against Harmful Interference originating from Radiocommunication Services.
Notification and Grant Stage	The stage of the Award Process during which Deposits (minus any applicable SAF or portion of Deposits forfeited for breaches of the Award Rules) are returned to Bidders and Licences are granted to Winning Bidders.
NTMA	National Treasury Management Agency.

Online Bid Processor	A standalone version of the algorithms used for determining Winning Bidders and prices (i.e. Base Prices and Additional Prices) and generating Assignment Options. This should provide Bidders with a practical understanding of the mechanics of the Winner and Price Determination procedure. It will be made available from Monday 16 August 2021 and will be taken offline at a time determined by ComReg but in advance of the Auction.
Opportunity Cost	Shall have the meaning ascribed to it in paragraph 4.165
Overall Competition Cap	No Bidder may bid for/acquire spectrum rights of use in the Award Process that would result in it holding total spectrum rights of use for more than 375 MHz across the 700 MHz Duplex, 800 MHz, 900 MHz, 1800 MHz, 2.1 GHz, 2.3 GHz, 2.6 GHz and 3.6 GHz Bands at any time during either of the two Time Slices.
Ownership Structure Document	Shall have the meaning ascribed to it in Section 3.3.2.
Package	<p>A selection of one or more Lots:</p> <ul style="list-style-type: none"> • Specified in a Bidder's Application Form; • Bid for in one or more of the Bid Rounds.
Partition Score	A measure of how evenly a given partition of winners splits the available frequency-generic Lots.
Payment Deadline	The last day upon which Winning Bidders can increase their Deposits to the level of their SAF in order to apply for a Licence for the Lots assigned to them within the Award Process.

Performance Bands	Means any of the following: 2.1 GHz Band, 2.3 GHz Band, 2.6 GHz FDD Band and 2.6 GHz TDD Band.
Phase 1 Application Date	The date by which Interested Parties must submit Phase 1 Application Documentation to participate in the Award Process.
Phase 1 Application Documentation	<p>Refers to Phase 1 Application Form documents:</p> <ul style="list-style-type: none"> • completed and signed Parts 1 and 2 of the Application Form (Annex 3a of this document); • an Ownership Structure Document along with appropriate certification in relation to same in accordance with paragraphs 3.61 and 3.62 of the IM; • appropriate evidence in respect of Authorised Agents in accordance with paragraph 3.57 of the IM; and • an indication of whether an Applicant will submit its Phase 2 Application Documentation electronically with e-signature (details of which are provided in this section with further specificity on same being made available to Applicants upon submission of Phase 1 Application Documentation) or via hardcopy.
Phase 1 Application Form	Refers to the Application Form as set out in Annex 3a, a writeable PDF format of which will be made available on the ComReg website alongside or shortly after publication of this document.
Phase 1 Questions	Interested Parties may submit questions to ComReg on the Award Process and Auction Rules in accordance with Section 3.3.1.

Phase 2 Application Date	The date by which Applicants must submit Part 3 of the Application Form to participate in the Award Process together with the required monetary Deposit.
Phase 2 Application Documentation	<p>Refers to Phase 2 Application Form documents:</p> <ul style="list-style-type: none"> • completed and signed Parts 3 of the Application Form; • a corresponding monetary Deposit; and • if an Applicants list of Insiders requires it, an updated list of same.
Phase 2 Application Form	Refers to the Application Form as set out in Annex 3b, a writeable PDF format of which will be made available on the ComReg website alongside or shortly after publication of this document.
Phase 2 Questions	Interested Parties may submit questions to ComReg on the Award Process and Auction Rules in accordance with Section 3.3.1.
Point to Multi-Point Radio Link	Means a Radio Link between a specified fixed point and multiple points. "Radio Link" means a link by means of apparatus for wireless telegraphy.
Price Increment	The increase of the price of Lots in a Lot Category from one Primary Bid Round of the Auction to the next based on demand expressed for Lots in that Lot Category in the previous Primary Bid Round (or in the case of the Price Increment applicable to Reserve Prices for the first Primary Bid Round, demand expressed by Bidders at the Application Stage).
Primary Bid	A Bid made by a Bidder in a Primary Bid Round.

Primary Bid Round	A Round of the Main Stage during which Bidders each have the opportunity to submit a single Bid for a Package of Lots for a Bid Amount equal to the sum of the Round Prices associated with each Lot within the Package of Lots upon which it submits a Bid.
Provisional Assignment Plan	<p>A specific frequency assignment for each Assignment Bidder, awarded frequency-generic B-Lots and is determined by the outcome of the Assignment Round.</p> <p>If an Assignment Round is not required, the Provisional Assignment Plan will be the unique frequency assignments for each Assignment Bidder.</p>
QoS	Quality of Service.
Qualification Stage	A stage of the Award Process during which ComReg assesses the Applications submitted before the Application Date, evaluates which Applications are valid, and determines which Applicants qualify to become Bidders in the Award Process.
Radiocommunication Service	A service as defined in the Radio Regulations of the International Telecommunication Union involving the transmission, emission and/or reception of radio waves for specific telecommunication purposes.
Relative Cap	A cap applying to a Supplementary Bid, which limits the Bid Amount for a Package of Lots as described in Section 4.2.3.
Relaxed Primary Bid(s)	A Primary Bid submitted by a Bidder whose Activity exceeds the Bidder's Eligibility to Bid but is permitted because it satisfies certain specified constraints. These conditions surrounding the submission of Relaxed Primary Bids and the associated Bids they may require in order to preserve relative preferences are detailed in Section 4.2.

Relocation	An Existing Licensee relocating to a different spectrum assignment within a spectrum band compared to its existing spectrum assignment.
Relocation Rebate	A rebate given to Eir in relation to its Existing 2.1 GHz Band Licence if it incurs a relocation cost as a result of the Assignment Stage that it would not have incurred otherwise, as detailed in Annex 13.
Reserve Price	The Reserve Price indicates the minimum SAF for each Lot included in the Licence and does not include the first or any subsequent payment of SUFs.
Round	A Round is a period of time set by ComReg within which Bidders submit their Bids. A Round may be extended by a Bidder exercising a right to use an Extension right.
Round Price	The price per Lot in a given Round.
Round Schedule	The scheduled start and end time of a Round.
RSRP	ReferenceSignal Received Power which is defined as the linear average of the reference signal power (in Watts) within a number of specific resource elements across a specified bandwidth within an LTE downlink signal. LTE specific equipment is required to decode the LTE downlink signal to make this measurement.
RSPP	Radio Spectrum Policy Programme.
RurTel	Means the Point to Multi-Point Radio Link system used to provide fixed telephony services in parts of county Donegal using the frequency ranges 2307 - 2327 MHz and 2401 - 2421 MHz.

RurTel Service	Means the service provided by Eir to users using its RurTel network.
SI	Statutory Instrument.
Specific Regulations	Specific Regulations has the same meaning as set out in Regulation 2 of the Framework Regulations 2011 (S.I. No. 333 of 2011).
Spectrum Access Fee (SAF)	The sum of the Base Price and any Additional Price to be paid by a Winning Bidder for the spectrum assigned to it within the Award Process.
Spectrum Block	Means any of the following: <ul style="list-style-type: none"> • a 700 MHz Duplex Block; • a 2.1 GHz Band Block; • the 2.3 GHz Band Fixed Frequency Block; • a 2.3 GHz Band Generic Frequency Block; • a 2.6 GHz Band FDD Block; • the 2.6 GHz Band TDD Fixed Frequency Block (Lower); • the 2.6 GHz Band TDD Fixed Frequency Block (Upper); or • a 2.6 GHz Band TDD Generic Frequency Block.
Spectrum Usage Fee (SUFs)	Annual fees which a Winning Bidder must pay in respect of spectrum rights of use assigned in the Award Process. For a MBSA2 Liberalised Use Licence, the total annual SUF is the sum of the SUFs associated with each Lot included in the Licence.
Sub-1 GHz Competition Cap	No Bidder may bid for/acquire spectrum rights of use in the Award Process that would result in it holding

	total spectrum rights of use for more than 70 MHz (2 × 35 MHz) of spectrum across the 700 MHz Duplex, 800 MHz and 900 MHz Bands at any time during either of the two Time Slices.
Supplementary Bid	A Bid submitted in the Supplementary Bids Round for a Package of Lots for a Bid Amount specified by the Bidder. The specified Bid Amount will be subject to a minimum (floor) and, in some cases, a maximum (cap), as set out in the Activity Rules for the Auction.
Supplementary Bids Round	A single Round of bidding during which each Bidder can submit multiple Bids, each for a Package of Lots for a Bid Amount specified by the Bidder. The specified Bid Amount for each Supplementary Bid submitted in this Round will be subject to a minimum (floor) and, in some cases, a maximum (cap), as set out in the Activity Rules for the Auction.
SUTP	Single User Throughput. The downlink bit rate that can be successfully delivered to a single active user per cell at a particular depth and consistency of coverage. This is the downlink bit rate or download speed that a user could experience when not contending with other users for service in that cell, so that the cell delivers the maximum possible data rate to a single user consistent with the signal quality experienced by that user.
TDD	Time Division Duplex.
TDD Inter-Licensee Synchronisation Procedure	As set out in Section 3 of Schedule 1 of the MBSA2 Licence Regulations.
Time Slice	<p>Lots in the 2.3 GHz Band and 2.6 GHz Band are being made available in two “time slices”, viz:</p> <ol style="list-style-type: none"> 1. Time Slice 1: From 14 February 2022 (or such other date as may be specified by ComReg in,

	<p>or in accordance with, the Information Memorandum) to 11 March 2027; and</p> <p>2. Time Slice 2: From 12 March 2027 to 13 January 2042.</p> <p>Lots in the 2.1 GHz Band are being made available in two Time Slices, viz:</p> <ul style="list-style-type: none"> • 2.1 GHz Band Time Slice 1: From 16 October 2022 to 11 March 2027; and • 2.1 GHz Band Time Slice 2: From 12 March 2027 to 13 February 2042.
Time Slice 1	<p>For Lots in the 2.3 GHz Band and 2.6 GHz Band, it is the time period from 14 February 2022 (as may be amended by ComReg) to 11 March 2027.</p> <p>For Lots in the 2.1 GHz Band, it is the time period from 16 October 2022 to 11 March 2027.</p>
Time Slice 2	<p>For Lots in the 2.3 GHz Band and 2.6 GHz Band, it is the time period from 12 March 2027 to 13 February 2042.</p> <p>For Lots in the 2.1 GHz Band it is the time period from 12 March 2027 to 13 February 2042.</p>
Time Slice 2 (“TS2”) Notional Winner	A hypothetical Bidder assigned all unsold Time Slice 2 B-Lots in a particular band for the purpose of determining winner orderings in that band.
Time Slice Variation (‘TSV’)	The number of the highest frequency block assigned to that winner in either Time Slice plus one, less the number of the lowest frequency block assigned to that winner in either Time Slice minus the maximum number of frequency blocks allocated to that winner across either Time Slice.
Total Radiated Power (TRP)	A measure of how much power a composite antenna radiates. It equals the total conducted power input into the antenna array system less any losses in the

	antenna array system. TRP means the integral of the power transmitted in different directions over the entire radiation sphere.
Total Time Slice Variation ('TTSV')	The sum of the Time Slice Variations of all winners of frequency-generic Lots in that band. Unsold Lots are not considered when evaluating the TTSV.
Transfer Regulations	Means the Wireless Telegraphy (Transfer of Spectrum Rights of Use) Regulations 2014 (S.I. No. 34 of 2014).
Transfer	Has the meaning set out in the Transfer Regulations.
Transferee	Has the meaning set out in the Transfer Regulations
Transition	The process of completing all Transition Activities.
Transition Activities	Adjustments as maybe required by Existing Licensees and Winning Bidders to their existing networks in order to comply with the outcome of the Award Process and align their use of spectrum with the rights of use that they obtain, if any.
Transition Plan	A plan which outlines interim milestones for Transition Activities for Existing 2.1 GHz Licensees and/or Existing 2.3 GHz Licences.
Transition Plan Proposals	Proposals formulated by Winning Bidders, Existing 2.1 GHz Licensees, and/or Existing 2.3 GHz Licences who have agreed to abide by the Transition Rules.
Transition Rules	Rules regarding Transition, as set out in Section 3.8 of this document.

Transition Scenario A	Refers to the scenario where an Existing 2.1 GHz Band Licensee or a Winning Bidder of Lots in Time Slice 1 wins an equal or greater amount of new spectrum rights in the same band in Time Slice 2 but these spectrum rights are in a different frequency location.
Transition Scenario B	Refers to the scenario where an Existing 2.1 GHz Band Licensee or a Winning Bidder of Lots in Time Slice 1 wins a reduced amount of new spectrum rights in the same band in Time Slice 2.
Transition Scenario C	Refers to the scenario where an Existing 2.1 GHz Band Licensee or a Winning Bidder of Lots in Time Slice 1 wins no new spectrum rights in the same band in Time Slice 2.
USO	Universal Service Obligation.
Valid Bid	A Bid submitted within the Auction or by way of the Application Form that is in accordance with the Auction Rules. A Valid Bid represents a binding commitment to buy the specified Package of Lots at any price not exceeding the specified Bid Amount and pay the appropriate SUFs over the duration of the Licence.
VAT	Value Added Tax.
VoIP	Voice over Internet Protocol.
VoLTE	Voice over LTE.
Winner Determination	The process of selecting the Winning Bids on the basis of optimisation.

Winning Bid	A Bid in respect of which a Winning Bidder is assigned at least one Lot in the Winning Combination of Bids.
Winning Bidder	A Bidder that wins at least one Lot in the Award Process.
Winning Combination of Bids	Is a Feasible Combination of Bids that has the greatest value across all Feasible Combinations of Bids, considering all the Bids submitted in the Auction (including Initial Bids, standard and Relaxed Primary Bids, Chain Bids and Supplementary Bids.
Winning Combination of Assignment Bids	The combination of valid Assignment Bids submitted during the Assignment Round that has the highest total value of Assignment Bid amounts, and is compatible with one of the Candidate Frequency Plans.
Wi-Fi	The wireless technology, based on the IEEE 802.11 family of standards, commonly used for local area networking of devices and Internet access.
Working Day	Working Day means a day which is not a Saturday or Sunday or a public holiday.
Zero Bid	<p>A Bid for no Lots with an Associated Bid Amount of zero. Entry of a Zero Bid in the Primary Bid Rounds does not prevent the entry of Supplementary Bids.</p> <p>A Zero Bid will be submitted automatically in the case that a Bidder fails to submit a Bid within the Round Schedule of a Round, or within 30 minutes of the scheduled end time of a Round where the Bidder had at least one Extension right at the beginning of the Round.</p>

Zero Package	A Package of Lots that consists of no Lots in any Lot Category for which the Bid Amount is zero.
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Annex: 2 Draft MBSA2 Licensing Regulations and Draft 2.1 GHz Early Liberalisation and Interim Licensing Regulations

Draft MBSA2 Licensing Regulations

Any final version of these regulations, which would be made by ComReg under section 6 of the Wireless Telegraphy Act 1926 is expressly subject to the consent of the Minister for the Environment, Climate and Communications under section 37 of the Communications Regulation Act 2002.

ComReg may make such editorial changes to the text of any final regulations as it considers necessary and without further consultation, where such changes would not affect the substance of the regulations.

S.I. No. XX of 2021**WIRELESS TELEGRAPHY (LIBERALISED USE AND RELATED LICENCES IN THE 700 MHZ DUPLEX, 2.1 GHZ, 2.3 GHZ AND 2.6 GHZ BANDS) REGULATIONS 2021**

Notice of the making of this Statutory Instrument was published in “Iris Oifigiúil” of [XX] 2021.

The Commission for Communications Regulation, in exercise of the powers conferred on it by section 6(1) of the Wireless Telegraphy Act, 1926 (No. 45 of 1926) as substituted by section 182 of the Broadcasting Act 2009 (No. 18 of 2009), and with the consent of the Minister for the Environment, Climate and Communications in accordance with section 37 of the Communications Regulation Act 2002 (No. 20 of 2002), (as adapted by the Communications, Climate Action and Environment (Alteration of Name of Department and Title of Minister) Order 2020 (S.I. No. 373 of 2020)) hereby makes the following Regulations:

Citation

1. These Regulations may be cited as the Wireless Telegraphy (Liberalised Use and Related Licences in the 700 MHz Duplex, 2.1 GHz, 2.3 GHz and 2.6 GHz Bands) Regulations 2021.

Interpretation

2. (1) In these Regulations:

“2.1 GHz Band” means radio frequency spectrum in the range 1920 to 1980 MHz paired with radio frequency spectrum in the range 2110 to 2170 MHz;

“2.1 GHz Band Block” means a 5 MHz paired block of radio frequency spectrum in the 2.1 GHz Band;

“2.3 GHz Band” means radio frequency spectrum in the range 2300 to 2400 MHz;

“2.3 GHz Band Blocks” means the 2.3 GHz Band Fixed Frequency Block and 2.3 GHz Band Generic Frequency Blocks;

“2.3 GHz Band Fixed Frequency Block” means the 10 MHz unpaired block of radio frequency spectrum in the range 2390 to 2400 MHz;

“2.3 GHz Band Generic Frequency Block” means a 5 MHz unpaired block of radio frequency spectrum in the range 2300 to 2390 MHz;

“2.4 GHz Band” means radio frequency spectrum in the range 2400 to 2500 MHz;

“2.6 GHz Band” means radio frequency spectrum in the range 2500 to 2690 MHz;

“2.6 GHz Band Blocks” means the 2.6 GHz Band FDD Block, 2.6 GHz Band TDD Fixed Frequency Block (Lower), 2.6 GHz Band TDD Fixed Frequency Block (Upper) and 2.6 GHz Band TDD Generic Frequency Blocks;

“2.6 GHz Band FDD Block” means a 5 MHz block of radio frequency spectrum in the range 2500 to 2570 MHz paired with a 5 MHz block of radio frequency spectrum in the range 2620 to 2690 MHz;

“2.6 GHz Band TDD Blocks” means the 2.6 GHz Band TDD Fixed Frequency Block (Lower), 2.6 GHz Band TDD Fixed Frequency Block (Upper) and 2.6 GHz Band TDD Generic Frequency Blocks;

“2.6 GHz Band TDD Fixed Frequency Block (Lower)” means the 5 MHz unpaired block of radio frequency spectrum in the range 2570 to 2575 MHz;

“2.6 GHz Band TDD Fixed Frequency Block (Upper)” means a 5 MHz unpaired block of radio frequency spectrum in the range 2615 to 2620 MHz;

“2.6 GHz Band TDD Generic Frequency Block” means a 5 MHz unpaired block of radio frequency spectrum in the range 2575 to 2615 MHz;

“700 MHz Duplex” means radio frequency spectrum in the range 703 to 733 MHz paired with radio frequency spectrum in the range 758 to 788 MHz;

“700 MHz Duplex Block” means a 5 MHz paired block of radio frequency spectrum in the 700 MHz Duplex;

“Act of 1926” means the Wireless Telegraphy Act 1926 (No. 45 of 1926);

“Act of 1972” means the Wireless Telegraphy Act, 1972 (No. 5 of 1972);

“Act of 2002” means the Communications Regulation Act 2002 (No. 20 of 2002);

“Apparatus” in relation to Licences means apparatus for wireless telegraphy as defined in section 2 of the Act of 1926 for terrestrial systems capable of providing Electronic Communications Services in one or more of the 700 MHz Duplex, 2.1 GHz Band, 2.3 GHz Band and 2.6 GHz Band;

“Authorisation Regulations” means the European Communities (Electronic Communications Networks and Services) (Authorisation) Regulations 2011 (S.I. No. 335 of 2011);

“Award” or “MBSA2” means the competitive award procedure used by the Commission for the purpose of granting individual rights of use for radio frequencies to the Liberalised Spectrum, as detailed in the Information Memorandum;

“Award Rules” means the rules and procedures relating to the Award as set out in the Information Memorandum;

“Bidder” has the meaning set out in the Information Memorandum;

“Commission” means the Commission for Communications Regulation established under the Act of 2002;

“CPI” means the Consumer Price Index as published from time to time by the CSO;

“CPI Adjustment” means a negative or positive adjustment to a Spectrum Usage Fee, calculated using the CPI according to the methodology set out in the Information Memorandum;

“CSO” means the Central Statistics Office of Ireland or its successor;

“Decision of 2008” means European Commission Decision (2008/477/EC) of 13 June 2008 on the harmonisation of the 2500-2690 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Community, as amended by European Commission Implementing Decision (EU) 2020/636 of 8 May;

“Decision of 2012” means European Commission Implementing Decision (2012/688/EU) of 5 November 2012 on the harmonisation of the frequency bands 1920-1980 MHz and 2110-2170 MHz for terrestrial systems capable of providing electronic communications services in the Union, as amended by European Commission Implementing Decision (EU) 2020/667 of 6 May 2020;

“Decision of 2014” means Electronic Communications Committee Decision (14)02 entitled "Harmonised technical and regulatory conditions for the use of the band 2300-2400 MHz for Mobile/Fixed Communications Networks (MFCN)";

“Decision of 2016” means European Commission Implementing Decision (EU) 2016/687 of 28 April 2016 on the harmonisation of the 694-790 MHz frequency band for terrestrial systems capable of providing wireless broadband electronic communications services and for flexible national use in the Union;

“Electronic Communications Network” and “Electronic Communications Service” have the meanings assigned to them in the Framework Regulations;

“EIRP” (i.e. equivalent isotropically radiated power) is the product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna (absolute or isotropic gain);

“Existing 2.3 GHz Band Licence” means a licence granted under the Wireless Telegraphy (Radio Link Licence) Regulations, 2009 (S.I. No 370 of 2009) by which rights of use for radio frequencies are assigned within the ranges 2307 – 2327 MHz and 2401 – 2421 MHz ;

“Existing 2.3 GHz Band Licensee” means a holder of an Existing 2.3 GHz Band Licence;

“FDD” means Frequency Division Duplex;

“Framework Regulations” means the European Communities (Electronic Communications Networks and Services) (Framework) Regulations 2011 (S.I. No. 333 of 2011);

“General Authorisation” means an authorisation for an undertaking to provide an Electronic Communications Network or Electronic Communications Service under and in accordance with Regulation 4 of the Authorisation Regulations;

“Harmful Interference” has the meaning set out in the Framework Regulations;

“Information Memorandum” means the document published by the Commission on 16 April 2021 and bearing the Commission Document number 21/40 and which outlines in detail the processes and procedures the Commission will follow in running the Award, as may be updated from time to time;

“Lease” means the assignment by a Licensee (“the Lessor”) of some or all of a right of use for radio frequencies granted under a MBSA2 Liberalised Use Licence for a period less than the remaining duration of the right of use to another party (“the Lessee”), after which the right of use for radio frequencies reverts to the Lessor;

“Liberalised Spectrum” consists of:

- (a) the 700 MHz Duplex Blocks;
- (b) the 2.1 GHz Band Blocks;
- (c) the 2.3 GHz Band Fixed Frequency Block;
- (d) the 2.3 GHz Band Generic Frequency Blocks;
- (e) the 2.6 GHz Band FDD Blocks;
- (f) the 2.6 GHz Band TDD Fixed Frequency Block (Lower);
- (g) the 2.6 GHz Band TDD Fixed Frequency Block (Upper); and
- (h) the 2.6 GHz Band TDD Generic Frequency Blocks.

“Licence” means a non-exclusive licence granted under section 5 of the Act of 1926 in accordance with and subject to the matters prescribed in these Regulations to keep and have possession of Apparatus in a specified place in the State, being one of:

- (a) a MBSA2 Liberalised Use Licence;
- (b) a MBSA2 Spectrum Lease Licence;
- (c) a MBSA2 Preparatory Licence; or
- (d) a MBSA2 2.3 GHz Band Transition Licence.

“Licence Commencement Date” means the date, as specified in the Licence, upon which the Licence comes into effect;

“Licensee” means the holder of a Licence;

“MBSA2 2.3 GHz Band Transition Licence” means a Licence in the form set out in Schedule 4 to keep and have possession of apparatus for wireless telegraphy for the

provision of Point to Multi-Point Radio Links in the 2.3 GHz Band and 2.4 GHz Bands, in accordance with and subject to the terms and conditions set out therein;

“MBSA2 Liberalised Use Licence” means a Licence in the form set out in Schedule 1 to keep and have possession of Apparatus, in accordance with and subject to the terms and conditions set out therein;

“MBSA2 Preparatory Licence” means a Licence in the form set out in Schedule 3 to keep and have possession of Apparatus, in accordance with and subject to the terms and conditions set out therein;

“MBSA2 Spectrum Lease Licence” means a Licence in the form set out in Schedule 2 to keep and have possession of Apparatus, in accordance with and subject to the terms and conditions set out therein;

“MFCN” means Mobile or Fixed Communications Networks;

“Non-exclusive”, in relation to a Licence, means that the Commission is not precluded from authorising the keeping and having possession by persons other than the Licensee, on a Non-Interference and Non-Protected Basis, of apparatus for wireless telegraphy for the radio frequency spectrum specified in the Licence;

“Non-Interference and Non-Protected Basis” means that the use of apparatus for wireless telegraphy is subject to no Harmful Interference being caused to any Radiocommunication Service, and that no claim may be made for the protection of apparatus for wireless telegraphy used on this basis against Harmful Interference originating from Radiocommunication Services;

“Point to Multi-Point Radio Link” means a Radio Link between a specified fixed point and multiple points;

“Radio Equipment Regulations” means the European Union (Radio Equipment) Regulations 2017 (S.I. No. 248 of 2017);

“Radio Link” means a link by means of apparatus for wireless telegraphy;

“Radiocommunication Service” means a service as defined in the Radio Regulations of the International Telecommunication Union involving the transmission, emission and/or reception of radio waves for specific telecommunication purposes;

“Spectrum Access Fee” or “SAF” has the meaning set out in the Information Memorandum;

“Spectrum Block” means any of the following: a 700 MHz Duplex Block, a 2.1 GHz Band Block, the 2.3 GHz Band Fixed Frequency Block, a 2.3 GHz Band Generic Frequency Block, a 2.6 GHz Band FDD Block, the 2.6 GHz Band TDD Fixed Frequency Block (Lower), the 2.6 GHz Band TDD Fixed Frequency Block (Upper) or a 2.6 GHz Band TDD Generic Frequency Block;

“Spectrum Usage Fee” or “SUF” means the relevant fee as detailed in Schedule 5;

“TDD” means Time Division Duplex;

“Time Slice 1” means, in relation to 2.3 GHz Band Blocks and 2.6 GHz Band Blocks, the period commencing on 14 February 2022, or on such other date as may be specified by the Commission, and ending on 11 March 2027, and, in relation to 2.1 GHz Band Blocks, means the period commencing on 16 October 2022 and ending on 11 March 2027;

“Time Slice 2” means, in relation to 2.1 GHz Band Blocks, 2.3 GHz Band Blocks and 2.6 GHz Band Blocks, the period commencing on 12 March 2027 and ending on 13 February 2042;

“Total Radiated Power” or “TRP” is a measure of how much power a composite antenna radiates. It equals the total conducted power input into the antenna array system less any losses in the antenna array system. TRP means the integral of the power transmitted in different directions over the entire radiation sphere.

“Transfer” has the meaning set out in the Transfer Regulations;

“Transferee” has the meaning set out in the Transfer Regulations;

“Transfer Regulations” means the Wireless Telegraphy (Transfer of Spectrum Rights of Use) Regulations 2014 (S.I. No. 34 of 2014); and

“Winning Bidder” has the meaning set out in the Information Memorandum.

(2) A word or expression that is used in these Regulations and that is also used in the Act of 1926 has, unless the context otherwise requires, the same meaning in these Regulations that it has in that Act.

(3) A word or expression that is used in these Regulations and that is also used in the Act of 2002 has, unless the context otherwise requires, the same meaning in these Regulations that it has in that Act.

(4) A word or expression that is used in these Regulations and that is also used in the Framework Regulations or in the Authorisation Regulations has, unless the context otherwise requires, the same meaning in these Regulations that it has in those Regulations.

Licences to which these Regulations apply

3. These Regulations apply to:

- (a) MBSA2 Liberalised Use Licences;
- (b) MBSA2 Spectrum Lease Licences;
- (c) MBSA2 Preparatory Licences; and

(d) MBSA2 2.3 GHz Band Transition Licences.

Application for the Grant and Form of Licences

4. (1) Application for the grant of a MBSA2 Liberalised Use Licence and/or MBSA2 Preparatory Licence on foot of the Award shall be made by a Winning Bidder to the Commission in writing and in such form as may be determined by the Commission from time to time.

(2) The Commission may grant a MBSA2 Liberalised Use Licence and/or MBSA2 Preparatory Licence on foot of the Award following payment by the applicant of the relevant fees prescribed in Regulation 8.

(3) The Commission may grant a MBSA2 Liberalised Use Licence to a Transferee in accordance with the Transfer Regulations.

(4) Application for the grant of a MBSA2 Spectrum Lease Licence shall be made by a Lessee to the Commission in writing and in such form as may be determined by the Commission from time to time. The Commission may grant a MBSA2 Spectrum Lease Licence to a Lessee following the approval of the relevant Lease by the Commission in accordance with sub-paragraphs (q) and (r) of Regulation 6 and following payment by the applicant of the relevant fees prescribed in Regulation 8.

(5) Application for the grant of a MBSA2 2.3 GHz Band Transition Licence shall be made by an Existing 2.3 GHz Band Licensee to the Commission in writing and in such form as may be determined by the Commission from time to time. The Commission may grant a MBSA2 2.3 GHz Band Transition Licence upon receipt of an application submitted in accordance with these Regulations following payment by the applicant of the relevant fees prescribed in Regulation 8.

(6) A person who applies for the grant of a Licence shall furnish to the Commission such information as the Commission may reasonably require for the purposes of its functions under these Regulations, the Framework Regulations or the Authorisation Regulations, and if the person, without reasonable cause, fails to comply with this paragraph, the Commission may refuse to grant the Licence concerned to the person.

(7) A MBSA2 Liberalised Use Licence to which these Regulations apply shall be in the form specified in Schedule 1, with such variation, if any, whether by addition, deletion or alteration as the Commission may determine from time to time or in any particular case in accordance with the Authorisation Regulations.

(8) A MBSA2 Spectrum Lease Licence to which these Regulations apply shall be in the form specified in Schedule 2, with such variation, if any, whether by addition, deletion or alteration as the Commission may determine from time to time or in any particular case in accordance with the Authorisation Regulations.

(9) A MBSA2 Preparatory Licence to which these Regulations apply shall be in the form specified in Schedule 3, with such variation, if any, whether by addition, deletion

or alteration as the Commission may determine from time to time or in any particular case in accordance with the Authorisation Regulations.

(10) A MBSA2 2.3 GHz Band Transition Licence to which these Regulations apply shall be in the form specified in Schedule 4, with such variation, if any, whether by addition, deletion or alteration as the Commission may determine from time to time or in any particular case in accordance with the Authorisation Regulations.

Duration of Licences

5. (1) The commencement date of a MBSA2 Liberalised Use Licence shall be specified in the Licence and, in respect of spectrum rights of use for:

- (a) 700 MHz Duplex Blocks shall be 14 February 2022 or such other date as may be specified by the Commission;
- (b) 2.1 GHz Band Blocks in Time Slice 1 shall be 16 October 2022;
- (c) 2.3 GHz Band Blocks and 2.6 GHz Band Blocks in Time Slice 1 shall be 14 February 2022 or such other date as may be specified by the Commission;
- (d) 2.1 GHz Band Blocks, 2.3 GHz Band Blocks and 2.6 GHz Band Blocks in Time Slice 2 shall be 12 March 2027.

(2) A MBSA2 Liberalised Use Licence, unless it has been withdrawn or had its duration reduced under Regulation 7, shall in any event expire:

- (a) in the case of 700 MHz Duplex Blocks on 13 February 2042;
- (b) in the case of 2.1 GHz Band Blocks, 2.3 GHz Band Blocks and 2.6 GHz Band Blocks in Time Slice 1 on 11 March 2027; and
- (c) in the case of 2.1 GHz Band Blocks, 2.3 GHz Band Blocks and 2.6 GHz Band Blocks in Time Slice 2 on 13 February 2042.

(3) The commencement date and expiry date of a MBSA2 Spectrum Lease Licence shall be set by the Commission and specified in the MBSA2 Spectrum Lease Licence. A MBSA2 Spectrum Lease Licence to which these Regulations apply shall in any event expire on or before 13 February 2042.

(4) The commencement date and expiry date of a MBSA2 Preparatory Licence shall be set by the Commission and specified in the MBSA2 Preparatory Licence.

(5) The commencement date and expiry date of a MBSA2 2.3 GHz Band Transition Licence shall be set by the Commission and specified in the MBSA2 2.3 GHz Band Transition Licence.

Conditions of Licences

6. (1) Any Licensee that is granted a Licence under these Regulations and to which these Regulations apply shall:

- (a) ensure that it complies with the conditions in its Licence and with these Regulations;
- (b) ensure that any Apparatus in the 700 MHz Duplex complies with the Decision of 2016, any Apparatus in the 2.1 GHz Band complies with the Decision of 2012, any Apparatus in the 2.3 GHz Band, except those held under a MBSA2 2.3 GHz Band Transition Licence, complies with the Decision of 2014, and that any Apparatus in the 2.6 GHz Band complies with the Decision of 2008;
- (c) ensure that all Apparatus installed, maintained, possessed or kept under the Licence is capable of operating within the radio frequency spectrum specified in the Licence;
- (d) ensure that all Apparatus worked or used under the Licence is worked or used only in the radio frequency spectrum specified in the Licence;
- (e) ensure that it makes payment of all applicable Licence fees set out in and in accordance with Regulation 8;
- (f) ensure that in advance of the Licence Commencement Date and on or before 14 February for each calendar year in which the Licence concerned is in force, it submits up to date information to the Commission in respect of Parts 1, 2 and 3 of its MBSA2 Liberalised Use Licence, Parts 1, 2 and 3 of its MBSA2 Spectrum Lease Licence, and/or Parts 1 and 2 of its MBSA2 2.3 GHz Band Transition Licence, as the case may be;
- (g) furnish such information in connection with the Licence as may be requested by the Commission from time to time;
- (h) ensure that all Apparatus, or any part thereof, is installed, maintained, and where a Licence other than a MBSA2 Preparatory Licence is held, worked and used, so as not to cause Harmful Interference;
- (i) ensure that all Apparatus, or any part thereof, complies with the Radio Equipment Regulations;
- (j) comply with any special conditions imposed under section 8 of the Act of 1972;
- (k) (i) notify the Commission in writing, not less than 6 months prior to the proposed cessation of use of any terrestrial system listed in Part 2 of the MBSA2 Liberalised Use Licence or MBSA2 Spectrum Lease Licence as the case may be; and

- (ii) use all reasonable endeavours to ensure that any adverse effects on users caused by the cessation of use of a terrestrial system are minimised;
- (l) upon becoming aware of any event likely to materially affect its ability to comply with these Regulations, or any conditions set out or referred to in any Licence, notify the Commission of that fact in writing no later than 5 working days upon becoming aware;
- (m) comply with all obligations under relevant international agreements relating to the use of Apparatus or the frequencies to which they are assigned under a Licence;
- (n) notify the Commission of its intention to Transfer any rights of use for radio frequencies attaching to a Licence;
- (o) only Transfer the rights of use for radio frequencies attaching to a Licence in accordance with the Transfer Regulations;
- (p) notify the Commission of its intention to Lease any rights of use for radio frequencies attaching to a Licence;
- (q) subject to paragraph (r), only Lease the rights of use for radio frequencies attaching to a Licence in accordance with such procedures as may be specified by the Commission from time to time;
- (r) where the Commission has not yet put in place procedures referred to in paragraph (q) of this Regulation, not, without the prior consent of the Commission, which shall not be unreasonably withheld, Lease any such rights of use attaching to a Licence; and
- (s) ensure that if the address of the Licensee or its Transferee or Lessee changes, the Licensee, Transferee or Lessee shall, as soon as possible, but in any event within 28 days, notify the Commission in writing of the change.

Enforcement, Amendment, Suspension and Withdrawal

7. (1) Enforcement by the Commission of compliance by a Licensee with conditions attached to its Licence shall be in accordance with the Authorisation Regulations.

(2) The Commission may amend any Licence from time to time in accordance with the Authorisation Regulations.

(3) The Commission may suspend or withdraw a Licence in accordance with the Authorisation Regulations.

(4) A Licence may be suspended or withdrawn by the Commission if, after the grant of a Licence pursuant to these Regulations, it emerges that the Licensee has breached the Award Rules.

Licence Fees

8. (1) The fee for a MBSA2 Liberalised Use Licence granted on foot of the Award is the sum of the Spectrum Access Fee and the Spectrum Usage Fees over the duration of the Licence, less any adjustments or refunds applicable to the Licensee as identified in the Information Memorandum.

(2) Where the commencement date of a MBSA2 Liberalised Use Licence is delayed due to circumstances identified in the Information Memorandum, a Licensee shall be entitled to an adjustment of the licence fees payable or a refund of licence fees already paid, as provided for in the Information Memorandum.

(3) The SAF specified in paragraph 1 of this Regulation shall be paid to the Commission on a date specified by the Commission in accordance with the Information Memorandum.

(4) The annual SUF before CPI Adjustment for each block of Liberalised Spectrum is detailed in Schedule 5.

(5) The annual SUF for a MBSA2 Liberalised Use Licence is the sum of the annual SUFs before CPI Adjustment associated with each block of Liberalised Spectrum identified in the Licence and the CPI Adjustment for each block of Liberalised Spectrum identified in the Licence.

(6) In the case of a SUF for a period of less than one year, the SUF shall be the relevant sum as detailed in paragraph 5 adjusted on a *pro rata* daily basis for such period.

(7) The SUF specified in this Regulation, less any adjustments or refunds applicable to the Licensee, shall be paid to the Commission prior to the grant of a MBSA2 Liberalised Use Licence or prior to 14 February in each respective calendar year during the term of the MBSA2 Liberalised Use Licence, as the case may be.

(8) If a MBSA2 Liberalised Use Licence is suspended or withdrawn, the Licensee shall not be entitled to be repaid any part of the SAF or SUF paid by the Licensee under this Regulation, but shall still be liable to pay any sums, including interest, that are outstanding.

(9) If the amount of radio frequency spectrum specified in a MBSA2 Liberalised Use Licence is reduced, the Licensee may be entitled to a refund of the relevant SUF already paid in the relevant year on a *pro rata* daily basis and to a reduction on future SUFs having regard to the nature of the amendment. The Licensee shall not be entitled to any refund of its SAF.

(10) If the duration of a MBSA2 Liberalised Use Licence is reduced at the request of the Licensee, the Licensee may be entitled to a refund of SUFs already paid in the

relevant year, on a *pro rata* daily basis having regard to the reduced duration. The Licensee shall not be entitled to any refund of its SAF.

(11) The fee for a MBSA2 Spectrum Lease Licence shall be specified by the Commission in accordance with such procedures as may be specified by the Commission from time to time.

(12) The fee for a MBSA2 Preparatory Licence is €100.

(13) The annual fee for a Point to Multi-Point Radio Link in a MBSA2 2.3 GHz Band Transition Licence is detailed in Schedule 6.

(14) If the duration of a Point to Multi-Point Radio Link in a MBSA2 2.3 GHz Band Transition Licence is reduced, the Licensee may be entitled to a refund of the annual fee already paid in the relevant year, on a *pro rata* daily basis having regard to the reduced duration.

(15) The SUFs for a MBSA2 Liberalised Use Licence granted on foot of a Transfer are the SUFs specified in paragraphs 4, 5 and 6 of this Regulation.

(16) Any payment to be paid by a Licensee under this Regulation shall be made by way of electronic funds transfer, banker's draft or such other means and on such other terms, if any, as the Commission may decide. Where the date of payment falls on a day other than a working day, payment shall be made on or before the last working day before the date on which payment would otherwise have fallen due.

(17) Failure by a Licensee to pay part or all of a fee required under this Regulation on or before the date it falls due shall constitute non-compliance by the Licensee concerned with these Regulations, and the Commission, in respect of such non-payment of a fee, may take enforcement action in accordance with Regulation 7 and may take steps to recover the amount due in accordance with paragraphs 18 and 19 of this Regulation.

(18) Where a fee or part of a fee is not paid in time, the Licensee concerned shall pay to the Commission interest on the fee or part thereof that was or is outstanding. Interest shall accrue from the date when such fee or part thereof fell due until the date of payment of such fee or part thereof and shall be calculated at the same rate payable in respect of late payments in commercial transactions pursuant to the European Communities (Late Payment in Commercial Transactions) Regulations 2012 (S.I. No. 580 of 2012), as amended.

(19) Any fee payable and owed by a Licensee under this Regulation may be recovered by the Commission from the Licensee as a simple contract debt in any court of competent jurisdiction.

Licensee to satisfy all legal requirements

9. Licences granted pursuant to these Regulations do not grant to the Licensee any right, interest or entitlement other than to keep, have possession of, install, and maintain, and, for Licences other than a MBSA2 Preparatory Licence, to work and use Apparatus, and, for a MBSA2 2.3 GHz Band Transition Licence, Apparatus for the

provision of Point to Multi-Point Radio Links in the 2.3 GHz Band and 2.4 GHz Band only, at a specified location or locations in the State.

DRAFT

SCHEDULE 1**WIRELESS TELEGRAPHY ACT, 1926****WIRELESS TELEGRAPHY (LIBERALISED USE AND RELATED LICENCES IN THE 700 MHZ DUPLEX, 2.1 GHZ, 2.3 GHZ AND 2.6 GHZ BANDS) REGULATIONS 2021****MBSA2 Liberalised Use Licence for terrestrial systems capable of providing Electronic Communications Services**

Licence under section 5 of the Act of 1926 to keep and have possession of apparatus for wireless telegraphy for terrestrial systems capable of providing Electronic Communications Services.

The Commission for Communications Regulation, in exercise of the powers conferred on it by section 5 of the Act of 1926 hereby grants the following licence to **[LICENSEE NAME]** of **[LICENSEE ADDRESS]** (“the Licensee”).

The Licensee is hereby authorised to keep and have possession of apparatus for wireless telegraphy for terrestrial systems capable of providing Electronic Communications Services as specified in Part 2 of this Licence, subject to such apparatus being installed, maintained, worked and used in accordance with the terms, conditions and restrictions set out in the Wireless Telegraphy (Liberalised Use and Related Licences in the 700 MHz Duplex, 2.1 GHz, 2.3 GHz and 2.6 GHz Bands) Regulations 2021 (S.I. No. of 2021) (“the Regulations”), including but not limited to, the following:

- (1) The Licensee shall ensure that it complies with all of the conditions contained within the Regulations and within Parts 1 to 4 of this Licence; and
- (2) The Licensee shall ensure that it makes payment of all fees as detailed in the Regulations.

For the purpose of this Licence, the definitions set out in the Regulations apply.

This Licence shall come in to effect on **DD/MM/YYYY** (the “Licence Commencement Date”) and, subject to revocation, suspension or withdrawal, expires on **DD/MM/YYYY**.

Signed: _____

For and on behalf of the Commission for Communications Regulation

Date of Issue: _____

Commencement and expiry dates of Liberalised Spectrum

Authorised Band	Name of Spectrum Block	Frequency Assigned to Spectrum Block	Commencement Date per Spectrum Block	Expiry Date per Spectrum Block
700 MHz Duplex, 2.1 GHz, 2.3 GHz, 2.6 GHz as appropriate	[One or more Blocks of Liberalised Spectrum]	From ——— MHz to ——— MHz	DD Month YYYY	DD Month YYYY

Part 2

The Apparatus to which this Licence applies

Authorised Band	Equipment Index Reference	Terrestrial System	Equipment Description	Manufacturer	Model
700 MHz Duplex, 2.1 GHz, 2.3 GHz, 2.6 GHz as appropriate					

Part 3

Apparatus Location and Details

Authorised Band	Site Identity	Eastings	Northings	Equipment Index Reference	Maximum EIRP/ TRP (dBm/5MHz)
700 MHz Duplex, 2.1 GHz, 2.3 GHz, 2.6 GHz as appropriate					

Part 4

Licence Conditions

Section 1: General

1. Definitions

The following additional definitions shall apply to Part 4.

“Base Station” means Apparatus connected to a backhaul network, which provides a Radiocommunication Service to Terminal Stations using the Liberalised Spectrum;

“LTE” means the technology defined by 3GPP called Long Term Evolution ;
and

“Terminal Station” means mobile user equipment and fixed customer premise equipment which communicates with a Base Station using the Liberalised Spectrum.

2. Resolution of Harmful Interference

In the event of Harmful Interference, the affected Licensees shall exchange information with a view to resolving the Harmful Interference by mutual consent. Where resolution cannot be agreed between the affected Licensees, the Commission may mediate in accordance with its statutory functions, objectives and duties.

Section 2: Technical Conditions

1. Definitions

The following additional definitions shall apply to this section:

“Active Antenna Systems” or “AAS” means a Base Station and an antenna system where the amplitude and/or phase between antenna elements is continually adjusted resulting in an antenna pattern that varies in response to short term changes in the radio environment. This excludes long-term beam shaping such as fixed electrical down tilt. In AAS Base Stations, the antenna system is integrated as part of the Base Station system or product;

“Non-Active Antenna Systems” or “non-AAS” means a Base Station and an antenna system that provides one or more antenna connectors, which are connected to one or more separately designed passive antenna elements to

radiate radio waves. The amplitude and phase of the signals to the antenna elements is not continually adjusted in response to short term changes in the radio environment;

“Aeronautical Primary Radars” means Apparatus (including “Star2000” and “TA10” models) providing primary aircraft detection used in airport surveillance networks;

“Block Edge Mask” or “BEM” is an emission mask that is defined as a function of frequency in relation to a ‘block edge’, the latter being the frequency boundary of a spectrum block for which rights of use are assigned to a Licensee. The BEM consists of several elements which are defined for certain measurement bandwidths;

“dBm” means decibels of power referenced to one milliwatt;

“Downlink” means transmissions from a Base Station to a Terminal Station;

“Inter-Licensee Synchronisation Procedure” means the synchronisation procedure set out in Section 3 of this Licence;

“Power Flux Density limit” or pfd limit (dBW/m²) means the interference threshold at radar receiver input (measured in dBW) minus the radar antenna gain (measured in dBi) plus $10 \log (4\pi / \lambda^2)$, where λ is the wavelength in metres;

“RurTel” means the Point to Multi-Point Radio Link system used to provide fixed telephony services in parts of county Donegal using the frequency ranges 2307 - 2327 MHz and 2401 - 2421 MHz;

“TD-LTE” means the TDD variant of LTE (Long Term Evolution) technology; and

“Uplink” means transmissions from a Terminal Station to a Base Station.

2. Technical Conditions

(1) 700 MHz Duplex

- (a) Only terrestrial systems compatible with the Decision of 2016 can be worked and used in the 700 MHz Duplex.
- (b) The FDD mode of operation shall be used in the 700 MHz Duplex. The duplex spacing shall be 55 MHz with Terminal Station transmission (FDD Uplink) located in the lower frequency band 703-733 MHz and Base Station transmission (FDD downlink) located in the upper frequency band 758-788 MHz.

- (c) The Licensee shall comply with all Memoranda of Understanding ('MoU')¹ between the Commission and its neighbouring national regulatory authorities responsible for communications matters, in particular the Office of Communications ("Ofcom") in the UK, or its successor, in relation to the 700 MHz Duplex.

Base Stations

- (d) Within a 700 MHz Duplex Block assigned to the Licensee, the in-block power from a Base Station must not exceed a maximum mean EIRP of 64 dBm/5 MHz per antenna.
- (e) Outside of the 700 MHz Duplex Block(s) assigned to the Licensee, the Licensee shall comply with the out-of-block BEM as specified in Section B of the Annex of the Decision of 2016.

Terminal Stations

- (f) The maximum mean in-block power limit of 23 dBm for Terminal Stations shall apply².
- (g) The technical conditions set out in Section C of the Annex to the Decision of 2016 shall apply to out-of-block Terminal Stations.
- (h) Where a Licensee is assigned more than two 700 MHz Duplex Blocks and if this assignment is deployed starting at 703 MHz, the Licensee shall ensure that the Terminal Station bandwidth is no greater than 10 MHz in order to meet the conditions as set out in Table 12 of the Annex to the Decision of 2016 to provide protection to the frequency range 470 - 694 MHz.

(2) The 2.1 GHz Band

- (a) Only terrestrial systems compatible with the Decision of 2012 can be worked and used in the 2.1 GHz Band.
- (b) The duplex mode of operation shall be FDD. The duplex spacing shall be 190 MHz with Terminal Station transmission (FDD Uplink) located in

¹ The current [Memorandum of Understanding](#) on frequency coordination between Ireland and the United Kingdom concerning the spectrum coordination of Land Mobile Radio Communication Networks in the frequency range 703 MHz to 2690 MHz, is available at www.comreg.ie.

² This power limit is specified as EIRP for Terminal Stations designed to be fixed or installed and as TRP for Terminal Stations designed to be mobile or nomadic. This value is subject to a tolerance of up to + 2 dB, to take account of operation under extreme environmental conditions and production spread.

the lower part of the band starting at 1920 MHz and finishing at 1980 MHz and base station transmission (FDD downlink) located in the upper part of the band starting at 2110 MHz and finishing at 2170 MHz.

- (c) The Licensee shall comply with all MoU³ between the Commission and its neighbouring national regulatory authorities responsible for communications matters, in particular Ofcom in the UK, or its successor, in relation to the 2.1 GHz Band.

Base Stations

- (d) Within a 2.1 GHz Band Block assigned to the Licensee, the in-block radiated power from a Base Station transmitter in the downlink direction must not exceed:
- i. an EIRP of 64 dBm/5 MHz per antenna for non-AAS; and
 - ii. a TRP limit of 57 dBm/5MHz per cell⁴ for AAS.
- (e) Outside of the 2.1 GHz Band Block(s) assigned to the Licensee, the Licensee shall comply with the out-of-block BEM as specified in Section C of the Annex to the Decision of 2012.

Terminal Stations

- (f) The maximum mean in-block power limit over frequencies of FDD Uplink of 24 dBm for Terminal Stations shall apply⁵.

(3) The 2.3 GHz Band

- (a) Only terrestrial systems compatible with the Decision of 2014 can be worked and used in the 2.3 GHz Band.
- (b) The TDD mode of operation shall be used in the 2.3 GHz Band.
- (c) The Licensee shall comply with the Inter-Licensee Synchronisation Procedure set out in Section 3 of this Licence.

³ Current [Memorandum of Understanding](#) on frequency coordination between Ireland and the United Kingdom concerning the spectrum coordination of Land Mobile Radio Communication Networks in the frequency range 703 MHz to 2690 MHz, available at www.comreg.ie.

⁴ In a multi-sector base station, the AAS radiated power limit applies to each one of the individual sectors.

⁵ This power limit is specified as EIRP for Terminal Stations designed to be fixed or installed and as TRP for Terminal Stations designed to be mobile or nomadic. EIRP and TRP are equivalent for isotropic antennas. It is recognised that this value may be subject to a tolerance defined in the harmonised standards to take account of operation under extreme environmental conditions and production spread.

- (d) The Licensee shall comply with all MoU⁶ between the Commission and its neighbouring national regulatory authorities responsible for communications matters, in particular Ofcom in the UK, or its successor, in relation to the 2.3 GHz Band.
- (e) If the Licence includes Spectrum Blocks in the range 2305 to 2330 MHz and the Licensee intends to deploy Base Stations in the coordination area⁷, the Licensee shall coordinate with the operator of the RurTel system to ensure coexistence with the RurTel system currently operating in the frequency range 2307-2327 MHz.

Base Stations

- (f) Within the 2.3 GHz Band Generic Frequency Blocks assigned to the Licensee, the in-block radiated power from a Base Station must not exceed 68 dBm/5 MHz EIRP per antenna.
- (g) Within the 2.3 GHz Band Fixed Frequency Block, if assigned to the Licensee, the in-block radiated power from a Base Station must not exceed 45 dBm/5 MHz EIRP.
- (h) Outside of the 2.3 GHz Band Generic Frequency Blocks and the 2.3 GHz Band Fixed Frequency Block, if assigned to the Licensee, the Licensee shall comply with the out-of-block BEM requirements as specified in Section A2.1 “*Technical Conditions for MFCN Base Stations*” of Annex 2 to the Decision of 2014.

Terminal Stations

- (i) The maximum mean in-block power limit of 25 dBm⁸ for Terminal Stations shall apply.

(4) The 2.6 GHz Band

⁶ Current [Memorandum of Understanding](#) on frequency coordination between Ireland and the United Kingdom in the frequency bands 2300 -2400 MHz to be applied in the area including the Republic of Ireland and the United Kingdom and the Isle of Man, available at www.comreg.ie.

⁷ The relevant coordination area is as defined in the Information Memorandum.

⁸ This power limit is specified as EIRP for Terminal Stations designed to be fixed or installed and as TRP for Terminal Stations designed to be mobile or nomadic. A tolerance of up to + 2 dB has been included in this limit, to reflect operation under extreme environmental conditions and production spread.

- (a) Only terrestrial systems compatible with the Decision of 2008 can be worked and used in the 2.6 GHz Band.
- (b) Within the 2.6 GHz Band FDD Blocks, the duplex mode of operation is FDD, where the duplex spacing shall be 120 MHz with Terminal Station transmission (Uplink) located in the lower part of the band starting at 2500 MHz (extending to 2570 MHz) and base station transmission (downlink) located in the upper part of the band starting at 2620 MHz.
- (c) Within the 2570 - 2620 MHz frequency range of the 2.6 GHz Band, the modes of operation permitted in accordance with the Decision of 2008 are:
 - i. TDD;
 - ii. Base Station transmission only; and
 - iii. Terminal Station transmission only.
- (d) To achieve coexistence of adjacent FDD and TDD networks:
 - i. the 2.6 GHz Band TDD Fixed Frequency Block (Lower) is a restricted spectrum block as described in the Annex of the Decision of 2008; and
 - ii. the 2.6 GHz Band TDD Fixed Frequency Block (Upper) may be utilised in accordance with the Decision of 2008 noting that it may suffer an increased risk of interference due to the emissions from the FDD downlink.
- (e) Licensees assigned 2.6 GHz Band TDD Blocks shall comply with the Inter-Licensee Synchronisation Procedure set out in Section 3 of this Licence.
- (f) The Licensee shall comply with all MoU⁹ between the Commission and its neighbouring national regulatory authorities responsible for communications matters, in particular Ofcom in the UK, or its successor, in relation to the 2.6 GHz Band.

Base Stations

- (g) Within any 2.6 GHz Band FDD Blocks, any 2.6 GHz Band TDD Generic Frequency Blocks, and the 2.6 GHz Band TDD Fixed Frequency Block (Upper)¹⁰ assigned to a Licensee, the in-block radiated power from a Base Station transmitter must not exceed an upper limit of:

⁹ Current [Memorandum of Understanding](#) on frequency coordination between Ireland and the United Kingdom concerning the spectrum coordination of Land Mobile Radio Communication Networks in the frequency range 703 MHz to 2690 MHz, available at www.comreg.ie.

¹⁰ The 2.6 GHz Band TDD Fixed Frequency Block (Upper), which is immediately adjacent to the FDD downlink, may suffer an increased risk of interference due to the emissions from the FDD downlink.

- i. 68 dBm/5 MHz per antenna for Non-AAS; and
 - ii. 60 dBm/5 MHz per cell for AAS.
- (h) Within the 2.6 GHz Band TDD Fixed Frequency Block (Lower), assigned to a Licensee, the in-block radiated power from a Base Station transmitter in the downlink direction must not exceed a mean in-block power of:
- i. 25 dBm/5 MHz EIRP per antenna for Non-AAS; and
 - ii. 22 dBm/5 MHz TRP limit per cell for AAS.
- (i) Outside of any 2.6 GHz Band FDD Blocks assigned to the Licensee, the Licensee shall comply with the out-of-block BEM which is built up by combining Tables 2, 3 and 4 of Section C of the Annex of the Decision of 2008, in such a way that the limit for each frequency is given by the higher value out of the baseline and the in-block power limits.
- (j) Outside of the 2.6 GHz Band TDD Fixed Frequency Block (Lower), any 2.6 GHz Band TDD Generic Frequency Blocks and the 2.6 GHz Band TDD Fixed Frequency Block (Upper) assigned to a Licensee, the Licensee shall comply with the Inter-Licensee Synchronisation Procedure set out in Section 3 of this Licence.
- (k) Outside of the 2.6 GHz Band TDD Fixed Frequency Block (Lower) and where Base Station antennas are placed indoors, the BEM for Non-AAS may be in line with Table 6 of Section C of the Annex of the Decision of 2008, provided that at geographical borders to other Member States, Table 3 of Section C of the Annex of the Decision of 2008 applies and that Table 5 of Section C of the Annex of the Decision of 2008 remains valid nationwide.
- (l) A Licensee assigned any 2.6 GHz Band Blocks must ensure protection of all Aeronautical Primary Radars as follows:
- i. observe a coordination zone of one kilometre radius around the location¹¹ of each Aeronautical Primary Radar to provide additional protection from MFCN base station emissions at the Aeronautical Primary Radar receiver;
 - ii. in relation to Star2000 Aeronautical Primary Radars, the Licensee shall:
 - A. comply with an out-of-band Power Flux Density limit (pfd) limit given¹² by $-140 \text{ dBW/m}^2/\text{MHz} + (10 \times \text{Log}_{10} (B_{\text{op}}/120))$, where

¹¹ Aeronautical Primary Radar locations are available from the Commission.

¹² Where $-140 \text{ dBW/m}^2/\text{MHz}$ is the absolute limit required to protect the Star2000 Aeronautical Primary Radar installations from emissions by all operators for out-of-band (i.e. $>2700 \text{ MHz}$) power.

- B_{op} is the quantum of downlink (i.e. FDD downlink and TDD) spectrum in MHz assigned to the Licensee in the 2.6 GHz Band, to address the impact of MFCN spurious emissions at the radar antenna receiver location; and
- B. until notified by the Commission in writing that filters are installed at the Aeronautical Primary Radar, comply with an in-band pfd limit, given¹³ by $-78 \text{ dBW/m}^2 + (10 \times \text{Log}_{10} (B_{op}/120))$, where B_{op} is the quantum of downlink (i.e. FDD downlink and TDD) spectrum in MHz assigned to the Licensee in the 2.6 GHz Band, to address the impact of blocking and intermodulation effects at the Aeronautical Primary Radar receiver.
- iii. in relation to the TA10 Aeronautical Primary Radar, the Licensee shall, until otherwise notified by the Commission in writing:
- A. comply with an out-of-band pfd limit given¹⁴ by $-151 \text{ dBW/m}^2/\text{MHz} + (10 \times \text{Log}_{10} (B_{op}/120))$, where B_{op} is the quantum of downlink (i.e. FDD downlink and TDD) spectrum in MHz assigned to the Licensee in the 2.6 GHz Band, to address the impact of MFCN spurious emissions at the Aeronautical Primary Radar antenna receiver location; and
- B. comply with an in-band pfd limit given¹⁵ by $-88 \text{ dBW/m}^2 + (10 \times \text{Log}_{10} (B_{op}/120))$, where B_{op} is the quantum of downlink (i.e. FDD downlink and TDD) spectrum in MHz assigned to the Licensee in the 2.6 GHz Band, to address the impact of blocking and intermodulation effects at the Aeronautical Primary Radar antenna receiver.
- iv. in relation to models of Aeronautical Primary Radars other than the Star2000 and TA10, the Licensee shall comply with conditions as may be determined by the Commission.

Terminal Stations

- (m) The maximum mean in-block power (including Automatic Transmitter Power Control range) of:

¹³ Where -78 dBW/m^2 is the absolute limit required to protect the Star2000 Aeronautical Primary Radar installation from emissions by all operators for in-band (i.e. 2570 – 2690 MHz) power.

¹⁴ Where $-151 \text{ dBW/m}^2/\text{MHz}$ is the absolute limit required to protect the TA10 Aeronautical Primary Radar installation from emissions by all operators for out-of-band (i.e. >2700 MHz) power.

¹⁵ Where -88 dBW/m^2 is the absolute limit required to protect the TA10 Aeronautical Primary Radar installation from emissions by all operators for in-band (i.e. 2570 – 2690 MHz) power.

- i. 35 dBm/5 MHz EIRP; and
- ii. 31 dBm/5 MHz TRP,

shall apply to Terminal Stations¹⁶.

Section 3: Inter-Licensee Synchronisation Procedure

This Section 3 applies only to Licensees assigned 2.3 GHz Band Blocks and/or 2.6 GHz Band TDD Blocks.

1. Definitions

The following additional definitions shall apply in this section:

“Default Frame Structure” means the frame structure as detailed in 3(1) below;

“Indoor Small Cell” means either a Non-AAS Base Station with an EIRP of less than or equal to 24 dBm per 20 MHz carrier or an AAS Base Station with a TRP of less than or equal to 16 dBm per 20 MHz carrier that is located indoors either within a residential or non-residential property;

“Other Frame Structure” means a frame structure other than the Default Frame Structure;

“Restrictive BEM” means, for Licensees utilising the Other Frame Structure (or failing to synchronise with adjacent channel networks for any other reason):

- (a) For any 2.6 GHz Band TDD Blocks assigned to a Licensee, a restrictive BEM¹⁷ given by combining Table 3 and either Table 2¹⁸ or Table 5¹⁹ as appropriate in Section C of the Annex of the Decision of 2008, in such a way that the limit for each frequency is given by the higher value out of the baseline and the in-block power limits applies; and
- (b) for any 2.3 GHz Band Blocks assigned to a Licensee, section A2.1.1, “*In-block requirements for MFCN base stations*” and Table 2 and Table 4 (relating to unsynchronised TDD blocks) of Annex 2 to the Decision of 2014 applies;

¹⁶ EIRP should be used for fixed or installed Terminal Stations and the TRP should be used for the mobile or nomadic Terminal Stations.

¹⁷ Noting Section 2(k) relating to indoor use.

¹⁸ For 2.6 GHz Band TDD Generic Frequency Blocks and the 2.6 GHz Band TDD Fixed Frequency Block (Upper).

¹⁹ For the case of 2.6 GHz Band TDD Fixed Frequency Block (Lower).

“Unrestrictive BEM” means, for Licensees utilising the Default Frame Structure on their network (and having a common reference phase clock with adjacent channel operators²⁰):

- (a) for any 2.6 GHz Band TDD Blocks assigned to a Licensee, a BEM²¹ given by combining Table 2¹⁸ or Table 5¹⁹ as appropriate, Tables 3 and 4 of Section C. of the Annex of the Decision of 2008, in such a way that the limit for each frequency is given by the higher value out of the baseline and the in-block power limits applies²²; and
- (b) for any 2.3 GHz Band Blocks assigned to a Licensee, Table 2 and Table 4 of Annex 2 of the Decision of 2014 relating to synchronised TDD blocks applies.

2. Introduction

- (1) Licensees assigned 2.3 GHz Band Blocks and/or 2.6 GHz Band TDD Blocks shall be bound by the Inter-Licensee Synchronisation Procedure set out in this Section 3.
- (2) Licensees shall co-operate in such a way that one network deployment within the Liberalised Spectrum does not cause Harmful Interference to another Licensee within the Liberalised Spectrum.
- (3) This procedure sets out the circumstances in which Licensees may use the Unrestrictive BEM and the Restrictive BEM, so as to minimise the risk of Harmful Interference to other Licensees.

3. Conditions for using the Unrestrictive BEM

Default Frame Structure - the technical conditions for Unrestrictive BEM shall apply where a Licensee’s Base Station complies with the Default Frame Structure outlined below:

- (a) Transmissions from a Licensee’s Base Station(s) shall have a frame structure as shown in Table 1. Indicated timeslots (or subframes) must not be allocated to anything other than Downlink (D) and Uplink (U) transmissions. ‘S’ denotes a special subframe. TD-LTE frame configuration 2 (Downlink: Uplink, 3:1) with special subframe configuration 6 or equivalent frame structures whose transmit and receive periods are aligned with this configuration are permitted;

²⁰ Each operator needs to ensure the start of frame is aligned with adjacent channel operators above and below its assignment.

²¹ Noting Section 2(k) relating to indoor use.

²² As the 2.6 GHz Band TDD Fixed Frequency Block (Lower) is a restricted spectrum block the in-block limit is taken from Table 5 of Section C of the Annex of the Decision of 2008.

- (b) Timeslots shall have a duration of 1 millisecond; and
- (c) Licensees shall ensure that frames start at a common reference time (+/- 1.5 μ s) so that all Licensees' frames are aligned and transmissions synchronised.

Table 1: Default Frame Structure

DL/UL ratio	Timeslot or Subframe number									
	0	1	2	3	4	5	6	7	8	9
3:1	D	S	U	D	D	D	S	U	D	D

4. Conditions for using the Restrictive BEM

Other Frame Structure — the technical conditions for Restrictive BEM shall apply where a Licensee's Base Station complies with the Other Frame Structure as outlined below:

- (a) All frame configurations that are not compatible with TD-LTE frame configuration 2 (3:1) with special sub-frame configuration 6 or equivalent frame structure whose transmit and receive periods are aligned with this configuration are permitted;
- (b) Licensees shall co-operate to minimise Harmful Interference caused by sub-frame overlaps if different technologies are used; and
- (c) Licensees using the Restrictive BEM shall not cause Harmful Interference to those Licensees' networks that use the Default Frame Structure (or equivalent). Achieving this may include applying internal guard bands and/or reduced in-block power levels in blocks adjacent to those Licensees' networks that use the Default Frame Structure (or equivalent).

5. Indoor Small Cells

Indoor Small Cells for indoor domestic and other indoor locations are permitted to operate under the Unrestrictive BEM on the condition that they do not cause Harmful Interference to any other Licensees.

Section 4: Coverage Requirements

1. Definitions

The following additional definition shall apply in this section:

“800 MHz Band” means radio frequency spectrum in the range 791 - 821 MHz paired with radio frequency spectrum in the range 832 – 862 MHz.

“900 MHz Band” means radio frequency spectrum in the range 880 – 915 MHz paired with radio frequency spectrum in the range 925 – 960 MHz.

“Eircode” means Ireland’s postcode system which identifies every home and business address in the State with a unique code.

“Existing MNO” means a Licensee that on 1 January 2021 was a holder of one or more of the following licences:

- (a) a licence under the Wireless Telegraphy (Liberalised Use and Preparatory Licences in the 800 MHz, 900 MHz and 1800 MHz bands) Regulations 2012 (S.I. No. 251 of 2012); and/or
- (b) a licence under the Wireless Telegraphy (Third Generation and GSM Mobile Telephony Licence) Regulations, 2002 (S.I. No 345 of 2002), as amended by the Wireless Telegraphy (Third Generation and GSM Mobile Telephony Licence) (Amendment) Regulations, 2003 (S.I. No 340 of 2003);

“Native Wi-Fi” means a technology which allows mobile phone calls and texts to be made on a device utilising a Wi-Fi connection rather than through the mobile network directly;

“New Entrant” means a Licensee that is not an Existing MNO;

“RSRP” means Reference Signal Received Power which is defined as the linear average of the reference signal power (in Watts) within a number of specific resource elements across a specified bandwidth within an LTE downlink signal. LTE specific equipment is required to decode the LTE downlink signal to make this measurement;

“Single user throughput cell edge” or “SUTP” means the downlink bit rate that can be successfully delivered to a single active user per cell at a particular depth and consistency of coverage. This is the downlink bit rate or download speed that a user could experience when not contending with other users for service in that cell, so that the cell delivers the maximum possible data rate to a single user consistent with the signal quality experienced by that user; and

“Wi-Fi” means the wireless technology, based on the IEEE 802.11 family of standards, commonly used for local area networking of devices and Internet access.

2. Minimum Coverage Requirements

- (1) A Licensee that is an Existing MNO and is assigned one or more 700 MHz Duplex Blocks under this Licence shall achieve and maintain for the remaining duration of the licence:
 - (a) the appropriate²³ General Outdoor Coverage Obligations for an Existing MNO as set out in Table 2 below; and
 - (b) the appropriate²⁴ Outdoor Coverage Obligations at specific locations for an Existing MNO as set out in Table 3 below.

²³ i.e. appropriate to the quantum of spectrum assigned to the Licensee in the 700 MHz Duplex under the Licence.

²⁴ i.e. appropriate to the quantum of spectrum assigned to the Licensee in the 700 MHz Duplex under the Licence.

Table 2: General Outdoor Coverage Obligations for an Existing MNO

Quantum of spectrum assigned to the Licensee in the 700 MHz Duplex under this Licence	Outdoor coverage service (Single User Throughput Cell Edge)	Coverage dimension	Coverage % levels to be met in ²⁵ :		
			3 Years	5 Years	7 Years
At least 2 x 10 MHz	30 Mbit/s	Population	85%	92%	95%
	30 Mbit/s	Motorways	75%	85%	90%
	30 Mbit/s	Primary Roads	60%	75%	80%
	3 Mbit/s	Population	99%	99%	99%
	3 Mbit/s	Geographic area	90%	91%	92%
Less than 2 x 10 MHz	20 Mbit/s	Population	85%	92%	95%
	20 Mbit/s	Motorways	75%	85%	90%
	20 Mbit/s	Primary Roads	60%	75%	80%
	3 Mbit/s	Population	99%	99%	99%
	3 Mbit/s	Geographic area	90%	91%	92%

²⁵ From the earliest commencement date of the 700 MHz Duplex Block(s).

Table 3: Outdoor Coverage Obligations at specific locations for an Existing MNO

Outdoor coverage service	Location	Coverage % levels and milestones ²⁶
<p>Outdoors:</p> <p><u>Case 1</u></p> <p>Where the Licensee is assigned at least 2 × 10 MHz in the 700 MHz Duplex under this Licence:</p> <p>30 Mbit/s (<i>Single User Throughput Cell Edge</i>)</p> <p><u>Case 2</u></p> <p>Where the Licensee is assigned less than 2 × 10 MHz in the 700 MHz Duplex under this Licence:</p> <p>20 Mbit/s (<i>Single User Throughput Cell Edge</i>)</p>	<p>Specific locations as particularised in the Information Memorandum which include:</p> <ul style="list-style-type: none"> • Business and technology Parks: Business and technology Parks (including strategic sites): Industrial Development Agency (IDA) Ireland provides a list of 31 Business and Technology Parks and 9 Strategic Sites. The obligation also includes adjacent business and technology parks to those of IDA Ireland; • Hospitals: the Health Service Executive (HSE) identifies a list of the 48 public and 17 private hospitals; • Higher Education Campuses: The Higher Education Authority (HEA) identifies a list of 8 Universities, 11 Institutes of Technology and 5 other colleges; • Air and Sea Ports: the Department of Transport Tourism and Sport (DTTAS) identifies a list of the 7 main airports and the Irish Maritime Development Office (IMDO) identify a list of the 7 passenger sea ports; • Train and bus stations: the National Transport Authority (NTA) identifies the busiest 144 train stations and Bus Éireann identifies a list of the main 16 bus stations; and • Top visitor attraction information points: Fáilte Ireland identifies a list of the top 21 fee charging and 21 free entry visitor attractions. 	<p>For each category</p> <p>70 % in 3 years</p> <p>90 % in 5 years</p> <p>100 % in 7 years</p>

(2) A Licensee that is a New Entrant and is assigned one or more 700 MHz Duplex Blocks under this Licence shall achieve and maintain for the remaining duration of the licence the appropriate²⁷ Outdoor Coverage Obligations for New Entrants as set out in Table 4 below.

²⁶ From the earliest commencement date of the 700 MHz Duplex Block(s).

²⁷ i.e. appropriate to the quantum of spectrum assigned to the Licensee under the Licence.

Table 4: Outdoor Coverage Obligations for New Entrants

Quantum of spectrum assigned to the Licensee under this Licence	Outdoor coverage service (Single User Throughput Cell Edge)	Coverage dimension	Coverage % level to be met in ²⁸ :		
			4 Years	6 Years	10 years
At least: a. 2 x 10 MHz in the 700 MHz Duplex and b. 2 x 20 MHz ²⁹ across any of the 2.1 GHz, 2.3 GHz or 2.6 GHz Bands	30 Mbit/s	Population	75%	80%	90%
a. 2 x 10 MHz in the 700 MHz Duplex and b. less than 2 x 20 MHz ³⁰ across any of the 2.1 GHz, 2.3 GHz or 2.6 GHz Bands	20 Mbit/s	Population	75%	80%	90%
a. 2 x 5 MHz in 700 MHz Duplex and b. any quantum of spectrum across any of the 2.1 GHz, 2.3 GHz or 2.6 GHz Bands	10 Mbit/s	Population	75%	80%	90%

(3) If the Licensee is assigned one or more 700 MHz Duplex Blocks under this Licence and provides a mobile voice and/or text service using rights of use in any of the 700 MHz Duplex, 2.1 GHz, 2.3 GHz or 2.6 GHz Bands under this Licence, the Licensee shall within 2 years of the earliest commencement date of the 700 MHz Duplex Block(s):

- (a) use (i.e. deploy and maintain) Native Wi-Fi technology on its network in respect of rights of use to the Liberalised Spectrum; and
- (b) make available Native Wi-Fi voice and/or text services (as appropriate to the type of mobile service/s provided by the Licensee) to all end users on its network (including the end users of third party customers³¹), where those

²⁸ From the commencement date of the 700 MHz Duplex Block(s).

²⁹ Or equivalent: i.e. 40 MHz of TDD spectrum.

³⁰ Or equivalent: i.e. 40 MHz of TDD spectrum.

³¹ E.g. mobile virtual network operators ("MVNOs")

end users:

- (i) have established for themselves a suitable Wi-Fi connection; and
- (ii) have a Native Wi-Fi / Wi-Fi calling-enabled mobile device.

3. Measuring and Monitoring Outdoor Coverage Compliance

(1) For the purpose of determining compliance with the above outdoor coverage obligations, the Commission will measure and monitor the outdoor coverage obligations based on the following principles:

- (a) the Commission's radio network planning tools, supported by field measurements which may include drive tests where appropriate, will be the key component in assessing compliance with the coverage obligations;
- (b) all rights of use available to the Licensee can be used to contribute to meeting the coverage obligations;
- (c) the Commission will use an RSRP metric for LTE as a proxy for determining the Licensee's compliance with the coverage levels;
- (d) the Commission acknowledges that while newer technologies will be rolled out over time, LTE technology is expected to continue to be used by operators in delivering data to consumers for some time;
- (e) the obligations are set to incentivise operators to rollout new sites as appropriate, upgrade sites with additional spectrum and make use of improvements in technology such as new standards including carrier aggregation and carrier sharing or extension techniques;
- (f) depending how the above techniques are deployed on a network, this will yield varying benefits in terms of increasing the range of a cell for a given throughput;
- (g) where carrier aggregation is deployed using carriers with similar propagation characteristics (e.g. carriers in the 700 MHz Duplex, 800 MHz Band and 900 MHz Band), the additional bandwidth and resultant throughput gains will be available, to a large extent, for the whole of the cell range;
- (h) where bands with different propagation characteristics are carrier aggregated, the throughput enhancements will be considered over the range of the highest of the frequency bands;
- (i) an RSRP base level of -103 dBm will be used as a proxy for 30 Mbit/s SUTP using a 10 MHz downlink carrier. Where capacity increasing techniques are

used such as carrier aggregation and/or deployment of additional bandwidth, a lower RSRP value can be used as follows:

- (i) where additional 10 MHz downlink carriers are added using two or three band carrier aggregation across bands with similar propagation characteristics (e.g. carriers in the 700 MHz Duplex, 800 MHz Band and 900 MHz Band) RSRP levels of -108 dBm and -113 dBm will apply respectively;
 - (j) an RSRP base level of -112 dBm be used as a proxy for 3 Mbit/s SUTP using a 10 MHz downlink carrier. Where capacity increasing techniques are used such as carrier aggregation and/or deployment of additional bandwidth, a lower RSRP value will be used as follows:
 - (i) where additional 10 MHz downlink carriers are added using two or three band carrier aggregation across bands with similar propagation characteristics (e.g. carriers in the 700 MHz Duplex, 800 MHz Band and 900 MHz Band) RSRP levels of -114 dBm and -116 dBm will apply respectively;
 - (k) noting that there may be many different potential combinations of spectrum and deployment techniques that could be used by a New Entrant, the Commission will apply the same principles as identified above in determining the appropriate approach to measuring and monitoring the coverage obligations; and
 - (l) as new technologies or coverage enhancing techniques are rolled out, the Commission will consider proposals from Licensees as to how this could influence meeting the coverage obligations, following which the Commission may determine additional metrics and base levels as a proxy for determining the Licensee's compliance with the coverage levels.
- (2) The Commission will identify a population file for the purposes of measuring and monitoring the population coverage obligation by using the most up to date and appropriate datasets available at the time of conducting the measurement which, at this juncture, the Commission envisages to consist of:
- (a) generating the population dataset by combining information from the CSO and the Eircode datasets; and
 - (b) using the residential addresses in the Eircode database to determine the geographic coordinates of the residential locations and the population statistics for the small areas dataset as provided by the CSO.

- (3) In the absence of manifest error, the population file used by the Commission will be definitive in assessing compliance with the obligation.

4. Reporting of Compliance

- (1) Where the Licensee holds rights of use in the 700 MHz Duplex under this Licence, the Licensee shall measure and/or assess its outdoor coverage every twelve months.
- (2) Where the Licensee provides a mobile voice and/or text service using rights of use in any of the 700 MHz, 2.1 GHz, 2.3 GHz or 2.6 GHz Bands under this Licence, the Licensee shall measure and/or assess Native Wi-Fi availability on its network in those bands every twelve months.
- (3) Where the Licensee is subject to the outdoor coverage and/or Native Wi-Fi obligations set out in this section, the Licensee shall submit to the Commission an annual compliance report on its outdoor coverage and/or Native Wi-Fi deployment ("Coverage Compliance Report") within 30 days of each anniversary of the commencement of the Licence. The Commission reserves the right to publish any information provided by the Licensee, subject to the provisions of the Commission's guidelines on the treatment of confidential information.
- (4) The information required for the Coverage Compliance Report shall be agreed with the Commission in advance and the compliance report shall have sufficient detail and granularity to allow the Commission to verify the contents of the Licensee's Coverage Compliance Report.
- (5) The Licensee shall identify in the Coverage Compliance Report whether it has either (a) met the relevant outdoor coverage obligations and indoor Native WiFi coverage obligations specified in its Licence, or (b) failed to meet the said obligations. The Licensee shall identify the outdoor coverage levels obtained at the time of the Coverage Compliance Report. Where the Licensee has failed to meet the relevant coverage obligation, the Licensee shall provide detailed reasons and supporting information for same.
- (6) Failure by the Licensee to submit the Annual Coverage Compliance Report to the Commission within the specified time period shall be deemed to be non-compliance by the Licensee with these reporting obligations.
- (7) Further, failure by the Licensee to submit the Annual Coverage Compliance Report to the Commission within the specified time period in a milestone year where the obligation is to be achieved or any year thereafter shall be deemed to be non-compliance by the Licensee with the relevant outdoor coverage obligations and indoor Native WiFi coverage obligations specified in its Licence.

- (8) The Commission reserves the right to survey the outdoor coverage level claimed by a Licensee, or inspect any Apparatus installed by a Licensee, at any time to ensure that the system is configured and operating in accordance with its Licence conditions. The Licensee shall facilitate any inspections by the Commission within such time as may be specified by the Commission.
- (9) In addition to the provision of the Coverage Compliance Report, the Commission reserves the right to require a Licensee to provide additional material or information in respect of a right of use for radio frequencies as it deems appropriate in line with its statutory obligations and duties, which may include but is not limited to:
- (a) Maps showing the Licensee's existing coverage levels; and
 - (b) Terminal Stations, Subscriber Identity Modules (SIM) cards or equivalents for measurements and testing as applicable, in sufficient quantity as the Commission shall determine to be necessary for the conduct of such measurements and testing.

Section 5: Rollout Requirements

1. Definitions

The following additional definitions shall apply in this section:

“2.6 GHz FDD Band” means radio frequency spectrum in the range 2500 – 2570 MHz paired with radio frequency spectrum in the range 2620 – 2690 MHz;

“2.6 GHz TDD Band” means radio frequency spectrum in the range 2570-2620 MHz;

“Existing Operator” means an Existing Operator (Mobile) or an Existing Operator (Other);

“Existing Operator (Mobile)” means an Existing MNO as defined in Section 4 above;

“Existing Operator (Other)” means a Licensee that on 1 January 2021 was a holder of a 3.6 GHz Band Liberalised Use Licence for terrestrial systems capable of providing Electronic Communications Services under the Wireless Telegraphy (3.6 GHz Band Licences) Regulations 2016 (S.I. No. 532 of 2016) and is not an Existing Operator (Mobile);

“Network-Controlled Wireless Telegraphy Apparatus” means apparatus which has backhaul capability³² over a network connection under the control of the Licensee. For the avoidance of doubt, “plug-and-play” type apparatus, such as femto cells, Terminal Stations and repeaters, are not Network-Controlled Wireless Telegraphy Apparatus;

“New Operator” means a Licensee that is not an Existing Operator;

“New Operator (Mobile)” means a New Operator which provides mobile Electronic Communications Services under this Licence;

“New Operator (Other)” means a New Operator which provides Electronic Communications Services other than mobile Electronic Communications Services under this Licence;

“Performance Band” means any of the following: 2.1 GHz Band, 2.3 GHz Band, 2.6 GHz FDD Band or 2.6 GHz TDD Band; and

“Rollout Base Station” means a Network Controlled Wireless Telegraphy Apparatus in any of the Performance Bands, with a minimum spectrum efficiency capability of 4 bits/Hz.

2. Base Station minimum rollout requirements

- (1) A Licensee that is an Existing Operator and is assigned rights of use to spectrum in a Performance Band under this Licence shall achieve, within 4 years of the earliest commencement date of a Spectrum Block in that band and maintain thereafter, the applicable Rollout Base Station obligation for that band detailed in Table 5 below.
- (2) However, where the Licensee is an Existing Operator (Mobile), is assigned rights of use in a Performance Band and can demonstrate to the satisfaction of the Commission that the services that it is providing in that band do not include mobile Electronic Communications Services, then the Rollout Base Station obligation applicable to the Licensee in respect of that band will be the same as that applicable to an Existing Operator (Other) in respect of that band, as detailed in Table 5 below.

³² If any of the Performance Bands are used for the provision of backhaul connectivity, even if such Apparatus comprises of multiple hops to the network, this counts as a single Rollout Base Station, provided such backhaul connectivity carries data originating from or destined for multiple customer premises. The connection to individual customer premises equipment is excluded.

Table 5. Existing Operator Rollout Base Station Obligation

Number of Rollout Base Stations to be worked and used				
	2.1 GHz Band	2.3 GHz Band	2.6 GHz FDD Band	2.6 GHz TDD Band
Existing Operator (Mobile)	1,200	525	525	525
Existing Operator (Other)	290	290	290	290

- (3) A Licensee that is a New Operator and is assigned rights of use to spectrum in a Performance Band under this Licence shall achieve within 5 years of the earliest commencement date of a Spectrum Block in that band and maintain thereafter the applicable Rollout Base Station obligation for that band detailed in Table 6 below.
- (4) However, where a Licensee is a New Operator, is assigned rights of use in a Performance Band and is providing both mobile Electronic Communications Services and Electronic Communications Services other than mobile Electronic Communications Services in the band, then the Rollout Base Station obligation applicable to the Licensee in respect of that band will be that applicable to a New Operator (Mobile) in respect of that band, as detailed in Table 6 below.

Table 6: New Operator Rollout Base Station Obligation

Number of Rollout Base Stations to be worked and used				
Band	2.1 GHz Band	2.3 GHz Band	2.6 GHz FDD Band	2.6 GHz TDD Band
New Operator (Mobile)	290	290	290	290
New Operator (Other)	80	80	80	80

- (5) Rollout Base stations worked and used pursuant to a spectrum leasing arrangement count towards the Rollout Base Station obligation of the Lessor's Licence.
- (6) Where a Licensee shares a Rollout Base Station with another Licensee, such Rollout Base Stations can count towards the Rollout Base Station obligation of each Licensee, provided that at least one licensed Spectrum Block of each Licensee is worked and used by the Rollout Base Station.

3. Reporting of Compliance

- (1) The Licensee shall submit to the Commission an annual compliance report on its rollout within 30 days of each anniversary of the commencement of the Licence.

- (2) In the annual compliance report the Licensee shall notify the Commission whether or not it has met the applicable rollout obligation(s) ("Annual Rollout Compliance Report"). Where the Licensee has failed to meet the relevant rollout obligation, the Licensee shall provide detailed reasons and supporting information for same.
- (3) The information required for this Annual Rollout Compliance Report shall be agreed with the Commission in advance and the Annual Rollout Compliance Report shall have sufficient detail and granularity to allow the Commission to verify the contents of the Licensee's Annual Rollout Compliance Report.
- (4) The Commission shall have the right to publish details of these reports subject to the provisions of the Commission's guidelines on the treatment of confidential information.
- (5) Failure by the Licensee to submit the Annual Rollout Compliance Report to the Commission within the specified time period shall be deemed to be non-compliance by the Licensee with these reporting obligations.
- (6) Further, failure by the Licensee to submit the Annual Rollout Compliance Report to the Commission within the specified time period in a milestone year where the obligation is to be achieved or any year thereafter shall be deemed to be non-compliance by the Licensee with the relevant rollout obligation(s) specified in its Licence.
- (7) The Commission reserves the right to inspect any Rollout Base Station and any associated infrastructure installed by a Licensee at any time to ensure that the system is configured and operating in accordance with its Licence conditions and the Licensee shall facilitate any such inspections by the Commission within such time as may be specified by the Commission.
- (8) In addition to the Annual Rollout Compliance Report as identified above, the Commission reserves the right to require a Licensee to provide additional material or information in respect of a right of use for radio frequencies as it deems appropriate in line with its statutory obligations and duties, which may include but is not limited to, an up-to-date list of the technical capabilities and locations of Base Stations including the Rollout Base Stations covered by the Licence.

Section 6: Quality of Service (QoS) Obligations

1. Definitions

The following additional definitions shall apply in this section:

“3GPP” means the 3rd Generation Partnership Project.

“Annual QoS Compliance Report” means an annual compliance report on the Licensee’s compliance with quality of service obligations, as described in section 6(5) below.

“Licensed Spectrum Blocks” means the Spectrum Blocks set out in Part 1 of the Licence;

“Maximum Permissible Blocking Rates” means the maximum percentage of total Voice Call attempts which are unsuccessful during the Time Consistent Busy Hour;

“Maximum Permissible Dropped Call Rates” means the maximum percentage of total originating calls which are prematurely released by the Network within 3 minutes of the Voice Call being made;

“Network” means any terrestrial system which uses the Licensed Spectrum Blocks;

“Network Unavailability” means the average number of minutes per six month period for which services on the Network are not available due to a disturbance, failure or scheduled unavailability to a Network;

“Time Consistent Busy Hour” means the period of one-hour starting at the same time each day for which the average voice traffic of the network concerned is greatest over the days under consideration. The time consistent busy hour shall be determined by the Licensee from an analysis of traffic data obtained from the service and be subject to the Commission’s approval;

“Voice Call” means all relevant non-VOIP (Voice over Internet Protocol) and managed VOIP call services³³ which are considered by the Commission to be substitutable with traditional voice call services as may be updated and notified to Licensees from time to time; and

“VoLTE” means voice over LTE which is is a managed voice service that benefits from prioritisation over other traffic..

2. The Minimum “Availability of the Network” Standard

³³ This includes traditional voice call services carried over circuit-switched connections and ‘managed’ packet-switched voice call services (e.g. using VOIP or similar protocols) which can be provided over different technologies (e.g. VoLTE, Native Wi-Fi, etc.).

- (1) “Availability of the Network” shall be measured in terms of Network Unavailability and reported on an annual basis.
- (2) The Licensee shall ensure that Network Unavailability is less than 35 minutes (based on the weighting factors set out in Table 7 below) per six month period.

Table 7: Weighting Factors for Network Unavailability tracking all periods of network unavailability

Network Unavailability, Weighting Factors (divide duration of each network event by weighting factor)			
	Monday to Friday	Saturday	Sunday
For periods between 07:00 and 24:00 hours	1	2	4
For periods between 00:00 and 07:00 hours	4	8	16

- (3) The “Availability of the Network” shall be calculated by combining the Network Unavailability measurements of the relevant services provided to the Licensee’s end users and provided to end users of third parties³⁴.
- (4) The Licensee shall maintain a network log on a per Base Station basis in a manner that can demonstrate to the satisfaction of the Commission that such a network log is an adequate means of assessing whether the Licensee is complying with its “Availability of the Network” licence obligations.
- (5) The Licensee shall make available the network log, or part thereof as appropriate, to the Commission upon request by the Commission.
- (6) The Licensee shall calculate the Network Unavailability for any period specified by the Commission from the information recorded in the network log, and shall, upon request and within such time as may be specified by the Commission, provide the Commission with the results of those calculations.

3. The Minimum Voice Call Standard

- (1) Where the Licensee and/or any third party by means of a contractual or other arrangement with the Licensee provides a Voice Call service on a terrestrial system using the Licensed Spectrum Blocks, the Licensee shall comply with the minimum Voice Call standard set out in Table 8 below.

³⁴ For example, MVNOs or other wholesale services.

Table 8: Minimum Voice Call Standards for each 6 month period for annual reporting

	Average	Worst Case
Maximum Permissible Blocking Rates ³⁵	2%	4%
Maximum Permissible Dropped Call Rates	2%	4%
Transmission quality: The Licensee shall ensure that: <ul style="list-style-type: none"> • the speech transmission quality of Voice Calls is as good as or better than the speech quality associated with the relevant ETSI Standard and Technical Specifications; and • appropriate echo treatment equipment is used and that such equipment is properly configured. 		

(2) Where a Voice Call service is provided by the Licensee and any third party via contractual or other arrangements with the Licensee, the minimum Voice Call standard shall be calculated by combining the Voice Call measurements of the Licensee with that of the third party.

4. The “VoLTE Availability” Obligation

Where the Licensee has deployed LTE technology in any of the bands in which it holds rights of use under this Licence and also offers a mobile voice service to consumers using those bands, the Licensee shall:

- (a) enable VoLTE technology on its network and on its Base Stations which use those bands within 1 year;
- (b) make a VoLTE service available to its end users (including MVNO end users) that have a VoLTE-enabled handset within 1 year; and
- (c) deploy and maintain VoLTE across 50% of its LTE Base Stations which use those bands within 1 year and across 100% of such Base Stations within 2 years.

5. Reporting on Compliance

(1) The Licensee shall maintain a log in respect of the performance of its Network against the Minimum Voice Call Standards in Table 8, according to measuring standards as agreed with the Commission and in such a manner that can demonstrate to the satisfaction of the Commission that its network log is an

³⁵ The blocked call rates are measured for the Time Consistent Busy hour. during each review period (i.e. 6 months).

adequate means of assessing whether the Licensee is complying with these standards.

- (2) Every twelve months, the Licensee shall measure and/or assess its compliance with each of (a) the Minimum Availability of the Network Standard, (b) the Minimum Voice Call Standard and (c) the VoLTE Availability Obligation set out above, and shall submit to the Commission, within 30 days of each anniversary of the commencement of the Licence, an Annual QoS Compliance Report detailing said compliance.
- (3) the information required for the Annual QoS Compliance Report shall be agreed with the Commission in advance and the Annual QoS Compliance Report shall have sufficient detail and granularity to allow the Commission to verify the results of the Licensee's measurements.
- (4) the Licensee shall identify in the Annual QoS Compliance Report whether it has either (a) met the relevant QoS obligations specified in its Licence, as set out in Section 6(2), Section 6(3) and Section 6(4) above, or (b) failed to meet any of these obligations and, if so, the Licensee shall provide detailed reasons and supporting information for same.
- (5) Failure by the Licensee to submit the Annual QoS Compliance Report to the Commission within the specified time period shall be deemed to be non-compliance by the Licensee with these reporting obligations and also with the Minimum Availability of the Network Standard, the Minimum Voice Call Standard and the VoLTE Availability Obligation.
- (6) The Commission shall have the right to publish details of these reports subject to the provisions of the Commission's guidelines on the treatment of confidential information.
- (7) The Licensee shall, upon request by the Commission³⁶, carry out drive test measurements against the Maximum Permissible Blocking Rates and Maximum Permissible Dropped Call Rates standards and submit these results to the Commission. These drive test measurements are to be carried out at the Licensee's own expense and to a standard as agreed with the Commission.
- (8) Failure by the Licensee to carry out and submit the drive tests measurements to the standard agreed with the Commission shall be deemed to be non-compliance by the Licensee with both these reporting obligations and the Maximum Permissible Blocking Rates and Maximum Permissible Dropped Call Rates standards.

³⁶ The Commission does not envisage drive test measurements being required on a frequent basis, but notes that such measurements may be appropriate in circumstances where:

- a Licensee is submitting a compliance report on QoS for the first time; and/or
- the Commission's own verification checks, drive test measurements or other information suggests that there may be discrepancies in the compliance report on QoS or the Licensee may not be meeting its QoS obligations.

- (9) The Commission shall have the right to publish details of these measurement results subject to the provisions of the Commission's guidelines on the treatment of confidential information.
- (10) In addition to the annual compliance reporting as identified above, the Commission reserves the right to require a Licensee to provide additional material or information in respect of a right of use for radio frequencies as it deems appropriate in line with its statutory obligations and duties, which may include but is not limited to, Terminal Stations, Subscriber Identity Modules (SIM) cards or equivalents for measurements and testing as applicable, in sufficient quantity as the Commission shall determine to be necessary for the conduct of such measurements and testing.

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SCHEDULE 2**WIRELESS TELEGRAPHY ACT, 1926****WIRELESS TELEGRAPHY (LIBERALISED USE AND RELATED LICENCES IN THE 700 MHZ DUPLEX, 2.1 GHZ, 2.3 GHZ AND 2.6 GHZ BANDS) REGULATIONS 2021****MBSA2 Spectrum Lease Licence for terrestrial systems capable of providing Electronic Communications Services**

Licence under section 5 of the Act of 1926 to keep and have possession of apparatus for wireless telegraphy for terrestrial systems capable of providing Electronic Communications Services.

The Commission for Communications Regulation, in exercise of the powers conferred on it by section 5 of the Act of 1926 hereby grants the following licence to **[LICENSEE NAME]** of **[LICENSEE ADDRESS]** (“the Licensee”).

The Licensee is hereby authorised to keep and have possession of apparatus for wireless telegraphy for terrestrial systems capable of providing Electronic Communications Services as specified in Part 2 of this Licence, subject to such apparatus being installed, maintained, worked and used in accordance with the terms, conditions and restrictions set out in the Wireless Telegraphy (Liberalised Use and Related Licences in the 700 MHz Duplex, 2.1 GHz, 2.3 GHz and 2.6 GHz Bands) Regulations 2021 (S.I. No. of 2021) (“the Regulations”), including but not limited to, the following:

- (1) The Licensee shall ensure that it complies with all of the conditions contained within the Regulations and within Parts 1 to 4 of this Licence; and
- (2) The Licensee shall ensure that it makes payment of all fees as detailed in the Regulations.

For the purpose of this Licence, the definitions set out in the Regulations apply.

This Licence shall come in to effect on **DD/MM/YYYY** (the “Licence Commencement Date”) and, subject to revocation, suspension or withdrawal, expires on **DD/MM/YYYY**.

Signed: _____

For and on behalf of the Commission for Communications Regulation

Date of Issue: _____

Commencement and expiry dates per leased Spectrum Block of Liberalised Spectrum

Lesser MBSA2 Liberalised Use Licence Number	Authorised Band	Name of Spectrum Block	Frequency Assigned to Spectrum Block	Commencement Date per Spectrum Block	Expiry Date per Spectrum Block
	700 MHz Duplex, 2.1 GHz, 2.3 GHz, 2.6 GHz as appropriate	[One or more Blocks of Liberalised Spectrum]	From ____ MHz to ____ MHz	DD Month YYYY	DD Month YYYY

Part 2

The Apparatus to which this Licence applies

Authorised Band	Equipment Index Reference	Terrestrial System	Equipment Description	Manufacturer	Model
700 MHz Duplex, 2.1 GHz, 2.3 GHz, 2.6 GHz as appropriate					

Part 3

Apparatus Location and Details

Authorised Band	Site Identity	Eastings	Northings	Equipment Index Reference	Maximum EIRP / TRP
700 MHz Duplex, 2.1 GHz, 2.3 GHz, 2.6 GHz as appropriate					

Part 4

Licence Conditions

The Licence Conditions will be specified by the Commission in accordance with such procedures as may be specified by the Commission from time to time under Regulation 19 of the Framework Regulations.

SCHEDULE 3**WIRELESS TELEGRAPHY ACT, 1926****WIRELESS TELEGRAPHY (LIBERALISED USE AND RELATED LICENCES IN THE 700 MHZ DUPLEX, 2.1 GHZ, 2.3 GHZ AND 2.6 GHZ BANDS) REGULATIONS 2021**

MBSA2 Preparatory Licence for terrestrial systems capable of providing Electronic Communications Services

Licence under section 5 of the Act of 1926 to keep and have possession of apparatus for wireless telegraphy for terrestrial systems capable of providing Electronic Communications Services.

The Commission for Communications Regulation, in exercise of the powers conferred on it by section 5 of the Act of 1926 hereby grants the following licence to **[LICENSEE NAME]** of **[LICENSEE ADDRESS]** (“the Licensee”).

The Licensee is hereby authorised to keep and have possession of apparatus for wireless telegraphy for terrestrial systems capable of providing Electronic Communications Services as specified in Part 2 of this Licence, subject to such apparatus being installed and maintained in accordance with the terms, conditions and restrictions set out in the Wireless Telegraphy (Liberalised Use and Related Licences in the 700 MHz Duplex, 2.1 GHz, 2.3 GHz and 2.6 GHz Bands) Regulations 2021 (S.I. No. of 2021) (“the Regulations”), including but not limited to, the following:

- (1) The Licensee shall ensure that it complies with all of the conditions contained within the Regulations and within Parts 1 to 2 of this Licence; and
- (2) The Licensee shall ensure that it makes payment of all fees as detailed in the Regulations.

For the purpose of this Licence, the definitions set out in the Regulations apply.

This Licence shall come in to effect on **DD/MM/YYYY** (the “Licence Commencement Date”) and, subject to revocation, suspension or withdrawal, expires on **DD/MM/YYYY**.

Signed: _____

For and on behalf of the Commission for Communications Regulation

Date of Issue: _____

Part 1
Licence Conditions

(1) The Licensee may keep, have possession of, install and maintain the Apparatus detailed in Part 2 of this Licence.

(2) The Licensee shall not work or use the Apparatus detailed in Part 2 of this Licence.

Part 2

The Apparatus to which this Licence applies

To Include:

Authorised Band	Commencement Date	Expiry Date	Manufacturer	Model
	DD Month YYYY	DD Month YYYY		

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SCHEDULE 4**WIRELESS TELEGRAPHY ACT, 1926****WIRELESS TELEGRAPHY (LIBERALISED USE AND RELATED LICENCES IN THE 700 MHZ DUPLEX, 2.1 GHZ, 2.3 GHZ AND 2.6 GHZ BANDS) REGULATIONS 2021**

MBSA2 2.3 GHz Band Transition Licence for apparatus for wireless telegraphy for the provision of Point to Multi-Point Radio Links in the 2.3 GHz Band and 2.4 GHz Bands

Licence under section 5 of the Act of 1926 to keep and have possession of apparatus for wireless telegraphy for the provision of Point to Multi-Point Radio Links in the 2.3 GHz Band and 2.4 GHz Bands.

The Commission for Communications Regulation, in exercise of the powers conferred on it by section 5 of the Act of 1926 hereby grants the following licence to **[LICENSEE NAME]** of **[LICENSEE ADDRESS]** (“the Licensee”).

The Licensee is hereby authorised to keep and have possession of apparatus for wireless telegraphy for the provision of Point to Multi-Point Radio Links as specified in Part 2 of this Licence, subject to such apparatus being installed, maintained, worked and used in accordance with the terms, conditions and restrictions set out in the Wireless Telegraphy (Liberalised Use and Related Licences in the 700 MHz Duplex, 2.1 GHz, 2.3 GHz and 2.6 GHz Bands) Regulations 2021 (S.I. No. of 2021) (“the Regulations”), including but not limited to, the following:

- (1) The Licensee shall ensure that it complies with all of the conditions contained within the Regulations and within Parts 1 to 2 of this Licence; and
- (2) The Licensee shall ensure that it makes payment of all fees as detailed in the Regulations.

For the purpose of this Licence, the definitions set out in the Regulations apply.

This Licence shall come in to effect on **DD/MM/YYYY** (the “Licence Commencement Date”) and, subject to revocation, suspension or withdrawal, expires on **DD/MM/YYYY**.

Signed: _____

For and on behalf of the Commission for Communications Regulation

Date of Issue: _____

Part 1

Commencement and Expiry dates per Point to Multi-Point Radio Link

Existing Point to Multi-Point Licence No.	Transmit Station location (Eastings, Northings)	Frequency Assigned	Commencement Date	Expiry Date
		From ____ MHz to ____ MHz And From ____ MHz to ____ MHz	DD MonthYYYY	DD MonthYYYY

Part 2

Location(s) and technical conditions of Apparatus

Existing Point to Multi-Point Licence No.	Transmit Station location (Eastings, Northings)	Max EIRP (dBW)	Make	Model

SCHEDULE 5

Annual SUF before CPI Adjustment for each Spectrum Block of Liberalised Spectrum

The CPI Adjustment for a SUF is calculated using 14 February 2022 as the base date for the CPI (i.e. CPI = 100). When calculating the CPI adjustment to the SUF, the Commission will use the most current CPI data available to it at that time. For example, for 14 February, the Commission envisages that the most up to date CPI data available is likely to be from January of that year.

Table 9: Annual SUF before CPI adjustment per Spectrum Block

Spectrum Blocks	Annual SUF before CPI Adjustment (€)
700 MHz Duplex Block	998,931
2.1 GHz Band Block	525,753
2.3 GHz Band Generic Frequency Block	52,575
2.3 GHz Band Fixed Frequency Block	52,575
2.6 GHz Band FDD Block	105,151
2.6 GHz Band TDD Fixed Frequency Block (Lower)	5,000
2.6 GHz Band TDD Fixed Frequency Block (Upper)	5,000
2.6 GHz Band TDD Generic Frequency Block	52,575

SCHEDULE 6

Annual Fee for a Point to Multi-Point Radio Link in a MBSA2 2.3 GHz Band Transition Licence

The Annual Fee per Point to Multi-Point Radio Link in a MBSA2 2.3 GHz Band Transition Licence shall be calculated on the basis of:

$$A \times (B/100) = C$$

where:

- A is €4,000, namely the relevant annual fee for a Point to Multi-Point Radio Link operating on a frequency greater than or equal to 1 GHz and less than 17 GHz and with a bandwidth of less than or equal to 3.5 MHz, as set out in Schedule 2 of the Wireless Telegraphy (Radio Link Licence) Regulations, 2009 (S.I. No 370 of 2009) on the basis of Table 1 thereof;
- B is the CPI relevant to the period from a baseline date of September 2009 (where CPI = 100) to the date of making of the Wireless Telegraphy (Liberalised Use and Related Licences in the 700 MHz Duplex, 2.1 GHz, 2.3 GHz and 2.6 GHz Bands) Regulations 2021³⁷; and
- C is the appropriate fee to be paid.

Where spectrum rights for a Point to Multi-Point Radio Link are granted for a portion of a year in a MBSA2 2.3 GHz Band Transition Licence, the fee to be paid by the Licensee for that Point to Multi-Point Radio Link shall be calculated as follows:

$$C \times (D/12) = E$$

where:

- C is the relevant annual fee for the Point to Multi-Point Radio Link as set out above in this schedule;
- D is the number of whole months for which the spectrum rights for the Point to Multi-Point Radio Link are granted (if granted for a period of less than one month then, for the purpose of these calculations only, they shall be considered as a being granted for a period of one month); and
- E is the appropriate fee to be paid.

³⁷ The Consumer Price Index for this period will be calculated using the most current CPI data available from the CSO at the time of making the Regulations.

Where the spectrum rights of use in the 2307 - 2327 MHz frequency range for a Point to Multi-Point Radio Link in a MBSA2 2.3 GHz Band Transition Licence are fully licensed to the Licensee in its MBSA2 Liberalised Use Licence, the relevant fees for that Point to Multi-Point Radio Link shall be reduced by 50%.

GIVEN under the official seal of the Commission for Communications Regulation,

[DATE] 2021

[NAME of COMMISSIONER]

For and on behalf of the Commission for Communications Regulation

The Minister for the Environment, Climate and Communications, in accordance with Section 37 of the Communications Regulation Act, 2002, (as adapted by the Communications, Climate Action and Environment (Alteration of Name of Department and Title of Minister) Order 2020 (S.I. No. 373 of 2020)) consents to the making of the foregoing Regulations.

GIVEN under the Official Seal of the Minister for the Environment, Climate and Communications,

[DATE] 2021

Eamon Ryan

Minister for the Environment, Climate and Communications

Explanatory Note

(This note is not part of the Instrument and does not purport to be a legal interpretation.)

These Regulations prescribe matters in relation to licences for apparatus for wireless telegraphy for terrestrial systems capable of providing Electronic Communications Services in the 700 MHz Duplex, the 2.1 GHz, the 2.3 GHz and the 2.6 GHz Bands.

DRAFT

Draft 2.1 GHz Early Liberalisation and Interim Licensing Regulations

Any final version of these regulations, which would be made by ComReg under section 6 of the Wireless Telegraphy Act 1926, is expressly subject to the consent of the Minister for the Environment, Climate and Communications under section 37 of the Communications Regulation Act 2002, as amended.

ComReg may make such editorial changes to the text of any final regulations as it considers necessary and without further consultation, where such changes would not affect the substance of the regulations.

S.I. No. [XX] of 2021**WIRELESS TELEGRAPHY (THIRD GENERATION AND GSM LICENCE (AMENDMENT) AND INTERIM LICENSING) REGULATIONS 2021**

Notice of the making of this Statutory Instrument was published in “Iris Oifigiúil” of [XX] 2021.

The Commission for Communications Regulation, in exercise of the powers conferred on it by section 6(1) of the Wireless Telegraphy Act, 1926 (No. 45 of 1926) as substituted by section 182 of the Broadcasting Act 2009 (No. 18 of 2009), and with the consent of the Minister for the Environment, Climate and Communications in accordance with section 37 of the Communications Regulation Act 2002 (No. 20 of 2002), (as adapted by the Communications, Climate Action and Environment (Alteration of Name of Department and Title of Minister) Order 2020 (S.I. No. 373 of 2020)) hereby makes the following Regulations:

Citation

1. These Regulations may be cited as the Wireless Telegraphy (Third Generation and GSM Licence (Amendment) and Interim Licensing) Regulations 2021.

Interpretation

2. (1) In these Regulations:

“2.1 GHz Band” means radio frequency spectrum in the range 1920 to 1980 MHz paired with radio frequency spectrum in the range 2110 MHz to 2170 MHz;

“Act of 1926” means the Wireless Telegraphy Act 1926 (No. 45 of 1926);

“Act of 1972” means the Wireless Telegraphy Act, 1972 (No. 5 of 1972);

“Act of 2002” means the Communications Regulation Act 2002 (No. 20 of 2002);

“Authorisation Regulations” means the European Communities (Electronic Communications Networks and Services) (Authorisation) Regulations 2011 (S.I. No. 335 of 2011);

“Award” means the competitive award procedure used by the Commission for the purpose of granting individual rights of use for radio frequencies in the 700 MHz Duplex, 2.1 GHz, 2.3 GHz and 2.6 GHz Bands, as detailed in the Information Memorandum;

“Commission” means the Commission for Communications Regulation established under the Act of 2002;

“Decision of 1999” means Decision No. 128/1999/EC of the European Parliament and of the Council of 14 December 1999 on the co-ordinated introduction of a third generation mobile and wireless communications system in the Community;

“Decision of 2012” means European Commission Implementing Decision (2012/688/EU) of 5 November 2012 on the harmonisation of the frequency bands 1920-1980 MHz and 2110-2170 MHz for terrestrial systems capable of providing electronic communications services in the Union, as amended by European Commission Implementing Decision (EU) 2020/667 of 6 May 2020;

“ERC Decision of 1999” means ERC Decision ERC/DEC/(99)25 of 29 November 1999 on the harmonised utilisation of spectrum for terrestrial Universal Mobile Telecommunications System (UMTS) operating within the bands 1900 - 1980 MHz, 2100 - 2170 MHz and 2110 - 2170 MHz;

“Electronic Communications Service” have the meanings assigned to them in the Framework Regulations;

“EURIBOR” means the rate at which euro interbank term deposits are offered within the European Monetary Union zone by one prime bank to another and, in relation to any payment, a reference to the prevailing EURIBOR means the rate prevailing at close of business on the date on which payment falls due;

“Existing Licence” means a licence issued under the Principal Regulations;

“Existing A Licence” means a licence issued under the Principal Regulations and which is due to expire on 24 July 2022;

“Existing B Licence” means a licence issued under the Principal Regulations and which is due to expire on 1 October 2022;

“Existing Licensee” means a person holding one, or more, Existing Licences;

“Framework Regulations” means the European Communities (Electronic Communications Networks and Services) (Framework) Regulations 2011 (S.I. No. 333 of 2011);

“Harmful Interference” has the meaning set out in the Framework Regulations;

“Information Memorandum” means the document published by the Commission on 16 April 2021 and bearing the Commission Document number 21/40 and which outlines in detail the processes and procedures the Commission will follow in running the Award, as may be updated from time to time;

“Liberalisation” or “Liberalise” in relation to an Existing Licence means such amendments to the rights and conditions as required to be made by the Commission

so as to grant a Liberalised 2.1 GHz Band Existing Licence to the Existing Licensee to enable the Existing Licensee to keep, have possession of, install, maintain, work and use Liberalised Apparatus;

“Liberalisation Fee” has the meaning set out in the Information Memorandum;

“Liberalised 2.1 GHz Band Existing Licence” means means a Licence in the form set out in Schedule 1 to keep and have possession of Liberalised Apparatus, in accordance with and subject to the terms and conditions set out therein;

“Liberalised 2.1 GHz Band Interim Licence” means a Liberalised 2.1 GHz Band Interim A Licence or a Liberalised 2.1 GHz Band Interim B Licence in the form set out in Schedule 3 to keep and have possession of Liberalised Apparatus, in accordance with and subject to the terms and conditions set out therein;

“Liberalised Apparatus” means apparatus for wireless telegraphy as defined in section 2 of the Act of 1926 for terrestrial systems capable of providing Electronic Communications Services in the 2.1 GHz Band and which comply with the Decision of 2012;

“Licence” means a non-exclusive licence granted under section 5 of the Act of 1926 in accordance with and subject to the matters prescribed in these Regulations to keep and have possession of Liberalised Apparatus or Third Generation Apparatus, as the case may be, in a specified place in the State, being one of:

- (a) a Liberalised 2.1 GHz Band Existing Licence;
- (b) a Third Generation 2.1 GHz Band Interim A Licence;
- (c) a Third Generation 2.1 GHz Band Interim B Licence;
- (d) a Liberalised 2.1 GHz Band Interim A Licence; or
- (e) a Liberalised 2.1 GHz Band Interim B Licence.

“Licence Commencement Date” means the date, as specified in the Licence, upon which the Licence comes into effect;

“Non-exclusive”, in relation to a Licence, means that the Commission is not precluded from authorising the keeping and having possession by persons other than the Licensee, on a Non-Interference and Non-Protected Basis, of apparatus for wireless telegraphy for the radio frequency spectrum specified in the Licence;

“Non-Interference and Non-Protected Basis” means that the use of apparatus for wireless telegraphy is subject to no Harmful Interference being caused to any Radiocommunication Service, and that no claim may be made for the protection of apparatus for wireless telegraphy used on this basis against Harmful Interference originating from Radiocommunication Services;

“Principal Regulations” means the Wireless Telegraphy (Third Generation and GSM Licence) Regulations, 2002 (S.I. No. 345 of 2002) as amended by the Wireless Telegraphy (Third Generation and GSM Licence) (Amendment) Regulations, 2003 (S.I. No. 340 of 2003);

“Radiocommunication Service” means a service as defined in the Radio Regulations of the International Telecommunication Union involving the transmission, emission and/or reception of radio waves for specific telecommunication purposes;

“Third Generation mobile telephony service” means a mobile and wireless communications system based on a standard within the IMT-2000 system capable of supporting innovative multimedia services beyond the capability of second generation systems such as GSM, and capable of supporting the characteristics referred to in Annex 1 of the Decision of 1999;

“Third Generation Apparatus” means apparatus for wireless telegraphy which is licensed to operate in the 2.1 GHz Band for the purpose of providing a Third Generation mobile telephony service and, in relation to a Third Generation 2.1 GHz Band Interim Licence, means apparatus to which the Third Generation 2.1 GHz Band Interim Licence relates;

“Third Generation 2.1 GHz Band Interim Licence” means a Third Generation 2.1 GHz Band Interim A Licence or a Third Generation 2.1 GHz Band Interim B Licence in the form set out in Schedule 2 to keep and have possession of Third Generation Apparatus, in accordance with and subject to the terms and conditions set out therein; and

“Undertaking” means Three Ireland (Hutchison) Limited, a company with a registered office at 28/29 Sir John Rogerson’s Quay, Dublin 2.

(2) A word or expression that is used in these Regulations and that is also used in the Act of 1926 has, unless the context otherwise requires, the same meaning in these Regulations that it has in that Act.

(3) A word or expression that is used in these Regulations and that is also used in the Act of 2002 has, unless the context otherwise requires, the same meaning in these Regulations that it has in that Act.

(4) A word or expression that is used in these Regulations and that is also used in the Framework Regulations or in the Authorisation Regulations has, unless the context otherwise requires, the same meaning in these Regulations that it has in those Regulations.

Licences to which these Regulations apply

3. These Regulations apply to:

- (a) Liberalised 2.1 GHz Band Existing Licences;

- (b) a Third Generation 2.1 GHz Band Interim A Licence;
- (c) a Third Generation 2.1 GHz Band Interim B Licence;
- (d) a Liberalised 2.1 GHz Band Interim A Licence; and
- (e) a Liberalised 2.1 GHz Band Interim B Licence.

Amendment of Principal Regulations

4. The Principal Regulations are amended:

- (1) by the insertion of Schedule 1 to these Regulations after Schedule 5 of the Principal Regulations;
- (2) by the insertion of the following new Regulation 13 after Regulation 12:

“Application by Existing Licensee for Liberalisation of Existing Licence and Grant of Liberalised 2.1 GHz Band Existing Licence

13. (1) Application by an Existing Licensee for the Liberalisation of its Existing Licence(s) through the granting of a Liberalised 2.1 GHz Band Existing Licence(s) shall be made by an Existing Licensee to the Commission in writing and in such form as may be determined by the Commission from time to time.

(2) The Commission may Liberalise an Existing Licence which expires on or before 15 October 2022 through the granting of a Liberalised 2.1 GHz Existing Licence(s) to such Existing Licensee for which no additional Liberalisation Fee shall apply. The Existing Licensee shall continue to be liable for all other applicable fees relating to the Existing Licence(s) specified in these Regulations.

(3) The Commission may, before the outcome of the Award, Liberalise an Existing Licence which expires after 15 October 2022 through the granting of a Liberalised 2.1 GHz Band Existing Licence to such Existing Licensee upon receipt of a written binding commitment by the Existing Licensee to pay the Liberalisation Fee, and such binding commitment shall be in such form as may be determined by the Commission from time to time. If, in light of the outcome of the Award, a Liberalisation Fee is determined by the Commission to apply to the Liberalisation of such Existing Licence, the Commission shall issue an invoice to the relevant Existing Licensee setting out the Liberalisation Fee and the relevant Existing Licensee shall pay the Liberalisation Fee within the time period specified in the invoice. The Existing Licensee shall continue to be liable for all other applicable fees relating to the Existing Licence specified in these Regulations.

(4) Where payment of the Liberalisation Fee is not made within the time period specified in the invoice, then the Existing Licensee shall pay to the Commission interest on the Liberalisation Fee or part thereof that was or is outstanding. Interest shall accrue from the date when such fee or part thereof fell due until payment of such fee or part thereof and shall be calculated at the same rate payable in respect of late payments in commercial transactions pursuant to the European Communities (Late Payment in Commercial Transactions) Regulations 2012, (S.I. No. 580 of 2012).

(5) Without prejudice to the Commission's other statutory powers, an amount payable by an Existing Licensee in respect of the Liberalisation Fee, including interest where applicable, may be recovered by the Commission from the Existing Licensee as a simple contract debt in any court of competent jurisdiction.

(6) The Commission may, after the outcome of the Award, Liberalise an Existing Licence which expires after 15 October 2022 through the granting of a Liberalised 2.1 GHz Existing Licence to such Existing Licensee following payment of the Liberalisation Fee if applicable. The Existing Licensee shall continue to be liable for all other applicable fees relating to the Existing Licence specified in these Regulations.

(7) A Liberalised 2.1 GHz Band Existing Licence shall be in the form specified in Schedule 6, with such variation, if any, whether by addition, deletion or alteration as the Commission may determine from time to time or in any particular case in accordance with the Authorisation Regulations.

(8) The commencement date and expiry date of a Liberalised 2.1 GHz Band Existing Licence shall be set by the Commission and specified in the Licence.

(9) Any Licensee that is granted a Liberalised 2.1 GHz Band Existing Licence and to which these Regulations apply shall:

(a) ensure that it complies with the geographical and technical conditions contained within Parts 1 to 3 of the Licence;

(b) notify the Commission of its intention to Transfer any rights of use for radio frequencies attaching to a Licence;

(c) only Transfer the rights of use for radio frequencies attaching to a Licence in accordance with the Transfer Regulations;

(d) notify the Commission of its intention to Lease any rights of use for radio frequencies attaching to a Licence;

(e) subject to paragraph (f), only Lease the rights of use for radio frequencies attaching to a Licence in accordance with such procedures as may be specified by the Commission from time to time;

(f) where the Commission has not yet put in place procedures referred to in paragraph (e) of this Regulation, not, without the prior consent of the Commission, which shall not be unreasonably withheld, Lease any such rights of use attaching to a Licence;

(g) ensure that if the address of the Licensee changes, the Licensee shall, as soon as possible, notify the Commission in writing of the change; and

(h) ensure that it complies with any special conditions imposed under section 8 of the Act of 1972.

(10) Enforcement by the Commission of compliance by a Licensee with conditions attached to its Licence shall be in accordance with the Authorisation Regulations.

(11) The Commission may amend any Licence from time to time in accordance with the Authorisation Regulations.

(12) A Licence may be restricted or withdrawn by the Commission in accordance with the Authorisation Regulations.

(13) For the purpose of this Regulation 13, the definitions set out in Regulation 2(1) of the Wireless Telegraphy (Third Generation and GSM Licence (Amendment) and Interim Licensing) Regulations 2021 (S.I. No. XX of 2021) also apply.”

Interim Licences in the 2.1 GHz Band

Application for the Grant and Form of Interim Licences

5. (1) Application for the grant of a Third Generation 2.1 GHz Band Interim A Licence, a Third Generation 2.1 GHz Band Interim B Licence, a Liberalised 2.1 GHz Band

Interim A Licence or a Liberalised 2.1 GHz Band Interim B Licence, as the case may be, shall be made by the Undertaking to the Commission in writing and in such form as may be determined by the Commission from time to time.

(2) If, at the time of application, the Existing A Licence held by the Undertaking has not been Liberalised by the Commission in accordance with Regulation 13 of the Principal Regulations, the Commission may grant a Third Generation 2.1 GHz Band Interim A Licence following payment by the Undertaking of the relevant fees prescribed in Regulation 9.

(3) If, at the time of application, the Existing B Licence held by the Undertaking has not been Liberalised by the Commission in accordance with Regulation 13 of the Principal Regulations, the Commission may grant a Third Generation 2.1 GHz Band Interim B Licence following payment by the Undertaking of the relevant fees prescribed in Regulation 9.

(4) If, at the time of application, the Existing A Licence held by the Undertaking has been Liberalised by the Commission in accordance with Regulation 13 of the Principal Regulations, the Commission may grant a Liberalised 2.1 GHz Band Interim A Licence following payment by the Undertaking of the relevant fees prescribed in Regulation 9.

(5) If, at the time of application, the Existing B Licence held by the Undertaking has been Liberalised by the Commission in accordance with Regulation 13 of the Principal Regulations, the Commission may grant a Liberalised 2.1 GHz Band Interim B Licence following payment by the Undertaking of the relevant fees prescribed in Regulation 9.

(6) A person who applies for the grant of a Licence shall furnish to the Commission such information as the Commission may reasonably require for the purposes of its functions under these Regulations, the Act of 1926, the Act of 2002, the Framework Regulations or the Authorisation Regulations, and if the person, without reasonable cause, fails to comply with this paragraph, the Commission may refuse to grant the Licence concerned to the person.

(7) A Third Generation 2.1 GHz Band Interim A Licence or a Third Generation 2.1 GHz Band Interim B Licence to which these Regulations apply shall be in the form specified in Schedule 2, with such variation, if any, whether by addition, deletion or alteration as the Commission may determine from time to time or in any particular case in accordance with the Authorisation Regulations.

(8) A Liberalised 2.1 GHz Band Interim A Licence or a Liberalised 2.1 GHz Band Interim B Licence to which these Regulations apply shall be in the form specified in Schedule 3, with such variation, if any, whether by addition, deletion or alteration as the Commission may determine from time to time or in any particular case in accordance with the Authorisation Regulations.

Duration of Licences

6. (1) The commencement date of a Third Generation 2.1 GHz Band Interim A Licence or a Liberalised 2.1 GHz Band Interim A Licence shall be 25 July 2022 or such other date as may be specified by the Commission. Unless it has been withdrawn, or had its duration reduced under Regulation 8, a Third Generation 2.1 GHz Band Interim A Licence or a Liberalised 2.1 GHz Band Interim A Licence to which these Regulations apply shall in any event expire on 15 October 2022.

(2) The commencement date of a Third Generation 2.1 GHz Band Interim B Licence or a Liberalised 2.1 GHz Band Interim B Licence shall be 2 October 2022 or such other date as may be specified by the Commission. Unless it has been withdrawn, or had its duration reduced under Regulation 8, a Third Generation 2.1 GHz Band Interim B Licence or a Liberalised 2.1 GHz Band Interim B Licence to which these Regulations apply shall in any event expire on 15 October 2022.

Conditions of Licences

7. (1) Any Licensee that is granted a Licence under these Regulations and to which these Regulations apply shall:

- (a) ensure that it complies with the geographical and technical conditions contained within Parts 1 to 3 of the Licence;
- (b) ensure that it complies with all those commitments contained within Part 4 of the Licence having been made in the course of a comparative evaluation selection procedure for the Existing A Licence or Existing B Licence as the case may be;
- (c) notify the Commission of its intention to Transfer any rights of use for radio frequencies attaching to a Licence;
- (d) only Transfer the rights of use for radio frequencies attaching to a Licence in accordance with the Transfer Regulations;
- (e) notify the Commission of its intention to Lease any rights of use for radio frequencies attaching to a Licence;
- (f) subject to paragraph (g), only Lease the rights of use for radio frequencies attaching to a Licence in accordance with such procedures as may be specified by the Commission from time to time;
- (g) where the Commission has not yet put in place procedures referred to in paragraph (f) of this Regulation, not, without the prior consent of the Commission, which shall not be unreasonably withheld, Lease any such rights of use attaching to a Licence;

- (h) ensure that if the address of the Licensee changes, the Licensee shall, as soon as possible, notify the Commission in writing of the change; and
- (i) ensure that it complies with any special conditions imposed under section 8 of the Act of 1972.

Enforcement, Amendment, Suspension or Withdrawal

8. (1) Enforcement by the Commission of compliance by a Licensee with conditions attached to its Licence shall be in accordance with the Authorisation Regulations.

(2) The Commission may amend any Licence from time to time in accordance with the Authorisation Regulations.

(3) The Commission may suspend or withdraw a Licence in accordance with the Authorisation Regulations.

Licence Fees

[DRAFTING NOTE: FEES AT (2) AND (3) BELOW TO BE UPDATED TO REFLECT DOCUMENT 20/122 "TO CALCULATE THE OVERALL CPI CHANGE USING THE LATEST CPI DATA AVAILABLE AT THE TIME AT WHICH IT MAKES THE LICENSING REGULATIONS UNDER THE WIRELESS TELEGRAPHY ACT"]

9. (1) Subject to paragraph (4) of this Regulation, the following fees are prescribed in relation to a Third Generation 2.1 GHz Band Interim A Licence, a Third Generation 2.1 GHz Band Interim B Licence, a Liberalised 2.1 GHz Band Interim A Licence and a Liberalised 2.1 GHz Band Interim B Licence.

(2) The fee for a Third Generation 2.1 GHz Band Interim A Licence or a Liberalised 2.1 GHz Band Interim A Licence is €711,553 per 2 x 5 MHz block.

(3) The fee for a Third Generation 2.1 GHz Band Interim B Licence or a Liberalised 2.1 GHz Band Interim B Licence is €118,170 per 2 x 5 MHz block.

(4) The fees specified in paragraphs (2) and (3) of this Regulation shall be paid to the Commission, on a date specified by the Commission, by way of electronic funds transfer, banker's draft or such other means and on such other terms, if any, as the Commission may decide. Where the date of payment falls on a day other than a working day, payment shall be made on or before the last working day before the date on which payment would otherwise have fallen due.

(5) An amount payable by a person in respect of a fee under these Regulations may be recovered by the Commission from the person as a simple contract debt in any court of competent jurisdiction.

(6) If a Licence is restricted or withdrawn, the Licensee shall not be entitled to be repaid any part of the fee paid by the Licensee under these Regulations but shall still be liable to pay any sums (including interest) outstanding.

(7) Where payment is not made in due time, interest shall accrue from the due date until the date on which payment is effected at the prevailing EURIBOR plus five percentage points.

Licensee to satisfy all legal requirements

10. Licences granted pursuant to these Regulations do not grant to the Licensee any right, interest or entitlement other than to keep, have possession of, install, maintain, work and use Third Generation Apparatus or Liberalised Apparatus, as the case may be, at a specified location or locations in the State.

DRAFT

SCHEDULE 1

WIRELESS TELEGRAPHY ACT, 1926

WIRELESS TELEGRAPHY (THIRD GENERATION AND GSM LICENCE) REGULATIONS, 2002, AS AMENDED

Liberalised 2.1 GHz Band Existing Licence

Licence under section 5 of the Act of 1926 to keep and have possession of Liberalised Apparatus for wireless telegraphy for terrestrial systems capable of providing Electronic Communications Services.

The Commission for Communications Regulation, in exercise of the powers conferred on it by section 5 of the Act of 1926, hereby grants the following licence to **[LICENSEE NAME]** of **[LICENSEE ADDRESS]** (“the Licensee”).

The Licensee is hereby authorised to keep and have possession of Liberalised Apparatus for wireless telegraphy for terrestrial systems capable of providing Electronic Communications Services as specified in Part 2 of this Licence, subject to such apparatus being installed, maintained, worked and used in accordance with the terms, conditions and restrictions set out in the Wireless Telegraphy (Third Generation and GSM Licence) Regulations 2002 (S.I No. 345 of 2002) as amended (“the Regulations”), including but not limited to, the following:

- (1) The Licensee shall ensure that it complies with all of the conditions contained within the Regulations, and within Parts 1 to 3 of this Licence; and
- (2) The Licensee shall ensure that it complies with all the commitments contained within Part 4 of the Licence being made in the course of a comparative evaluation selection procedure forming part of the Existing Licence to which this Liberalised 2.1 GHz Band Existing Licence relates.

For the purpose of this Licence, the definitions set out in the Wireless Telegraphy (Third Generation and GSM Licence (Amendment) and Interim Licensing) Regulations 2021 also apply.

This Licence shall come in to effect on **DD/MM/YYYY** (the “Licence Commencement Date”) and, subject to suspension or withdrawal, expires on **DD/MM/YYYY**.

Signed: _____

For and on behalf of the Commission for Communications Regulation

Date of Issue: _____

Part 1

Places at which the Licensee is authorised by this Licence to keep and have possession of Liberalised Apparatus

No.	Site I.D.	Easting	Northing

Part 2

The Liberalised Apparatus for wireless telegraphy to which this Licence applies

No.	Manufacturer	Component	Equipment No.

Part 3

Radio frequency bands in which the Liberalised Apparatus is authorised by this Licence to be used

The following frequency bands may be used for FDD mode operation:

Mobile Transmit	Paired with Base Station Transmit

Use of the frequency bands shall be in compliance with the Decision of 2012.

Part 4

Commitments made in the course of a comparative evaluation selection procedure forming part of the Existing Licence to which this Liberalised 2.1 GHz Band Existing Licence relates

SCHEDULE 2**WIRELESS TELEGRAPHY ACT, 1926****WIRELESS TELEGRAPHY (THIRD GENERATION AND GSM LICENCE
(AMENDMENT) AND INTERIM LICENSING) REGULATIONS 2021**

Third Generation 2.1 GHz Band Interim Licence

Licence under section 5 of the Act of 1926 to keep and have possession of apparatus for wireless telegraphy for terrestrial systems capable of providing Electronic Communications Services.

The Commission for Communications Regulation, in exercise of the powers conferred on it by section 5 of the Act of 1926, hereby grants the following licence to **[LICENSEE NAME]** of **[LICENSEE ADDRESS]** (“the Licensee”).

The Licensee is hereby authorised to keep and have possession of apparatus for wireless telegraphy for terrestrial systems capable of providing Electronic Communications Services as specified in Part 2 of this Licence, subject to such apparatus being installed, maintained, worked and used in accordance with the terms, conditions and restrictions set out in the Wireless Telegraphy (Third Generation and GSM Licence (Amendment) and Interim Licensing) Regulations 2021 (S.I. No. of 2021) (“the Regulations”), including but not limited to, the following:

- (1) The Licensee shall ensure that it complies with all of the conditions contained within the Regulations, and within Parts 1 to 3 of this Licence; and
- (2) The Licensee shall ensure that it complies with all the commitments contained within Part 4 of the Licence being made in the course of a comparative evaluation selection procedure forming part of the Existing Licence to which this Third Generation 2.1 GHz Band Interim Licence relates.

For the purpose of this Licence, the definitions set out in the Wireless Telegraphy (Third Generation and GSM Licence (Amendment) and Interim Licensing) Regulations 2021 apply.

This Licence shall come in to effect on **DD/MM/YYYY** (the “Licence Commencement Date”) and, subject to suspension or withdrawal, expires on **15 October 2022**.

Signed: _____

For and on behalf of the Commission for Communications Regulation

Date of Issue: _____

Part 1

Places at which the Licensee is authorised by this Licence to keep and have possession of Third Generation Apparatus

No.	Site I.D.	Easting	Northing

Part 2

The Third Generation Apparatus for wireless telegraphy to which this Licence applies

No.	Manufacturer	Component	Equipment No.

Part 3

Radio frequency bands in which the Third Generation Apparatus is authorised by this Licence to be used

The following frequency bands may be used for FDD mode operation:

Mobile Transmit	Paired with Base Station Transmit

Use of the frequency bands shall be in compliance with the ERC Decision of 1999.

Part 4

Commitments made in the course of a comparative evaluation selection procedure forming part of the Existing Licence to which this Third Generation 2.1 GHz Band Interim Licence relates

SCHEDULE 3

WIRELESS TELEGRAPHY ACT, 1926

WIRELESS TELEGRAPHY (THIRD GENERATION AND GSM LICENCE (AMENDMENT) AND INTERIM LICENSING) REGULATIONS 2021

Liberalised 2.1 GHz Band Interim Licence

Licence under section 5 of the Act of 1926 to keep and have possession of apparatus for wireless telegraphy for terrestrial systems capable of providing Electronic Communications Services.

The Commission for Communications Regulation, in exercise of the powers conferred on it by section 5 of the Act of 1926, hereby grants the following licence to **[LICENSEE NAME]** of **[LICENSEE ADDRESS]** (“the Licensee”).

The Licensee is hereby authorised to keep and have possession of Liberalised Apparatus for wireless telegraphy for terrestrial systems capable of providing Electronic Communications Services as specified in Part 2 of this Licence, subject to such apparatus being installed, maintained, worked and used in accordance with the terms, conditions and restrictions set out in the Wireless Telegraphy (Third Generation and GSM Licence (Amendment) and Interim Licensing) Regulations 2021 (S.I. No. of 2021) (“the Regulations”), including but not limited to, the following:

- (1) The Licensee shall ensure that it complies with all of the conditions contained within the Regulations, and within Parts 1 to 3 of this Licence; and
- (2) The Licensee shall ensure that it complies with all the commitments contained within Part 4 of the Licence being made in the course of a comparative evaluation selection procedure forming part of the Existing Licence to which this Liberalised 2.1 GHz Band Interim Licence relates.

For the purpose of this Licence, the definitions set out in the Wireless Telegraphy (Third Generation and GSM Licence (Amendment) and Interim Licensing) Regulations 2021 apply.

This Licence shall come in to effect on **DD/MM/YYYY** (the “Licence Commencement Date”) and, subject to suspension or withdrawal, expires on **15 October 2022**.

Signed: _____

For and on behalf of the Commission for Communications Regulation

Date of Issue: _____

Part 1

Places at which the Licensee is authorised by this Licence to keep and have possession of Liberalised Apparatus

No.	Site I.D.	Easting	Northing

Part 2

The Liberalised Apparatus for wireless telegraphy to which this Licence applies

No.	Manufacturer	Component	Equipment No.

Part 3

Radio frequency bands in which the Liberalised Apparatus is authorised by this Licence to be used

The following frequency bands may be used for FDD mode operation:

Mobile Transmit	Paired with Base Station Transmit

Use of the frequency bands shall be in compliance with the Decision of 2012.

Part 4

Commitments made in the course of a comparative evaluation selection procedure forming part of the Existing Licence to which this Liberalised 2.1 GHz Band Interim Licence relates

GIVEN under the official seal of the Commission for Communications Regulation

[DATE] 2021

[NAME of COMMISSIONER]

For and on behalf of the Commission for Communications Regulation

The Minister for the Environment, Climate and Communications, in accordance with section 37 of the Communications Regulation Act, 2002, (as adapted by the Communications, Climate Action and Environment (Alteration of Name of Department and Title of Minister) Order 2020 (S.I. No. 373 of 2020)) consents to the making of the foregoing Regulations.

GIVEN under the Official Seal of the Minister for the Environment, Climate and Communications,

[DATE] 2021

EAMON RYAN

Minister for the Environment, Climate and Communications.

Explanatory Note

(This note is not part of the Instrument and does not purport to be a legal interpretation.) These Regulations prescribe matters in relation to licences for apparatus for wireless telegraphy for terrestrial systems capable of providing Electronic Communications Services in the 2.1 GHz Band.

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Annex: 3 Application Form¹⁶⁹

As part of Phase 1 of the Application Stage, Interested Parties must complete and submit the Phase 1 Application Form set out in Annex 3a. As part of Phase 2 of the Application Stage, Applicants must then complete and submit the Phase 2 Application Form set out in Annex 3b.

Any additional documentation required to be supplied by the Applicant as part of its Application is to be appended to the relevant Phase 1 or Phase 2 Application Form.

See Table 17 of the IM for an outline of the timing for each of these phases.

¹⁶⁹ A writeable PDF format of this form will be made available on the ComReg website.

Annex 3a – Phase 1 Application Form

Part 1: Administrative Information

For an Application to be complete, the administrative information listed in Table A3.1 below and the statement of intent regarding the submission of the Phase 2 Application Form must be provided.

Appropriate evidence of the authorisation of Authorised Agent(s), as per Section 3.3.2 paragraph 3.57 of the IM, must also be attached hereto.

Note that the Applicant name provided will be that to whom Licence/s will be awarded where relevant. Contact details for Authorised Agents are those that will be used by ComReg for circulating Bidder Materials for the Award Process and for contacting the Bidder during the Award Process if necessary. As discussed below, some details will also be used for two-factor authentication for electronic signatures.

Table A3.1: Administrative information

Information required	Information provided
Name of Applicant*	Name:
Complete postal address of registered office or, if it does not have a registered office, the principal place where it carries on business	Address 1:
Telephone number for Applicant	Telephone:
Bank details of Applicant (for the purpose of returning part or all of the Applicant's Deposit where applicable)	Name of bank and address of relevant branch:
	Account Number:

Information required	Information provided
	Sort Code: BIC Code: IBAN No:
Name of Applicant's Authorised Agent 1** (Block capitals)	Name:
Position of Applicant's Authorised Agent 1	Position:
Telephone numbers and e- mail address of Applicant's Authorised Agent 1****	Telephone (fixed): Telephone (mobile): Email: [Telephone (Mobile) and email to be used for two-factor authentication for electronic signatures]
Specimen signature of Applicant's Authorised Agent 1 Witnessed By:	Signature 1: Name: Position: Signature:
Name of Applicant's Authorised Agent 2*** (Block capitals)	Name:

Information required	Information provided
Position of Applicant's Authorised Agent 2	Position:
Telephone numbers and e-mail address of Applicant's Authorised Agent 2****	Telephone (fixed): Telephone (mobile): Email: [Telephone (Mobile) and email to be used for two-factor authentication for electronic signatures]
Specimen signature of Applicant's Authorised Agent 2 Witnessed By:	Signature: Name: Position: Signature:

* Note: In the case of Applicants that are bodies corporate, attach a certified copy of Certificate of Registration along with the constitution of the company or equivalent together with a certified translation thereof into English or Irish, where the original is not in English or Irish. The Company Secretary or other authorised signatory is required to certify the copy.

** Note: Authorised Agents must be authorised to bind the Bidder and to take all decisions or communicate all decisions connected with the Auction on the Bidder's behalf including, but not limited to, the authority to submit Bids (including the Initial Bid Form) in respect of any of the Lots available in the Award Process and to commit to payment of the necessary amount if the Bidder is granted a Licence as a result of the outcome of the Award Process. The same applies with respect to Authorised Agent 2 where one is appointed (see Note below).

*** Note: Applicants can authorise another person (i.e. Authorised Agent 2) to act as an alternative Authorised Agent in case of unavailability of the primary Authorised Agent (i.e. Authorised Agent 1). In case of any duplication of documentation submitted (this would not include documentation requested by ComReg, or where an Applicant is updating or replacing its Application in accordance with this IM) on behalf of the Bidder by different Authorised Agents, the documentation submitted by Authorised Agent 1 would be considered as final and binding.

**** Note: Any two-factor authentication must use the mobile phone number and email address of the relevant Authorised Agent set out in this Table A3.1 (but this does not preclude further appropriate electronic security measures that the Applicant may also use). Applicants should ensure that this can be complied with at the time of electronic signature.

Statement of intent regarding the submission of Phase 2 Application Documentation

(Please state YES/NO in boxes as appropriate)

Hardcopies of the Phase 2 Application Form will be submitted to ComReg

OR

Electronic copies of Phase 2 Application Documentation with the electronic signature of an Authorised Agent (in accordance with the Award Rules) will be submitted to ComReg. If so, please complete the following:

- Name of the secure reputable third party electronic signature platform that will be used:

- Confirmation which type of electronic signature will be used and details of same (e.g. advanced electronic signature, qualified electronic signature, simple or basic electronic signature with at a minimum of two factor authentication). Note that two-factor authentication must use the mobile phone number and email address of the relevant Authorised Agent set out in this Table A3.1 (but this does not preclude further appropriate electronic security measures that the Applicant may also use):

Part 2: Applicant Declaration

The terms “Award Rules”, “Associated Bidders”, “Applicant”, “Bidding Group”, “Connected Person”, “Confidential Information” and “Insider” for the purposes of this declaration shall be construed as defined in the Information Memorandum.

We, the undersigned, being Authorised Agents of [_____]
(the “**Applicant**”) hereby undertake, warrant, acknowledge and declare, and to the extent that anything contemplated hereunder remains to be done, covenant, both on our own behalf and on behalf of the Applicant, having made all reasonable inquiries that:

1. The Applicant is entitled to submit the Application and participate in the Award Process, and the Applicant has obtained all necessary declarations of consent, permissions and approvals, whereas we, as Authorised Agent(s), are authorised to bind the Applicant and to take all decisions or communicate all decisions connected with the Auction on the Applicant’s behalf including, but not limited to, the authority to submit Bids (including the Initial Bid Form) in respect of any of the Lots available in the Award Process and to commit to payment of the necessary amount if the Applicant is granted a Licence as a result of the outcome of the Award Process.
2. The Applicant has ensured and will ensure that all information and all declarations contained in the Application and appendices attached thereto are correct and accurate.
3. The Applicant has and will ensure that, until public announcement by ComReg on the outcome of the Award Process, the Applicant discloses Confidential Information only to the extent necessary and then, save as expressly permitted by the Information Memorandum, only to other parties within the Applicant's own Bidding Group or to persons who, prior to such disclosure, are Insiders in relation to the same Applicant and that the Applicant shall take all reasonable measures with a view to ensuring that the person who receives such Confidential Information treats it as confidential at all times until public announcement by ComReg on the outcome of the Award Process.
4. The Applicant has ensured and will ensure that the Applicant, the Applicant's employees, board of directors (where Applicant is a body corporate) and persons connected with the Applicant or Insiders refrain from disclosing Confidential Information to parties other than as specified in paragraph 3 above and from exchanging Confidential Information with other parties regarding the Applicant’s strategy for obtaining and use of the Licence or Licences until public announcement by ComReg on the outcome of the Award

Process.

5. Save as expressly permitted by the Information Memorandum, the Applicant will ensure that the Applicant, the Applicant's employees, any Connected Persons and any Insiders - shall refrain from entering into agreements or negotiations with a view to entering into agreements with other Interested Parties or their Connected Persons in relation to matters concerning the Award Process, including without prejudice to the generality of the foregoing, agreements relating to spectrum, network or infrastructure sharing, from the time at which this Application is submitted until the public announcement on the outcome of the Award Process by ComReg.
6. The Applicant has ensured and will ensure that the Applicant - and, to the best knowledge of the Applicant, the Applicant's employees, any Connected Persons and any Insiders - neither prior to the submission of the Application, nor after the submission thereof and until the public announcement on the outcome of the Award Process by ComReg, shall enter into agreements or establish any understanding with a provider of equipment or software which:
 - regulates such provider's possibility of supplying equipment or software to another Applicant or their Connected Persons concerning the planning, establishment or operation of a network using the frequencies dealt with in this Award Process, or
 - regulates the prices or other terms and conditions that a provider of equipment or software may offer another Applicant or their Connected Persons in connection with the planning, establishment or operation of a network using the frequencies dealt with in this Award Process.

The Applicant has ensured that agreements already entered into or understandings already established, as mentioned in this paragraph 6, have been terminated, and to the best knowledge of the Applicant, any Connected Persons and any Insider have ensured that any such agreements or understandings have been terminated.

7. The Applicant has ensured and will ensure that the Applicant - and, to the best knowledge of the Applicant, the Applicant's employees, any Connected Persons and any Insider - does not enter into agreements or establish any understanding with a third party, either prior to or during the Award Process, for the access to or the use of the Applicant's network or networks using the frequencies dealt with in this Award Process, if the agreement or the understanding directs such third party not to participate or limits such third party's ability to participate in the Award Process.

8. The Applicant has ensured that agreements already entered into or understandings already established, as mentioned in paragraph 7, have been terminated, including to the best knowledge of the Applicant, any Connected Persons and any Insider have ensured such agreements or understandings have been terminated.
9. The Applicant has ensured and will ensure that the Applicant – and, to the best knowledge of the Applicant, the Applicant's employees, any Connected Persons and any Insiders – both prior to and after the submission of an Application and until the public announcement on the outcome of the Award Process by ComReg, refrains from any action that could have an adverse effect on the Award Process.
10. The Applicant shall comply with the Award Rules as contained in the Information Memorandum as well as the provisions of Chapter 5 of the Information Memorandum at all times and shall procure that its personnel, Insiders and Connected Persons, to the extent appropriate, shall also comply with the Award Rules and the provisions of Chapter 5 of the Information Memorandum from the date of publication of the Information Memorandum until the commencement of the Licences.
11. The Applicant has ensured and will ensure that, prior to the submission of its Application, it has taken all reasonable measures with a view to identifying its Connected Persons and Associated Bidders.
12. The Applicant will ensure that, in accordance with Section 3.3 of the Information Memorandum, after submitting its Application all material changes to its ownership structure are notified to ComReg.
13. Save as disclosed in an appendix attached to this Declaration, the Applicant (i) is not, or, in case the Applicant is a partnership, a joint venture or equivalent, each of the relevant partners or participants is not and is not expected to be subject to an insolvency process including, without prejudice to the generality of the foregoing, liquidation, examinership, receivership, bankruptcy, winding-up proceedings or equivalent proceedings in other jurisdictions and (ii) is capable of paying its debts as they fall due.
14. Save as disclosed in an appendix attached to this Declaration, the Applicant is not, or, in case the Applicant is a partnership, a joint venture or equivalent, each of the relevant partners or participants is not and is not expected to be involved in any disputes which may in any material and adverse way affect the Applicant's possibility of complying with the terms of any Licence, if the Applicant is awarded such Licence.

15. Any disclosure made under paragraph 13 and/or paragraph 14 above will contain sufficiently clear and detailed information to allow ComReg to assess the Applicant's capacity to participate in the Award Process, to comply with the Award Rules and the provisions of Chapter 5 of the Information Memorandum and to comply with the terms of any Licence. ComReg's decision further to any assessment in this respect shall be final and that ComReg reserves the right to, where necessary and proportionate, seek further information or clarification from an Applicant, to specify the level of detail required and the timescales within which it must be provided. Any failure to cooperate fully with this disclosure requirement may result in an Applicant's Application being deemed invalid or in subsequent disqualification of the Applicant from the Award Process.
16. Even if an Applicant is unsuccessful in becoming a Bidder or withdraws its Application, it remains bound by the Award Rules and the provisions of Chapter 5 of the Information Memorandum, including those on confidentiality and Bidder behaviour, until a public announcement on the outcome of the Award Process is made by ComReg.
17. The Applicant will take part and be bound by any Transition Plan that may be defined by ComReg with regard to the Award Spectrum.
18. This Declaration is without prejudice to the Applicant's legal obligations more generally, including those relating to any duty of confidence and its obligations under competition law.
19. That, if the Applicant indicates on its Phase 1 Application Form that it intends to use electronic signatures as part of the Award Process, it and each Authorised Agent:
 - consents to the use of electronic signatures;
 - is authorised and has the requisite capacity to use electronic signatures;
 - will be bound by the said electronic signature(s); and
 - will use electronic signatures in accordance with the terms of the Award Rules and the Information Memorandum.

Applicant Name: _____

For and on behalf of the Applicant (**Authorised Agent 1**):

Name in block capitals: _____

Date (DD/MM/YYYY):

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Where the Applicant has authorised a second person to act as Authorised Agent:-

Applicant Name: _____

For and on behalf of the Applicant (**Authorised Agent 2**):

Name in block capitals: _____

Date (DD/MM/YYYY):

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If the Applicant is a partnership, a joint venture or equivalent, the Declaration must also be signed by each of the relevant partners or participants:

As partner/participant:

(Signature)

Name in block capitals: _____

Date (DD/MM/YYYY):

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Phase 1 Application Documentation Checklist

Tick the boxes to ensure that all the required information is included in your Phase 1 Application Documentation. Completed Phase 1 Application Documentation must consist of the following:

Part 1: Original Administrative Information - All sections of Table A3.1 completed and signed.

Part 1: Original Administrative Information - All sections of Table A3.1 completed and signed.

- Appropriate evidence for authorisation of Authorised Agents as specified in paragraph 3.57 and, if applicable, of the Information Memorandum
- An Ownership Structure Document and accompanying document in accordance with paragraphs 3.61 and 3.62 of the Information Memorandum

Indication as to whether the Applicant will submit the Phase 2 Application Form in hardcopy or electronically with electronic signature.

Part 2: Original Applicant Declaration signed

Note that, for an Application to be considered complete, five identical paper copies of the above documents should be provided. The original version of these documents should be identified as such.

Phase 1 Application Procedure

Further to Section 3.3.2 above, Phase 1 Application Documentation consists of:

- a completed and signed Phase 1 Application Form (Annex 3a of this document);
- an Ownership Structure Document along with appropriate certification in relation to same in accordance with paragraphs 3.61 and 3.62 of the IM;
- appropriate evidence in respect of Authorised Agents in accordance with paragraph 3.57 of the IM; and
- a statement of whether an Applicant will submit its Phase 2 Application Documentation:
 - electronically with electronic signature/s¹⁷⁰; or
 - in hardcopy, in a similar way as for the Phase 1 Application Documentation.

An Interested Party must submit five identical paper copies of each of the above documents. The original documents should be identified as such.

The container(s) in which the above paper documentation are submitted must not in any way disclose the identity of the Interested Party.

ComReg will only accept Phase 1 Application Documentation submitted between **09.00 hours and 17.30 hours** (Irish time) on any of the following Working Days:

- **Monday 14 June 2021;**
- **Tuesday 15 June 2021**
- **Wednesday 16 June 2021;**
- **Thursday 17 June 2021; and**
- **Friday 18 June 2021.**

Interested Parties must make appointments with ComReg to submit their Phase 1 Application Documentation. To make an appointment for submission of Phase 1 Application Documentation, an Interested Party must contact **Mr Joseph**

¹⁷⁰ Details of what constitutes an electronic signature is set out in paragraphs 3.33 – 3.42 above, details of the dedicated file portal to send the documents electronically will be given to Applicants at the time of the submission of Phase 1 Application Documentation.

Coughlan or Mr. Patrick Bolton by telephone between **10:00 to 13:00 and 14:00 to 16:00 hours (Irish time)** on Working Days between **Thursday 2 June 2021 and Thursday 17 June 2021** inclusive.

The number for telephoning Mr. Coughlan or Mr. Bolton is: **+353 (0)1 804 9761**. ComReg will record all phone calls made or received during the Award Process in order to manage technical issues and risks arising, and to ensure the integrity and administrative efficiency of the Award Process. These recordings, which shall be stored securely, shall be retained and used only for these purposes. In the event of a dispute arising ComReg may seek to rely on the contents of these recordings.

All submitted application documents will be date and time stamped upon being received by ComReg. Once Phase 1 Application Documentation is received by ComReg, the Interested Party is deemed to be an Applicant.

Each Applicant will be given a receipt acknowledging the submission of its Phase 1 Application Documentation.

Only in exceptional circumstances outside the control of the Applicant will Phase 1 Application Documentation be accepted after 17:30 hours on the Phase 1 Application Date and this will be at ComReg's discretion.

Submission of a second or subsequent Application documents during phase 1 of the Application Stage

Phase 1 Application Documentation can be replaced at any time up to 17.30 hours (Irish time) on the Phase 1 Application Date, Friday 18 June 2021.

In the event that an Applicant submits more than one version of Phase 1 Application Documentation prior to 17:30 hours on the Phase 1 Application Date, only the latest Phase 1 Application Documentation received from that Applicant will be taken into consideration.

On the submission of second or subsequent Phase 1 Application Documentation prior to the Phase 1 Application Date then the Applicant must return the receipt for the prior Phase 1 Application Documentation to ComReg. This receipt will be endorsed to indicate that the earlier Phase 1 Application Documentation has been superseded and will not be evaluated. Any superseded Phase 1 Application Documentation will not be returned and will be securely destroyed.

No Phase 1 Application Documentation will be opened by ComReg before 17:30 hours on **Friday 18 June 2021** (the Phase 1 Application Date). All Applications

will be opened at the same time and place and in the presence of an independent auditor.

At the time of submission of Phase 1 Application Documentation, ComReg will provide each Applicant with details on how ComReg will securely communicate with the Applicant. ComReg aims to make use of an electronic means as much as possible to facilitate the process after the Phase 1 Application Date.

Should ComReg determine that additional information is required from an Applicant regarding its Phase 1 Application Documentation, it will instruct the Applicant on the process for providing same.

Annex 3 b – Phase 2 Application Form

Part 3: Initial Bid Form

The submission of this Initial Bid Form as part of a complete Application represents a binding offer to pay the SAF and annual SUFs linked to each of the Lots specified herein in exchange for a Licence for those Lots. The Initial Bid Form, including Lots in all Lot Categories, Reserve Prices and associated Eligibility Points are presented in Tables A3.3 and A3.4 below. Note that, for an Initial Bid Form to be valid, it must:

- adhere to the Award Rules on Competition Caps; and
- be accompanied by a Deposit of an amount no lower than the sum of the Reserve Prices of Lots requested by the Applicant in Tables A3.3 and A3.4 below.

All Deposits are to be paid into ComReg's Nominated Bank Account by the deadline of **23:59 hours (Irish time) on Friday 6 August 2021**. The details of ComReg's Nominated Bank Account are as follows:

Bank of Ireland, 2 College Green, Dublin 2, Ireland.

Account Number: 96614639

Sort Code: 90-00-17

BIC Code: BOFIIIE2D

IBAN No: IE96 BOFI 9000 1796 6146 39

If making a bank transfer/EFT, please ensure that:

- Reference is "MBSA2 Award"; and
- Your Bank quotes your ComReg account number (if an existing ComReg account holder) in making the transfer to ComReg.

Table A3.2. Summary Information

Information Required	Information Provided
Applicant Name:	
Total number of Lots applied for:	
Total amount of Deposit:	

Table A3.3: Frequency specific A-Lots available in the Award Process

Lot Category	Frequency range	Duration ¹⁷¹	Time Slice	Lots available	Lot size	Reserve Price per Lot (€)	Annual SUF per Lot before CPI Adjustment(€)	Eligibility Points/ Lot	Number of Lots applied for per Lot Category
A2.3/1	2390 – 2400 MHz unpaired	14/02/2022 to 11/03/2027	1	1	10 MHz	197,000	52,575	2	
A2.3/2	2390 – 2400 MHz unpaired	12/03/2027 to 13/02/2042	2	1	10 MHz	285,000	52,575	2	
A2.6TL/1	2570 – 2575 MHz unpaired	14/02/2022 to 11/03/2027	1	1	5 MHz	25,000	5,000	1	
A2.6TL/2	2570 – 2575 MHz unpaired	12/03/2027 to 13/02/2042	2	1	5 MHz	35,000	5,000	1	
A2.6TU/1	2615 – 2620 MHz unpaired	14/02/2022 to 11/03/2027	1	1	5 MHz	25,000	5,000	1	
A2.6TU/2	2615 – 2620 MHz unpaired	12/03/2027 to 13/02/2042	2	1	5 MHz	35,000	5,000	1	

¹⁷¹ As detailed in Section 2.3.3 of the Information Memorandum, the commencement date of 14 February 2022 for Lots in Time Slice 1 may be adjusted by ComReg.

Table A3.4: Frequency generic B-Lots available in the Award Process

Lot Category	Frequency range	Duration ¹⁷²	Time Slice	Number of Lots	Lot size	Reserve Price per Lot (€)	Annual SUF per Lot before CPI Adjustment (€)	Eligibility Points/Lot	Number of Lots applied for per Lot Category
B700	703 – 733 MHz paired with 758- 788 MHz	14/02/2022 to 13/02/2042	1 & 2	6	2 x 5 MHz	9,158,000	998,931	4	
B2.1/1	1920 – 1980 MHz paired with 2110 – 2170 MHz ¹⁷³	16/10/2022 to 11/03/2027	1	9	2 x 5 MHz	1,398,000	525,753	2	
B2.1/2	1920 – 1980 MHz paired with 2110 – 2170 MHz	12/03/2027 to 13/02/2042	2	12	2 x 5 MHz	3,188,000	525,753	2	
B2.3/1	2300 – 2390 MHz unpaired	14/02/2022 to 11/03/2027	1	18	5 MHz	163,000	52,575	1	
B2.3/2	2300 – 2390 MHz unpaired	12/03/2027 to 13/02/2042	2	18	5 MHz	319,000	52,575	1	

¹⁷² Note that, as discussed in Section 2.3.3, the commencement date of 14 February 2022 for Lots in Time Slice 1 may be adjusted by ComReg.

¹⁷³ This does not include the three lots currently assigned to Eir.

Lot Category	Frequency range	Duration ¹⁷²	Time Slice	Number of Lots	Lot size	Reserve Price per Lot (€)	Annual SUF per Lot before CPI Adjustment (€)	Eligibility Points/Lot	Number of Lots applied for per Lot Category
B2.6F/1	2500 – 2570 MHz paired with 2620 – 2690 MHz	14/02/2022 to 11/03/2027	1	14	2 × 5 MHz	326,000	105,151	2	
B2.6F/2	2500 – 2570 MHz paired with 2620 – 2690 MHz	12/03/2027 to 13/02/2042	2	14	2 × 5 MHz	638,000	105,151	2	
B2.6T/1	2575 – 2615 MHz unpaired	14/02/2022 to 11/03/2027	1	8	5 MHz	163,000	52,575	1	
B2.6T/2	2575 – 2615 MHz unpaired	12/03/2027 to 13/02/2042	2	8	5 MHz	319,000	52,575	1	

Applicant Name: _____

(Signature of Authorised Agent): _____

Name in block capitals: _____

Date (DD/MM/YYYY):

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Phase 2 Application Documentation Checklist

Tick the boxes to ensure that all the required information is included in your Phase 2 Application. A complete Phase 2 Application must consist of the following:

Part 3: Original Initial Bid Form completed and signed in accordance with the Award Rules

An updated list of Insiders (if applicable)

Each document which is electronically signed must be accompanied by a document, or equivalent confirmation, which reflects the verifiable electronic audit trail for the electronic signature. This is sometimes referred to as a certificate of completion (or equivalent) by commonly used electronic signature platforms and demonstrates how and when the electronic signature process for the relevant document was undertaken.

Note that, for a hardcopy paper Application to be considered complete, five identical hardcopy paper copies of the above documents should also be provided with the Application. The original version of the paper Application Form should be identified as such.

Phase 2 Application Procedure

As per Section 3.3.2 above, Phase 2 Application Documentation consists of:

- completed and signed Phase 2 Application Form;
- a corresponding monetary Deposit; and
- if required, updated Phase 1 Application Documentation¹⁷⁴.

ComReg will only accept **Phase 2 Application Documentation** submitted before **17:30 hours** (Irish time) on the Phase 2 Application Date¹⁷⁵. This applies where documents are submitted electronically with electronic signature and/or in hardcopy.

Only in exceptional circumstances outside the control of the Applicant will Phase 2 Application Documentation received after 17:30 hours on the Phase 2 Application Date be accepted and this will be at ComReg's discretion.

ComReg reserves the right to reject any documents submitted after this deadline and, in submitting Phase 1 Application Documentation, Applicants acknowledge and accept same.

Electronic submission

Where an Applicant has chosen to submit Phase 2 Application Documentation electronically with electronic signature (see Section 3.3.2 above in that regard), it must make its submission using the secure file transfer protocol as will be shared with the Applicant on the submission of its Phase 1 Application Documentation. Phase 2 Application Documentation submitted by any other means (including by email, fax, post or hand delivery) will not be accepted (save in circumstances where the Applicant has obtained ComReg's express prior written consent).

Applicants should familiarise themselves with the operation of the secure file transfer protocol and should ensure that they give themselves sufficient time to upload all required documentation by 17:30 hours on the Phase 2 Application Date, bearing in mind that upload speeds vary. It is not advisable to wait until the last moment to upload documents in case of connection difficulties, slow upload speed or other technical problems. It is the responsibility of Applicants to ensure that their Phase 2 Application Documentation are submitted to and reach

¹⁷⁴ Note that as per paragraph 3.68 any updated Phase 1 Application Documentation will need to be submitted in hardcopy in person, consistent with the Phase 1 Application Form process.

¹⁷⁵ Interested Parties are reminded that these dates are subject to the outcome of an appeal of Decision D11/20.

ComReg on time and ComReg bears no responsibility in this regard.

Similarly, ComReg is not responsible for corruption in documents. Applicants must ensure that documents are not corrupt or otherwise illegible or inaccessible. All Phase 2 Application Documentation submitted must be compiled such that they can be downloaded and read immediately using PDF or Microsoft Office format readers.

On the submission of a second or subsequent Phase 2 Application Documentation prior to the Phase 2 Application Date, the Applicant must, as part of submission of same, confirm that the earlier Phase 2 Application Documentation have been superseded. ComReg will not evaluate any such superseded Phase 2 Application Documentation.

Submission of documents in hardcopy

Where an Applicant chooses (as required to be indicated on its Phase 1 Application Form) not to submit Phase 2 Application Documentation electronically, then the same process as per the Phase 1 Application Form applies. In particular, the Applicant must make an appointment with ComReg to submit same. To make an appointment for submission of Phase 2 Application Documentation, an Applicant must contact **Mr Joseph Coughlan or Mr. Patrick Bolton** by telephone between **10:00 to 13:00 and 14:00 to 16:00 hours (Irish time)** on Working Days between **Thursday 29 July and Thursday 5 August 2021**.

The number for telephoning Mr. Coughlan or Mr. Bolton is: **+353 (0)1 804 9761**. ComReg will record all phone calls made or received during the Award Process in order to manage technical issues and risks arising, and to ensure the integrity and administrative efficiency of the Award Process. These recordings, which shall be stored securely, shall be retained and used only for these purposes. In the event of a dispute arising ComReg may seek to rely on the contents of these recordings.

All submitted Application documents will be date and time stamped upon being received by ComReg.

An Applicant must submit five identical paper copies of each of the above documents. The original documents should be identified as such.

The container(s) in which the above paper documentation are submitted must not in any way disclose the identity of the Applicant.

Submission of a second or subsequent Application documents during phase 2 of the Application Stage

Phase 2 Application Documentation can be replaced at any time up to 17:30 hours (Irish time) on the Phase 2 Application Date, **Friday 6 August 2021**. In the event that an Applicant submits more than one version of Phase 2 Application Documentation prior to 17:30 hours on the Phase 2 Application Date, only the latest Phase 2 Application Documentation received from that Applicant will be taken into consideration.

Where an Applicant has chosen to submit its initial Phase 2 Application Form in hardcopy, it must do so again for any second or subsequent Phase 2 Application Documentation submitted prior to the Phase 2 Application Date. On doing so, the Applicant must return the receipt for the prior Phase 2 Application Documents to ComReg. This receipt will be endorsed to indicate that the earlier Phase 2 Application Documentation has been superseded and will not be evaluated. However, any superseded Phase 2 Application Documentation will not be returned and will be securely destroyed.

If an Applicant has opted to submit its initial Phase 2 Application Form electronically using electronic signatures, if and when submitting any second or subsequent Phase 2 Application Documentation it must confirm that the earlier Phase 2 Application Documentation have been superseded. ComReg will not evaluate any such superseded Phase 2 Application Documentation.

No Phase 2 Application Documentation will be opened by ComReg before 17:30 hours on the Phase 2 Application Date. All Phase 2 Application documents will be opened at the same time and place and in the presence of an independent auditor.

The deadline for receipt of all Deposits, in cleared funds, will be **23:59 hours (Irish time)** on the Phase 2 Application Date.

As noted at Section 3.3.1 above, ComReg will facilitate the submission of questions regarding the Award Process prior to the Phase 1 Application Date and Phase 2 Application Date. Following the latter date, and onwards through to the conclusion of the Notification and Grant Stage, no questions will be accepted from Applicants or Interested Parties, save for those that would qualify as permitted communications of the type set out in Section 4.1.4 of this document (Communicating with ComReg) and save for those communications and responses which are specifically requested by ComReg or its agents in accordance with the IM.

Annex: 4 Rollout and Coverage – Specific Locations

Business and Technology Parks

A 4.1 IDA Ireland provides a list of 31 Business and Technology Parks and 9 Strategic Sites these locations are used to identify the locations of business and technology parks. The obligation thus includes adjacent business and technology parks to those of IDA Ireland.

A 4.2 Table A4.1 below contains a list of the IDA Ireland Business and Technology Parks and strategic sites. However the coverage obligation also applies to the outdoor areas around buildings, and adjacent carpark and thoroughfares within, as well as adjacent to IDA Ireland Business and Technology Parks and Strategic Sites, where large green areas of no development have been removed.

Table A4.1: IDA Ireland Business and Technology Parks

Business and Technology Parks	Location	Business and Technology Parks	Location
IDA Ireland Business and Technology Park			
1. Dublin/East - College Park Dublin	College Park, Dublin	17. South East - Clonmel Business & Technology Park	Ballingarrane, Clonmel, Tipperary
2. Dublin/East - Grange Castle Business Park	Grange Castle, Dublin	18. South East - Dungarvan Business & Technology Park	Lisfennel, Dungarvan, Waterford
3. Mid East - Arklow Business & Technology Park	Ballynattin, Arklow, Wicklow	19. South East - Kilkenny Business & Technology Park	Loughboy, Kilkenny
4. Mid East - Navan Business & Technology Park	Athlumney, Navan, Meath	20. South East - Waterford Business & Technology Park, Butlerstown	Butlerstown, Waterford
5. Mid West - National Technology Park (NTP), Limerick	Plassey, Limerick	21. South East - Wexford Business & Technology Park	Sinnottstown, Wexford
6. Midlands - Athlone Business & Technology Park	Dublin Road, Athlone, Westmeath	22. South West - Carrigtwohill Business & Technology Park	Carrigtwohill, Cork
7. Midlands - Mullingar Business & Technology Park	Ardmore, Mullingar, Westmeath	23. South West - Cork Business & Technology Park	Model Farm Road, Cork
8. Midlands - Portlaoise Business & Technology Park	Mountrath Road, Portlaoise, Laois	24. South West - Fermoy Business & Technology Park	Fermoy, Cork
9. Midlands - Tullamore Business & Technology Park	Srah, Tullamore, Offaly	25. South West - Kerry Business & Technology Park	Tralee, Kerry

Business and Technology Parks	Location	Business and Technology Parks	Location
10. North East - Cavan Business & Technology Park	Killygarry, Cavan	26. South West - Kilbarry Business & Technology Park	Kilbarry, Cork
11. North East - Drogheda Business & Technology Park	Donore Road, Drogheda, Louth	27. West - Ballinasloe Business & Technology Park	Roscommon Road, Ballinasloe, Galway
12. North East - Dundalk Business & Technology Park	Finnabair, Dundalk, Louth	28. West - Castlebar Business & Technology Park	Drumconlan, Castlebar, Mayo
13. North East - Monaghan Business & Technology Park	Knockaconny Monaghan	29. West - Galway Business & Technology Park	Parkmore, Galway
14. North West - Carrick on Shannon Business & Technology Park	Keenaghan, Carrick-on-Shannon, Leitrim	30. West - Roscommon Business & Technology Park	Gallowstown, Roscommon
15. North West - Letterkenny Business & Technology Park	Lisnennan, Letterkenny, Donegal	31. West - Tuam Business & Technology Park	Dunmore Road, Tuam, Galway
16. North West - Sligo Business & Technology Park	Finisklin, Sligo		
IDA Ireland Strategic Site			
1. Mid East - Strategic Site Greystones	Charlesland, Greystones, Wicklow	6. South West - Strategic Site Carrigtwohill	Ballyadam, Carrigtwohill, Cork
2. Mid West - Strategic Site on the National Technology Park, Limerick	Plassey, Limerick	7. South West - Strategic Site Ringaskiddy, County Cork	Ringaskiddy, Cork
3. Mid West - Strategic Site, Raheen Business Park, Limerick	Raheen Business Park, Limerick	8. West - Strategic Site Athenry	Athenry, Galway
4. North East - Strategic Site Dundalk - Dundalk Science & Technology Park	Mullagharlin, Dundalk, Louth	9. West - Strategic Site Oranmore	Oranmore, Galway
5. South East - Strategic Site, Belview, Co. Kilkenny	Belview, Waterford Port, Kilkenny/Waterford		

Source: IDA Ireland November 2019, <https://www.idaireland.com/how-we-help/property>.

Hospitals

A 4.3 Table A4.2 below contains a list of public and private hospitals obtained from the Health Service Executive. Where a hospital is located in more than one location, the coverage obligations apply to each of these locations.

A 4.4 The coverage obligations apply to the hospital's buildings, adjacent car parks and key thoroughfares.

Table A4.2: Public and Private Hospitals

Hospitals	Location	Hospitals	Location
Public Hospital			
1. Bantry General Hospital	Cork	25. National Maternity Hospitals, Holles Street	Dublin
2. Beaumont Hospital	Dublin	26. Nenagh Hospital: UL Hospitals	Tipperary
3. Cappagh National Orthopaedic Hospital	Dublin	27. Our Lady Of Lourdes Hospital, Drogheda	Louth
4. Cavan Monaghan Hospital	Cavan, Monaghan	28. Our Lady's Hospital, Navan	Meath
5. Children's University Hospital, Temple Street	Dublin	29. Our Lady's Children's Hospital Crumlin	Dublin
6. Connolly Hospital Blanchardstown	Dublin	30. Portiuncula Hospital, Ballinasloe	Galway
7. Coombe Women's Hospital	Dublin	31. Roscommon County Hospital	Roscommon
8. Cork University Hospital	Cork	32. Rotunda Hospital	Dublin
9. Cork University Maternity Hospital	Cork	33. Royal Victoria Eye & Ear Hospital, Dublin	Dublin
10. Croom Hospital: UL Hospitals	Limerick	34. Sligo General Hospital	Sligo
11. Ennis Hospital: UL Hospitals	Clare	35. South Infirmery-Victoria Hospital, Cork	Cork
12. Galway University Hospitals	Galway	36. South Tipperary General Hospital	Tipperary
13. Kerry General Hospital	Kerry	37. St Columcille's Hospital, Loughlinstown	Dublin
14. Letterkenny University Hospital	Donegal	38. St James's Hospital	Dublin
15. Lourdes Orthopaedic Hospital, Kilcreene	Kilkenny	39. St John's Hospital Limerick	Limerick
16. Louth County Hospital, Dundalk	Louth	40. St Luke's General Hospital Carlow / Kilkenny	Kilkenny
17. Mallow General	Cork	41. St Luke's Hospital, Rathgar (Cancer Services)	Dublin
18. Mater Misericordiae University Hospital	Dublin	42. St Michael's, Dun Laoghaire	Dublin
19. Mayo General Hospital	Mayo	43. St Vincent's University Hospital, Elm Park	Dublin
20. Mercy University Hospital, Cork	Cork	44. Tallaght Hospital	Dublin
21. Midland Regional Hospital Mullingar	Westmeath	45. University Hospital Limerick	Limerick
22. Midland Regional Hospital Portlaoise	Laois	46. University Maternity Hospital: UL Hospitals	Limerick

Hospitals		Hospitals		Location	
Hospitals		Location		Hospitals	Location
23. Midland Regional Hospital Tullamore		Offaly		47. University Hospital Waterford	Waterford
24. Naas General Hospital		Kildare		48. Wexford General Hospital	Wexford
Private Hospital					
1. Aut Even Hospital		Kilkenny		10. Mount Carmel Hospital	Dublin
2. Barringtons Hospital		Limerick		11. Mater Private Hospital	Dublin, Cork
3. Beacon Hospital		Dublin		12. St. Joseph's Hospital	Sligo
4. Blackrock Clinic		Dublin		13. St John of God Hospital	Dublin
5. Bon Secours Health System		Cork, Dublin, Galway, Kerry		14. St Patrick's University Hospital	Dublin
6. Clane General Hospital		Kildare		15. St Vincent's Private Hospital	Dublin
7. Galway Clinic		Galway		16. Sports Surgery Clinic	Dublin
8. Hermitage Medical Centre		Dublin		17. Whitfield Clinic	Waterford
9. Highfield Healthcare		Dublin			

Source: HSE, <https://www.hse.ie/eng/services/list/3/acutehospitals/hospitals/hospitallist.html>, <https://www.hse.ie/eng/services/list/1/schemes/cbd/acchealthcareireland/>.

Higher Education Campuses

A 4.5 Table A4.3 below contains a list of higher education institutions encompassing: universities, institutes of technology and other colleges as identified by the Higher Education Authority. Where an institution is located in more than one location, the coverage obligations apply to each of these locations.

A 4.6 The coverage obligations apply to the institution's buildings (including accommodation), adjacent carparks and key thoroughfares.

Table A4.3: Higher Education Campuses

Higher Institution	Education Location	Higher Institution	Education Location
University			
1. Dublin City University	Dublin	5. Trinity College Dublin	Dublin
2. University College Cork	Cork	6. University College Dublin	Dublin
3. National University of Ireland, Galway	Galway	7. University of Limerick	Limerick
4. Maynooth University - Kildare	Kildare	8. TU Dublin	Dublin
Institute of Technology			
1. Athlone Institute of Technology	Westmeath	7. Institute of Technology Sligo	Sligo
2. Cork Institute of Technology	Cork	8. Institute of Technology Tralee	Kerry
3. Dun Laoghaire Institute of Art and Design	Dublin	9. Letterkenny Institute of Technology	Donegal
4. Dundalk Institute of Technology	Louth	10. Limerick Institute of Technology	Limerick
5. Galway-Mayo Institute of Technology	Galway	11. Waterford Institute of Technology	Waterford
6. Institute of Technology Carlow	Carlow		
Other College			
1. Royal College of Surgeons in Ireland	Dublin	4. National College of Art and Design	Dublin
2. Royal Irish Academy	Dublin	5. Mary Immaculate College	Limerick
3. St Angela's College	Sligo		

Source: HEA, <http://hea.ie/higher-education-institutions/?v=1>.

Ports (Air and Sea)

A 4.7 Table A4.4 below contains the list of passenger focussed transport provided by airports and seaports. The list of airports is as set out by the Department of Transport, and the list of passenger seaports is as set out by the Irish Maritime Development Office (“IMDO”). Where a port as listed below contains more than one location, the coverage obligations apply to each of these locations as detailed in the Specific Location Boundary Files. For airports, the coverage obligations apply to areas where passengers will be waiting, embarking or disembarking, adjacent short term car parks and key passenger thoroughfares.

A 4.8 For passenger seaports, the coverage obligations apply to areas where passengers will be waiting, embarking or disembarking, adjacent car parks and key passenger thorough fares

Table A4.4 Ports (Air and Sea)

Ports	Location	Ports	Location
Airport			
1. Dublin Airport	Dublin	5. Ireland West Airport Knock	Mayo
2. Cork Airport	Cork	6. Kerry Airport	Kerry
3. Shannon Airport	Clare	7. Waterford Airport	Waterford
4. Donegal Airport	Donegal		
Passenger Seaport			
1. Bantry Bay Port Company	Cork	5. Port of Galway	Galway
2. Dublin Port Company	Dublin	6. Rosslare Europort	Wexford
3. Dun Laoghaire Port Company	Dublin	7. Port of Waterford	Waterford
4. Port of Cork	Cork		

Source: DTTS, <http://www.dttas.ie/aviation/airports>; IMDO, <http://www.dttas.ie/aviation/airports>

Principal Bus Stations

A 4.9 Table A4.5 below contains a list of Bus Éireann's 16 principal bus stations which also include information offices.

A 4.10 The outdoor coverage obligations apply to areas where passengers will be waiting, embarking or disembarking, and adjacent carparks.

Table A4.5: Principal Bus Stations

Bus Station	Location	Bus Station	Location
1. Athlone	Southern Station Road, Athlone	9. Galway	Ceannt Station, Eyre Square, Galway
2. Ballina	Kevin Barry Street, Ballina	10. Killarney	Fairhill, Killarney
3. Cavan	Farnham Street, Cavan	11. Letterkenny	Port Road, Letterkenny
4. Cork	Parnell Place, Cork	12. Limerick	Colbert Station, Parnell Street, Limerick
5. Drogheda	Donore Road, Drogheda	13. Monaghan	North Road, Monaghan
6. Dundalk	Long Walk, Dundalk	14. Sligo	Lord Edward Street, Sligo
7. Dublin	Busáras Central Station, Store Street, Dublin	15. Tralee	Casement Station, Tralee
8. Ennis	Clonroad More, Ennis	16. Waterford	The Quay, Waterford

Source: Bus Éireann, <https://www.buseireann.ie/pdf/1473240111-Network-Map.pdf>

Train Stations

A 4.11 Table A4.6 below contains a list of 144 train stations by descending passenger numbers¹⁷⁶ as obtained from the NTA.

A 4.12 The outdoor coverage obligations apply to each station including areas where passengers will be waiting, embarking or disembarking (platforms), and adjacent carparks.

Table A4.6: Train Stations

Train Station	Location	Train Station	Location
1. Connolly	Dublin	73. M3 Parkway	Dublin
2. Pearse	Dublin	74. Sligo	Sligo
3. Heuston	Dublin	75. Longford	Longford
4. Tara Street	Dublin	76. Killarney	Kerry
5. Grand Canal Dock	Dublin	77. Kilcock	Kildare
6. Dun Laoghaire	Dublin	78. Dunboyne	Meath
7. Cork	Cork	79. Adamstown	Dublin
8. Bray	Wicklow	80. Glounthaune	Cork
9. Lansdowne	Dublin	81. Navan Road Parkway	Dublin
10. Malahide	Dublin	82. Wicklow	Wicklow
11. Maynooth	Kildare	83. Tralee	Kerry
12. Blackrock	Dublin	84. Waterford	Waterford
13. Greystones	Wicklow	85. Manulla Junction	Mayo
14. Sydney Parade	Dublin	86. Enfield	Meath
15. Coolmine	Dublin	87. Ennis	Clare
16. Balbriggan	Dublin	88. Ballinasloe	Galway
17. Howth Junction and Donaghmede	Dublin	89. Hansfield	Dublin
18. Raheny	Dublin	90. Oranmore	Galway
19. Clontarf Rd	Dublin	91. Wexford	Wexford
20. Portmarnock	Dublin	92. Castlebar	Mayo
21. Limerick Junction	Tipperary	93. Clondalkin Fonthill	Dublin
22. Galway	Galway	94. Ballybrophy	Laois
23. Dalkey	Dublin	95. Carrick-on-Shannon	Leitrim
24. Docklands	Dublin	96. Muine Bheag	Carlow
25. Glenageary	Dublin	97. Edgeworthstown	Longford
26. Booterstown	Dublin	98. Carrigtwohill	Cork
27. Sallins and Naas	Kildare	99. Arklow	Wicklow
28. Skerries	Dublin	100. Clara	Offaly
29. Drumcondra	Dublin	101. Roscommon	Roscommon
30. Clonsilla	Dublin	102. Westport	Mayo
31. Kilbarrack	Dublin	103. Gorey	Wexford

¹⁷⁶ By number of passengers boarding and alighting on 16 November 2017 as published in NTA's 'National Heavy Rail Census Report 2017'.

Train Station	Location	Train Station	Location
32. Howth	Dublin	104.Dromod	Leitrim
33. Mallow	Cork	105.Gormanston	Meath
34. Bayside	Dublin	106.Monasterevin	Kildare
35. Donabate	Dublin	107.Kilcoole	Wicklow
36. Newbridge	Kildare	108.Ballymote	Sligo
37. Shankill	Dublin	109.Ballina	Mayo
38. Harmonstown	Dublin	110.Boyle	Roscommon
39. Salthill and Monkstown	Dublin	111.Charleville	Cork
40. Clongriffin	Dublin	112.Templemore	Tipperary
41. Sandycove and Glasthule	Dublin	113.Claremorris	Mayo
42. Limerick	Limerick	114.Ballyhaunis	Mayo
43. Drogheda	Louth	115.Millstreet	Cork
44. Killester	Dublin	116.Enniscorthy	Wexford
45. Sandymount	Dublin	117.Rushbrooke	Cork
46. Ashtown	Dublin	118.Castlerea	Roscommon
47. Portlaoise	Laois	119.Collooney	Sligo
48. Leixlip Louisa Bridge	Kildare	120.Rathdrum	Dublin
49. Killiney	Dublin	121.Woodlawn	Galway
50. Sutton	Dublin	122.Thomastown	Kilkenny
51. Castleknock	Dublin	123.Sixmilebridge	Clare
52. Rush and Lusk	Dublin	124.Rathmore	Kerry
53. Kildare	Kildare	125.Banteer	Cork
54. Athlone	Westmeath	126.Nenagh	Tipperary
55. Seapoint	Dublin	127.Craughwell	Galway
56. Carlow	Carlow	128.Carrigaloe	Cork
57. Portarlington	Laois	129.Farranfore	Kerry
58. Leixlip Confey	Kildare	130.Clonmel	Tipperary
59. Thurles	Tipperary	131.Fota	Cork
60. Tullamore	Offaly	132.Rosslare Strand	Wexford
61. Midleton	Cork	133.Foxford	Mayo
62. Mullingar	Westmeath	134.Roscrea	Tipperary
63. Littleisland	Cork	135.Attymon	Galway
64. Dundalk	Louth	136.Gort	Galway
65. Hazelhatch and Celbridge	Kildare	137.Rosslare Euro Port	Wexford
66. Broombridge	Dublin	138.Castleconnell	Limerick
67. Cobh	Cork	139.Cahir	Tipperary
68. Athenry	Galway	140.Birdhill	Tipperary
69. Kilkenny	Kilkenny	141.Carrick-on- Suir	Tipperary
70. Athy	Kildare	142.Ardrahan	Galway
71. Parkwest and Cherry Orchard	Dublin	143.Cloughjordan	Tipperary
72. Laytown	Meath	144.Tipperary	Tipperary

Source: National Transport Authority, 'National Heavy Rail Census Report 2017', published July 2018, https://www.nationaltransport.ie/wp-content/uploads/2018/08/National_Heavy_Rail_2018_V8_Web.pdf

Visitor Attractions - Information Centres

A 4.13 Table A4.7 below contains a list of the top 21 visitor attractions (fee charging and free of charge) by visitor numbers in 2017, as obtained from Fáilte Ireland.

A 4.14 The outdoor coverage obligations apply to the information centre at each attraction.

Table A4.7: Visitor Attraction – Information Centres

Visitor Attraction	Location	Visitor Attraction	Location
Fee Charging			
1. Guinness Storehouse	Dublin	12. Blarney Castle and Gardens	Cork
2. Cliffs of Moher Visitor Experience	Clare	13. Kilmainham Gaol	Dublin
3. Dublin Zoo	Dublin	14. Kilkenny Castle	Kilkenny
4. National Aquatic Centre	Dublin	15. Rock of Cashel	Tipperary
5. Book of Kells	Dublin	16. Dublin Castle	Dublin
6. Tayto Park	Meath	17. Bunratty Castle and Folk Park	Clare
7. St Patrick's Cathedral	Dublin	18. Old Jameson Distillery	Dublin
8. Kylemore Abbey & Gardens	Galway	19. Brú na Bóinne Newgrange	Meath
9. Muckcross House Gardens and Traditional Farm	Kerry	20. Christ Church Cathedral	Dublin
10. Powerscourt Gardens and Waterfall	Wicklow	21. Glenveagh Castle and Grounds	Donegal
11. Fota Wildlife Park	Cork		
Free of Charge			
1. National Gallery of Ireland	Dublin	12. National Museum of Ireland - Natural History, Merrion St	Dublin
2. Castletown House Parklands	Kildare	13. Kilkenny Castle Parklands	Kilkenny
3. Glendalough Site	Wicklow	14. Chester Beatty Library	Dublin
4. National Botanic Gardens	Dublin	15. National Museum of Ireland - Decorative Arts and History, Collins Barracks	Dublin
5. DLR Lexicon1	Dublin	16. Connemara National Park	Galway
6. Irish Museum of Modern Art	Dublin	17. The National Library of Ireland	Dublin
7. Doneraile Wildlife Park	Cork	18. Crawford Art Gallery	Cork
8. National Museum of Ireland - Archaeology, Kildare St	Dublin	19. Malin Head Viewing Point	Donegal
9. Science Gallery at Trinity College Dublin	Dublin	20. Dublin City Gallery The Hugh Lane	Dublin
10. Farmleigh	Dublin	21. Sliabh Liag Cliffs	Donegal
11. Newbridge Silverware Museum of Style Icons	Kildare		

Source: Fáilte Ireland, 'TOURISM FACTS 2017', published July 2018, http://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/3_Research_Insights/5_International_Tourism_Trends/Tourism-Facts-2017_2.pdf?ext=.pdf

Geographic Coordinates

A 4.15 For the purposes of assessing compliance with the Coverage obligation at specific Locations, ComReg provides the geographic coordinates and Specific Location Boundary Files for each specific location across the 7 categories on its Multi Band Spectrum Award webpage¹⁷⁷.

A 4.16 The Geographic coordinates of the specific locations and the Specific Location Boundary files were derived using the following methodology:

- Locations for each of the categories were obtained from the authoritative sources referenced in the above tables.
- Satellite images were obtained for each specific location using Google maps.
- Areas encompassed by the outdoor coverage obligations were identified using the criteria tabled below:

Table A4.8: Criteria (Outdoor coverage at/around)

Category	Criteria (outdoor coverage at/around)
Business and Technology Parks	Buildings, the adjacent carparks and thorough fares within, as well as those adjacent to IDA Ireland Business and Technology Parks and Strategic Sites.
Hospitals	Hospital's buildings, adjacent car parks and key thoroughfares.
Higher Education Campuses	Institution's buildings (including accommodation), adjacent carparks and key thoroughfares.
Ports	Airports - areas where passengers will be waiting, embarking or disembarking, adjacent short term car parks and key passenger thoroughfares. Passenger seaports - areas where passengers will be waiting, embarking or disembarking, adjacent car parks and key passenger thorough fares.
Principal Bus Stations	Areas where passengers will be waiting, embarking or disembarking, and adjacent carparks.
Train Stations	Areas where passengers will be waiting, embarking or disembarking (platforms), and adjacent carparks
Visitor Attractions – Visitor Centres	Visitor Centre

- Coordinates for the identified areas were mapped using visuals from the satellite images and QGIS. Due to the angle from which the satellite images may have been projected, the coordinates may vary slightly

¹⁷⁷ <https://www.comreg.ie/industry/radio-spectrum/spectrum-awards/proposed-multi-band-spectrum-award/>

from the actual coordinates (e.g. mapped boundaries produced by the coordinates may vary from the actual physical boundaries).

A 4.17 The Specific Location Boundary Files for each location included in the coverage obligations can be downloaded in .shp or shape files from <https://www.comreg.ie/industry/radio-spectrum/spectrum-awards/proposed-multi-band-spectrum-award/>.

Annex: 5 Relationships, resolution of Bidder connections, exemptions and changes

Ownership Rules – Relationship Examples¹⁷⁸

A 5.1 This paragraph is intended to illustrate the types of relations that ComReg considers to fall within the concepts of Connected Persons and Associated Bidders, as discussed in Section 3.3.5. The following is not meant to be an exhaustive or comprehensive description of the relationships that may fall within each category.

A “**Bidding Group**” includes a Bidder and its Connected Persons.

(a) A person is considered to be a “**Connected Person**” in relation to a Bidder where the person and/or any of its Controlling Persons and/or any of its Controlled Persons:

- (iii) either by itself or in concert with another person or other persons controls the Bidder;
- (iv) either by itself or in concert with another person or other persons has a direct or indirect interest of 10% or more in the Bidder;
- (v) is a partner of the Bidder;
- (vi) is Controlled by the Bidder alone or in concert with another Connected Person or Persons; or
- (vii) has as a director or senior executive any individual who is a director or senior executive of the Bidder or any of its Controlled Persons.

(b) A person (the “**Controlling Person**”) is considered to control another person (the “**Controlled Person**”) for example:

- (i) where the Controlling Person and/or its Controlled Persons and/or its Associates, either by itself or in concert with other persons has:
 - (A) an interest in 30% or more of the share capital of the Controlled Person;

¹⁷⁸ As set out in Section 3.3.5, the ownership rules apply from the submission of Phase 1 Application Documentation until the public announcement on the outcome of the Award Process by ComReg. Accordingly, this Annex should be read in that context so, for example, references in this Annex to “Bidder” should be read as “Applicant” for the period from the submission of Phase 1 Application Documentation until the point at which the Applicant becomes a Bidder etc.

- (B) the right to cast 30% or more of the votes of shareholders on any matter at shareholders meetings;
- (ii) where the Controlled Person routinely or generally acts in accordance with the instructions of the Controlling Person;
- (iii) where, in the plain meaning of the words, the Controlling Person and/or its Controlled Persons controls the Controlled Person;
- (iv) where the Controlling Person is capable of exercising decisive influence on the activity of the Controlled Person by means of:
 - (A) securities, contracts or any other means, or any combination of securities, contracts or other means; and/or
 - (B) ownership of, or the right to use all or part of, the assets of the Controlled Person, and/or
 - (C) rights or contracts which enable decisive influence to be exercised with regard to the composition, voting or decisions of the organs of the “Controlled Person”; and/or
 - (D) without limitation by the foregoing, any other way,

and “**Control**” will be construed accordingly.

In addition to the above, in determining whether influence of the kind referred to above is capable of being exercised by a “Controlling Person” over a “Controlled Person”, regard shall be had to all the circumstances of the matter and not solely to the legal effect of any instrument.

- (c) A person is considered to be “**in concert**” with another person in circumstances where, for example:
 - (i) one person Controls the other person;
 - (ii) one person is Associated with the other person;
 - (iii) there is an agreement or arrangement (whether or not legally binding) between those persons as to co-ordinated or concerted behaviour or activity by those persons (or either of them); or
 - (iv) where, within the plain meaning of the expression “concerted”, the persons’ behaviour or activity is concerted.
- (d) An “**interest**” is considered to include:
 - (i) an ownership interest, legal or beneficial, actual or contingent;
 - (ii) an interest as the holder of a mortgage, charge, lien, hypothecation or other encumbrance;
 - (iii) any derivative interest such as a participation or sub-participation where the holder of the interest and/or any of its Controlled Persons

- directly or indirectly bears some or all of the rewards and / or some or all of the risks of the relevant entity, shares or other securities;
- (iv) an option to acquire any of the foregoing; or
 - (v) a right to convert a right or asset (such as a debt security) into any of the foregoing.
- (e) An “**Associate**” of any entity is considered to include:
- (i) a director or company secretary or like officer of the entity and/or of its Controlled Persons;
 - (ii) a senior executive of the entity and/or of its Controlled Persons;
 - (iii) a spouse, civil partner or cohabiting partner of the foregoing;
 - (iv) any minor child of the foregoing and any child of the foregoing residing with the foregoing;
 - (v) any partner of the foregoing; or
 - (vi) any entity Controlled by any one or more of the foregoing and any partner of such entity.
- (f) “**Associated Bidders**” is considered to include Bidders who have one of the following relationships to each other:
- (i) a Connected Person in relation to one Bidder holds a direct or indirect interest of 20% or more in the other Bidder, or
 - (ii) a person who is not a Connected Person in relation to any of the Bidders concerned holds a direct or indirect interest of 20% or more in both Bidders.

Resolution of Bidder connections

A 5.2 It is possible at the Phase 1 and/or Phase 2 Application Date that a Bidder is unaware that another party with whom it has common or overlapping Bidding Groups or with which it is an Associated Bidder is applying. If ComReg considers that one of the relations referred to above exists between Bidders, it shall notify this to the Bidders affected, indicating a deadline for Bidders to:

- (a) apply for exemption from the rules on relations between Bidders (see below);
- (b) bring the relation to an end; or
- (c) refrain from further participation in the Award Process.

A 5.3 For the avoidance of doubt, if ComReg identifies that a common Insider exists between two Bidders, it will inform each Bidder of that fact but will not disclose the identity of the other Bidder. It will be for each Bidder to communicate this information to the Insider and to resolve this issue in cooperation with the Insider in accordance with the Award Rules. The Insider will obviously play an important role in this regard, being the only party with full knowledge of the situation and, in accordance with this Information Memorandum, ComReg may also deem it appropriate to engage with the Insider directly in order to resolve the situation.

A 5.4 It is important to note that, in seeking to resolve such a conflict, it will be incumbent upon each Bidder and the Insider to ensure compliance with the rules on Confidential Information (which, as per paragraph 3.91 of this Information Memorandum, includes knowledge of an entity's participation in the Award) set out in Section 3.3.6 of this Information Memorandum. So, for example, in such a situation it would not be appropriate for a Bidder to seek to reveal the identity of the other Bidder via the Insider or otherwise.

A 5.5 If the Bidders affected are not granted an exemption, do not bring the relation to an end or refrain from participation in the Award Process, ComReg will exclude the Bidders affected from further participation in the Award Process. If the relationship comes to light later in the Award Process, i.e. after the Auction has commenced, then ComReg may exclude the Bidder from further participation in the Award Process (see paragraph 3.101 of this Information Memorandum above in that regard) and this may result in partial or whole Deposit forfeiture for the affected Bidders. ComReg may also declare the result of the Award Process not binding, wholly or partly, on it.

A 5.6 If one of the above-mentioned relationship exists between two or more Bidders, and it is not possible to bring the relation to an end within the deadline set by ComReg, and ComReg does not grant an exemption, one or more of the Bidders may withdraw from participation in the Award Process, before the deadline for doing so set by ComReg, so that it is not necessary for ComReg to exclude both Bidders from the Award Process. However, the composition of the remaining Bidder and the content of its Application must remain unchanged, subject to ComReg's discretion to approve appropriate amendments.

Exemption from ownership rules

A 5.7 ComReg may, in exceptional circumstances and at its sole discretion, grant exemption from the ownership rules described in Section 3.3.5 of this Information Memorandum. Furthermore, ComReg may attach terms to a decision granting exemption from the ownership rules.

A 5.8 In considering whether to grant an exemption and any terms to attach to an exemption, ComReg will be guided by the need to ensure the efficient use of spectrum, compliance with Section 4 of the Competition Act 2002 (as amended) and compliance with its statutory functions, objectives and duties generally.

A 5.9 ComReg will only grant an exemption from the ownership rules if it is established by the affected Bidders, without undue delay and to ComReg's satisfaction, that there will be no breach of the rules on confidentiality and Bidder behaviour and the relation will not otherwise have a negative impact on the Award Process. For the avoidance of doubt, ComReg will exercise its discretion whether or not to grant an exemption acting reasonably and in accordance with its statutory functions, objectives and duties.

Changes to ownership structures

A 5.10 After the Phase 1 Application Date (and Phase 2 Application Date if an Applicant updates its list of Insiders), a Bidder and its Connected Persons must refrain from actions or omissions that establish a relation to another Bidder resulting in the Bidders falling outside permitted ownership structures. In the absence of an exemption, failure to comply with this rule may result in partial or whole Deposit forfeiture and/or exclusion from the Award Process.

A 5.11 In any event, the Bidder must notify ComReg of any changes that occur after the date of its Phase 1 Application Documentation (and Phase 2 Application Date if an Applicant updates its list of Insiders) is submitted which impact on the ownership structures on which its Application is based.

Bidders subject to Restructuring

A 5.12 ComReg may, at its sole discretion, permit an Applicant in a restructuring process to participate in the Auction subject to additional conditions to be set by ComReg on a case by case basis on receipt of the relevant disclosures.

Annex: 6 Worked Example of Activity Rules for the Primary Bid Rounds and Caps on Supplementary Bids

A 6.1 This annex presents a worked example¹⁷⁹ to illustrate the mechanics of the Main Stage, including the Primary Bid Rounds and the Supplementary Bids Round. Bidders should note that the Electronic Auction System (EAS) will automatically compute a number of calculations for assisting with bidding in the Auction (such as Bid Amounts for the Primary Bid Rounds, required Chain Bids, floors and caps on Supplementary Bids). Prior to the start of the Auction (if any) ComReg will schedule at least one mock Auction for Bidders to facilitate their understanding of practicalities of participating in the award.

A 6.2 The Supplementary Bids Round example is shown in several variations to illustrate the application of the caps on Supplementary Bids in different scenarios.

A 6.3 The first part of the example shows how a Bidder can state its demand for a Package of Lots in Primary Bid Rounds and switch to bidding for different Packages of Lots as Round Prices evolve, including:

- changing the number of Lots it bids for;
- switching between frequency bands; and
- using Relaxed Primary Bids.

A 6.4 The example then proceeds to illustrate the mechanics of the Supplementary Bids Round and the constraints that apply to Supplementary Bids.

¹⁷⁹ Nothing in this example is intended to be illustrative of values that ComReg believes may be achieved in the Auction, how ComReg would determine Price Increments, in light of given levels of demand, or similar matters. The valuations, increments etc in the examples have been chosen for ease of illustration only.

A 6.5 Bidders will be assisted throughout the Auction by the EAS, which will automatically make certain calculations¹⁸⁰ on behalf of the Bidder (e.g. calculating the Bid Amount and Eligibility associated with the Bidder's selected Package of Lots during the Primary Bid Rounds, calculating any Chain Bids required when submitting a Relaxed Primary Bid, and calculating the relevant floors and caps that apply to Supplementary Bids) and will allow the Bidder to check this information before either confirming or amending its Bid decisions.

Set Up

A 6.6 The example presented in this annex is based on some simple assumptions about the Lot Categories available and about a particular Bidder's valuations for different packages.

A 6.7 For simplicity, the example assumes that the Bidder is only interested in Lots in the 700 MHz Duplex and the 2.1 GHz Band in both Time Slices.

A 6.8 In Bands where there are two Time Slices a suffix in brackets indicates which Time Slice is being referred to. Thus:

- a 2.1 GHz Band Block in Time Slice 1 is denoted as a 2.1 GHz Band (1) Lot; and
- a 2.1 GHz Band Block in Time Slice 2 is denoted as a 2.1 GHz Band (2) Lot.

A 6.9 Eligibility is calculated separately for each Time Slice. Let (x,y) denote Eligibility or Activity of a Package of Lots, where x is the Eligibility in Time Slice 1 and y is the Eligibility in Time Slice 2. Therefore:

- a 2.1 GHz Band (1) Lot has Eligibility of $(2,0)$;
- a 2.1 GHz Band (2) Lot has Eligibility of $(0,2)$; and
- a 700 MHz Duplex Lot has Eligibility of $(4,4)$.¹⁸¹

A 6.10 Similarly, we denote the Bidder's Eligibility as a vector (x,y) , where x is the Bidder's Eligibility in Time Slice 1 and y is the Bidder's Eligibility in Time Slice 2.

¹⁸⁰ With certain exceptions, including calculating the Bidder's surplus (as the EAS is not provided with the Bidder's valuations) or setting the level of Bids in the Supplementary Bids Round (which are at the discretion of the Bidder). As noted below, the EAS will however verify that Supplementary Bids comply with the Auction Rules.

¹⁸¹ As noted in Section 3.5.2, the eligibility associated with any 700 MHz Duplex Lots included in a Package of Lots would be counted in both Time Slices.

A 6.11 All Lots included in this example are 2 × 5 MHz Lots of frequency-generic spectrum. As a result of the number of Lots included in the packages, and the Lot Categories included, there are no Bidding Restrictions in this example.

A 6.12 Suppose the Bidder is interested in the following Packages of Lots.

Table A6.1. Packages of Lots and corresponding valuations and Eligibility

Package	700 MHz Lots	2.1 GHz (1) Lots	2.1 GHz (2) Lots	Valuation (€)	Eligibility
A	3	3	6	1,300,000	(18,24)
B	2	5	8	1,291,000	(18,24)
C	2	5	3	1,125,000	(18,14)
D	2	4	4	1,121,000	(16,16)
E	1	4	4	970,000	(12,12)

A 6.13 In this example, the Bidder's Initial Bid is for Package of Lots B, so its Initial Eligibility is (18,24).

A 6.14 In this example, the Bidder will make decisions based on the 'surplus' of the Package of Lots that would be achieved were the Bidder to win the Package of Lots at the submitted Bid Amount. Surplus is calculated by subtracting the Bid Amount for a Package of Lots from the Bidder's valuation for that Package of Lots. For example, if the Bidder bids for Package of Lots A and the Bid Amount is €1,000,000, the surplus associated with the Bid is €1,300,000 – €1,000,000 = €300,000.

A 6.15 Defined in this way, the surplus represents the net return that the Bidder would expect if it won the Package of Lots and it were required to pay a Base Price exactly equal to the Bid Amount. In the price determination, Bid Amounts act as upper bounds on possible Base Prices, so the Base Price will be less than or equal to the Bid Amount. Therefore, the surplus is a lower bound on the net return that the Bidder would expect if it won the Package of Lots¹⁸².

A 6.16 For the purposes of this example, we assume that the Bidder bids according to its valuations, in that:

¹⁸² For simplicity, we ignore any Additional Price that the Bidder may have to pay following the Assignment Stage.

- it will never submit a Bid for a Package of Lots with a Bid Amount that gives negative surplus, as this would entail the possibility of winning spectrum with a negative return;
- during the Primary Bid Rounds, when there are multiple Packages of Lots with positive surplus at current Round Prices, the Bidder would prefer to bid on the Package of Lots that has the highest surplus, as this gives the highest expected return¹⁸³; and
- during the Supplementary Bids Round, the Bidder submits Supplementary Bids for all Packages of Lots of interest with a Bid Amount equal to the Bidder's valuation for the corresponding Package of Lots.

Primary Bid Rounds

Initial Bid

A 6.17 During the Application Stage, Bidders must specify the number of Lots in each Lot Category they would want to acquire at Reserve Prices. The Package of Lots specified and corresponding total price is the Bidder's Initial Bid. The Reserve Price per Lot for each Lot Category used in this example are set out in the Table below. These Reserve Prices are for the purpose of illustration only, the Reserve Prices for the Award Process are detailed in Table A6.2.

Table A6.2. Reserve Prices

Lot Category	Reserve Price (€)
700 MHz Duplex	110,000
2.1 GHz Band (1)	25,000
2.1 GHz Band (2)	25,000

¹⁸³ We do not consider the possibility of ties as these do not arise in this example.

A 6.18 Based on these prices, the Bidder can calculate the surplus associated with each of the five Packages of Lots it is interested in. As explained in the previous section, the surplus is calculated as the Bidder's valuation for a Package of Lots minus the relevant Bid Amount for that Package of Lots (in this case, based on Reserve Prices). The surplus for each Package of Lots at Reserve Prices is shown in Table A6.3 below, with the Bidder's preferred Package¹⁸⁴ highlighted in green.

Table A6.3. Bidder's preferences at Reserve Prices

Package	Eligibility	Valuation	Reserve Prices (€)	Surplus (€)
A	(18,24)	1,300,000	555,000	745,000
B	(18,24)	1,291,000	545,000	746,000
C	(18,14)	1,125,000	420,000	705,000
D	(16,16)	1,121,000	420,000	701,000
E	(12,12)	970,000	310,000	660,000

A 6.19 The Bidder would therefore want to be awarded Package B at Reserve Prices. This would be the Package of Lots it would include as its Initial Bid on the Application Form, with an associated Bid Amount of €545,000.

A 6.20 The Bidder's Initial Eligibility is therefore (18,24). That is, it has an Initial Eligibility of 18 for Time Slice 1 and 24 for Time Slice 2. This is equal to the sum of the Eligibility Points for all Lots included in Package B.

A 6.21 The Round Prices in the first Primary Bid Round are dependent on the level of Aggregate Demand for each Lot Category based on Initial Bids (i.e. the sum of the demand from all Bidders in their Initial Bids). For any Lot Category where there was excess demand (i.e. Aggregate Demand exceeded the number of Lots available) at Reserve Prices, the price per Lot would be increased for Round 1. For any Lot Category with no excess demand based on Initial Bids, the Round Price for the first Round would be equal to the Reserve Price for that Lot Category.

¹⁸⁴ Note that reference to a Bidder's preferred Package of Lots in this example means the Package of Lots that maximises the Bidder's surplus at given prices (e.g. Reserve Prices or prevailing Round Prices in the current Primary Bid Round). As the Primary Bid Rounds progress, the Bidder's preferred Package of Lots may change relative to the Package of Lots specified in its Initial Bid (or earlier Primary Bid Rounds), in line with changing relative prices.

A 6.22 Suppose that the Initial Bids submitted resulted in excess demand for all three Lot Categories in which the Bidder is interested, so all three prices will be increased relative to the Reserve Prices for the first Primary Bid Round.

Table A6.4. Round 1 prices

Lot Category	Reserve Price (€)	Excess Demand	Round 1 Price (€)
700 MHz Duplex	110,000	Yes	120,000
2.1 GHz Band (1)	25,000	Yes	30,000
2.1 GHz Band (2)	25,000	Yes	30,000

The first Primary Bid Round

A 6.23 In the first Primary Bid Round, Bidders need to state their demand for Lots in the different Lot Categories at the Round 1 prices. The EAS will display Lot Category information and prices; Bidders simply need to select the number of Lots that they wish to bid for in each Lot Category.

A 6.24 Based on the Round 1 prices, the Bidder can calculate the surplus associated with each of the five Packages of Lots it is interested in. The surplus for each Package of Lots is shown in Table A6.5 below, with the Bidder's preferred Package of Lots at Round 1 prices highlighted in green.

Table A6.5. Bidder's preferences in Round 1

Package	Eligibility	Valuation	Package Price (€)	Surplus (€)
A	(18,24)	1,300,000	630,000	670,000
B	(18,24)	1,291,000	630,000	661,000
C	(18,14)	1,125,000	480,000	645,000
D	(16,16)	1,121,000	480,000	641,000
E	(12,12)	970,000	360,000	610,000

A 6.25 The Bidder would therefore, acting rationally, bid in the first Round for Package A as this maximises its surplus at the prevailing Round Prices. Upon entering this selection, the EAS would calculate and display the Bid Amount corresponding to this Package of Lots (€630,000) and the Eligibility of the Package (18,24), allowing the Bidder to confirm the decision, or to change the selection if it so wished. The Activity of the Bid is equal to the Eligibility of the Initial Bid, so the Bidder maintains its Eligibility for the next Primary Bid Round.

A 6.26 From one Primary Bid Round to the next, a Bidder is free to change demand between different Lot Categories that cover different frequency bands (or between frequency-generic and frequency-specific or TDD and FDD Lots in the same frequency band) within the same Time Slice, provided that the Eligibility of the Package is no greater than the Bidder's Eligibility in either Time Slice.

A 6.27 In this example, the Bidder has opted to switch demand between Lot Categories in the first Round, bidding for Package A, rather than Package B as it did in its Initial Bid. Package A and Package B have the same Eligibility in both Time Slices, so the Activity of the Bid is equal to the Bidder's Eligibility at the start of the Round. Therefore, the Bidder maintains its Eligibility in both Time Slices for the next Primary Bid Round.

A 6.28 Once Round 1 has finished, all Bidders receive information about Aggregate Demand for all Lot Categories (i.e. the sum of the demand from all Bidders in that Primary Bid Round). The Round Price for Lot Categories with excess demand (i.e. more Aggregate Demand than Lots available) would be increased for the subsequent Round. Table A6.6 shows that, again, there is excess demand in all three Lot Categories that the Bidder is interested in, so the Round Prices will increase in each Lot Category in the next Primary Bid Round. For the avoidance of doubt, the Bid increments would be determined by the Auctioneer during the Auction and pertaining to the circumstances at the time.

Table A6.6. Round 1 results and Round 2 prices

Lot Category	Round 1 Price (€)	Excess Demand	Round 2 Price (€)
700 MHz Duplex	120,000	Yes	132,000
2.1 GHz Band (1)	30,000	Yes	35,000
2.1 GHz Band (2)	30,000	Yes	35,000

A 6.29 Following the first Primary Bid Round, the Bidder's Eligibility is 18 in Time Slice 1 and 24 in Time Slice 2.

The second Primary Bid Round

A 6.30 It may also be the case that the Bidder continues to bid for the same Package of Lots from one Round to the next, where that Package of Lots continues to have the greatest associated surplus of the Packages of Lots that the Bidder is interested in, given the new Round Prices.

A 6.31 In this example, the Bidder bids again for Package A in the second Primary Bid Round. The Activity of this Bid is equal to the Bidder's Eligibility, which it maintains for the next Primary Bid Round. The Packages of Lots and corresponding surplus for Round 2 are given in the Table below, with the Bidder's preferred Package of Lots at Round 2 prices highlighted in green.

Table A6.7. Bidder's preferences in Round 2

Package	Eligibility	Valuation	Package Price (€)	Surplus (€)
A	(18,24)	1,300,000	711,000	589,000
B	(18,24)	1,291,000	719,000	572,000
C	(18,14)	1,125,000	544,000	581,000
D	(16,16)	1,121,000	544,000	577,000
E	(12,12)	970,000	412,000	558,000

A 6.32 In this Round, suppose there is excess demand for the 2.1 GHz Band in both Time Slices, but there is no excess demand for the 700 MHz Duplex Lots. Therefore, for the next Primary Bid Round, the price of the 700 MHz Duplex Lots remains constant, while the prices for the other Lot Categories increases.

A 6.33 Round Prices for the third Primary Bid Round are given below.

Table A6.8. Round 2 results and Round 3 prices

Lot Category	Round 2 Price (€)	Excess Demand	Round 3 Price (€)
700 MHz Duplex	132,000	No	132,000
2.1 GHz Band (1)	35,000	Yes	38,000
2.1 GHz Band (2)	35,000	Yes	40,000

A 6.34 Following the second Primary Bid Round, the Bidder's Eligibility is 18 in Time Slice 1 and 24 in Time Slice 2.

The third Primary Bid Round

Reducing Demand

A 6.35 As Round Prices increase, a Bidder may wish to reduce its demand by bidding for fewer Lots in one or more Lot Categories. If a Bidder bids for a Package with Eligibility in a Time Slice less than the Bidder's Eligibility at the start of the Round in that Time Slice, then the Bidder's Eligibility for the next Primary Bid Round in that Time Slice will be reduced. In our example, the Bidder's Eligibility at the start of Round 3 was (18,24). Its preferences in this Round are expressed in Table A6.9, showing that it bids for Package C (highlighted in green).

Table A6.9. Bidder's preferences in Round 3

Package	Eligibility	Valuation	Package Price (€)	Surplus (€)
A	(18,24)	1,300,000	750,000	550,000
B	(18,24)	1,291,000	774,000	517,000
C	(18,14)	1,125,000	574,000	551,000
D	(16,16)	1,121,000	576,000	545,000
E	(12,12)	970,000	444,000	526,000

A 6.36 The Activity of this Bid in Time Slice 1 is equal to the Bidder's Eligibility at the start of the Round, but in Time Slice 2 the Activity of the Bid is strictly less than the Eligibility at the start of the Round. Therefore, the Bidder's Eligibility at the start of the next Primary Bid Round will remain at 18 for Time Slice 1, but fall to 14 in Time Slice 2.

A 6.37 In this Round, there is no excess demand for the 2.1 GHz Band in Time Slice 2, but there is excess demand for the other two Lot Categories. Therefore, Round Prices are increased for the latter two categories, but not for the 2.1 GHz Band Time Slice 2 Lots. The resulting Round Prices in Round 4 are given in the table below.

Table A6.10. Round 3 results and Round 4 prices

Lot Category	Round 3 Price (€)	Excess Demand	Round 4 Price (€)
700 MHz Duplex	132,000	Yes	148,000
2.1 GHz Band (1)	38,000	Yes	45,000
2.1 GHz Band (2)	40,000	No	40,000

A 6.38 Following the third Primary Bid Round, Bidder Eligibility is 18 in Time Slice 1 and 14 in Time Slice 2.

The fourth Primary Bid Round

Relaxed Primary Bids

A 6.39 A Bidder that has reduced its Eligibility in at least one Time Slice in one or more Primary Bid Rounds and/or submitted an Initial Bid resulting in Initial Eligibility strictly below the maximum possible in at least one Time Slice may still be able, under certain conditions, to submit a Primary Bid for a Package with Eligibility greater than the Bidder's current Eligibility (in one or both Time Slices). This is known as a Relaxed Primary Bid. In some cases, making a Relaxed Primary Bid will require that the Bidder also makes additional new Bids for certain other Packages of Lots. These are known as Chain Bids.

A 6.40 The EAS will automatically inform the Bidder about whether or not a Relaxed Primary Bid is possible and about any Chain Bids that are required if the Bidder wishes to make a Relaxed Primary Bid. The calculations shown here are included to illustrate how Relaxed Primary Bids and Chain Bids work, but in practice Bidders will not be required to perform any of these calculations themselves. Moreover, the rules for Relaxed Primary Bids are specifically designed so that Relaxed Primary Bids are always permitted when a Bidder has been bidding according to its valuations, as in this example. Therefore, Bidders that adopt this bidding approach know that they will be able to bid for their preferred Package of Lots at all times and need not worry about the detailed conditions for Relaxed Primary Bids to be allowed.

A 6.41 In this Round, the surplus maximising Package of Lots is Package D, as shown in the table below (highlighted in green). However, note that the Bidder is not eligible to bid for Package D at the start of Round 4 as its Eligibility in Time Slice 2 (14) is less than the Eligibility of the Package in Time Slice 2 (16). In order to bid for Package D in Round 4, the Bidder must therefore submit a Relaxed Primary Bid.

Table A6.11. Bidder's preferences in Round 4

Package	Eligibility	Valuation	Package Price (€)	Surplus (€)
A	(18,24)	1,300,000	819,000	481,000
B	(18,24)	1,291,000	841,000	450,000
C	(18,14)	1,125,000	641,000	484,000
D	(16,16)	1,121,000	636,000	485,000
E	(12,12)	970,000	488,000	482,000

A 6.42 For the Bidder to be allowed to submit a Relaxed Primary Bid for Package D, it must be that doing so would be consistent with the Bidder's bidding decisions in previous Eligibility-reducing Primary Bid Rounds. The EAS will check whether the relevant criteria are met, and whether or not any Chain Bids would be required for the Relaxed Primary Bid to be valid.

A 6.43 The EAS identifies the Constraining Round for the Package of Lots subject to a Relaxed Primary Bid (Package D). In this case, this is Round 3; at the start of Round 3, the Bidder's Eligibility was (18,24), which is greater than the Eligibility of Package D (16,16) in both Time Slices. In Round 3, instead of bidding for Package D, the Bidder instead chose to submit a Bid for Package C, which is therefore the Constraining Package for Package D.

A 6.44 In Round 3, the difference in price between Package D and Package C was $€576k - €574k = €2k$. The decision to bid for Package C rather than Package D at those prices indicates that the Bidder's value for Package D does not exceed its value for Package C by more than $€2k$ i.e. the Bidder is not willing to pay more than $€2k$ to win Package D instead of Package C.

A 6.45 There are two conditions that need to be met in order for the Bidder to be able to submit a Relaxed Primary Bid for Package D.

A 6.46 The first condition is that the difference between the price of Package D and the price of the Constraining Package (Package C) at Round 4 prices must not exceed the difference in prices for the two Packages of Lots in the Constraining Round (Round 3). In this case:

- The price difference in Round 4 is $€636k - €641k = -€5k$;
- The price difference in Round 3 was $€2k$;
- The first condition for the Bidder to be allowed to submit the Relaxed Primary Bid is therefore satisfied.

A 6.47 The second condition is that the difference between the price of Package D at Round 4 prices and the highest Bid Amount submitted for Package C at any point should not exceed the difference in prices for the two Packages at Round 3 prices:

- The price of Package D in Round 4 is $€636k$;
- The highest Bid Amount submitted for Package C so far is $€574k$, submitted in Round 3;
- The difference between the two amounts is $€636k - €574k = €62k$, which exceeds the $€2k$ price difference in Round 3;
- Therefore, the second condition is not satisfied.

A 6.48 In order to satisfy the second condition, the Bidder must make a higher Bid for Package C (a Chain Bid). The Bid Amount of the Chain Bid is the smallest amount necessary to satisfy the (second) condition above i.e. the Bid Amount for the Chain Bid is calculated as the price of Package D at Round 4 prices (€636k), minus the difference in the price of the two packages at Round 3 prices (€2k). Therefore, to submit a Relaxed Primary Bid for Package D, the Bidder must also submit a Chain Bid of €634k for Package C.

A 6.49 The amount of the Chain Bid is less than the price of Package C at Round 4 prices, therefore the Bidder is permitted to submit the required Chain Bid for Package C.

A 6.50 In Round 4, the Bidder was still eligible to bid for Package C, so no further Chain Bids are required and the Bidder is allowed to submit a Relaxed Primary Bid for Package D (along with the required Chain Bid for Package C).

A 6.51 In summary, the Bidder makes the following Bids in Round 4:

- a Relaxed Primary Bid for Package D with a Bid Amount of €636k; and
- a Chain Bid for Package C with a Bid Amount of €634k.

A 6.52 Note that the Bidder is willing to submit the Chain Bid for Package C, as it is less than the Bidder's valuation for Package C.

A 6.53 As mentioned earlier, for any Bidder that bids consistently according to valuation (as in this example) it is always possible to bid for the Bidder's preferred Package in every Primary Bid Round, including through Relaxed Primary Bids. Moreover, a Bidder that bids in this way will never be required to make Chain Bids with a negative surplus. Therefore, a Bidder that adopts this approach does not need to be able to perform calculations regarding the detailed conditions related to Relaxed Primary Bids and Chain Bids.

A 6.54 Note that the Bid for Package D in Round 4 is an Eligibility-reducing Relaxed Primary Bid, as the Eligibility of the Package is strictly less than the Bidder's Eligibility at the start of the Round in Time Slice 1. Therefore, the Bidder's Eligibility going into the next Primary Bid Round falls to 16 in Time Slice 1 but remains at 14 in Time Slice 2.

A 6.55 The outcome of Round 4 in the relevant Lot Categories is given below.

Table A6.12. Round 4 results and Round 5 prices

Lot Category	Round 4 Price (€)	Excess Demand	Round 5 Price (€)
700 MHz Duplex	148,000	No	148,000
2.1 GHz Band (1)	45,000	Yes	50,000
2.1 GHz Band (2)	40,000	Yes	47,000

A 6.56 Following the fourth Primary Bid Round, the Bidder's Eligibility is 16 in Time Slice 1 and 14 in Time Slice 2.

A 6.57 Note that the Activity Rules allow for Relaxed Primary Bids to be submitted for Packages with Eligibility that exceeds the Bidder's Initial Eligibility in one or both of the Time Slices. We do not include a specific example in this Annex, but the calculations for establishing the relevant conditions and any required Chain Bids follow the same logic described above. However, in this case the last point at which the Bidder is considered to have been eligible to submit a Bid for the Package subject to the Relaxed Primary Bid is at the Application Stage, when it chose to submit an Initial Bid for a different Package of Lots at Reserve Prices.

The fifth Primary Bid Round

A 6.58 In Round 5, the Bidder wishes to switch back to bidding for Package C, as shown in Table A6.13 (highlighted in green).

Table A6.13. Bidder's preferences in Round 5

Package	Eligibility	Valuation	Package Price (€)	Surplus (€)
A	(18,24)	1,300,000	876,000	424,000
B	(18,24)	1,291,000	922,000	369,000
C	(18,14)	1,125,000	687,000	438,000
D	(16,16)	1,121,000	684,000	437,000
E	(12,12)	970,000	536,000	434,000

A 6.59 At the start of the Round, the Bidder is not eligible to bid for Package C (as it does not have sufficient Eligibility in Time Slice 1), so the Bidder would again like to submit a Relaxed Primary Bid. In this case the Relaxed Primary Bid would not be Eligibility-reducing as the Eligibility of the Package is not strictly less than the Bidder's Eligibility in either Time Slice.

A 6.60 The Constraining Round for Package C is Round 4, when the Bidder was eligible to bid for Package C but instead submitted a Bid for Package D.

A 6.61 We first check that a Bid for Package C in this Round would be consistent with the preferences expressed in the Constraining Round for Package C (Round 4):

- At Round 4 prices, the price of Package C was €641k and the price of Package D was €636k. The difference is €5k;
- At Round 5 prices, the price of Package C is €687k and the price of Package D is €684k. The difference is €3k;
- Since €3k is less than €5k, the condition is satisfied and the Bidder is allowed to submit a Relaxed Primary Bid for Package C in Round 5, subject to the need for Chain Bids.

A 6.62 Next, it is necessary to check if a Chain Bid is required for Package D, the Constraining Package:

- The price of Package C at Round 5 prices is €687k. The highest Bid Amount submitted for Package D is currently €636k (the Bidder's Round 4 Bid). The difference between these two amounts is €51k.
- The difference in price of the two Packages in Round 4 (the Constraining Round for Package C) was €5k.
- Since €51k is greater than €5k, the Bidder needs to submit a Chain Bid for Package D in order to submit the Relaxed Primary Bid for Package C.
- The amount of the required Chain Bid for Package D is €687k - €5k = €682k (which is less than the price of Package D in Round 5).

A 6.63 Since the Bidder was not eligible to bid for Package D at the start of Round 5, we need to check whether the Chain Bid for Package D would be valid. At this point, we have a loop of constraints, as (currently) Package C is the Constraining Package for Package D and Package D is the Constraining Package for Package C. It is therefore not simply a case of checking whether a Chain Bid is required for the Constraining Package for Package D. We instead need to ensure that the Bid Amount associated with the Relaxed Primary Bid for Package C and the Chain Bid to be submitted for Package D are compatible with the preferences expressed in Round 3:

- The required Chain Bid for Package D in Round 5 is €682k. The Bid Amount to be submitted for Package C in Round 5 is €687k. The difference between these two amounts is -€5k.
- The difference in price of the two Packages in Round 3 (the Constraining Round for Package D) was €2k.
- Since -€5k is less than €2k, the Bid Amounts are consistent with the preferences expressed in Round 3.

A 6.64 Therefore, the Relaxed Primary Bid for Package C and the Chain Bid for Package D can both be submitted.

A 6.65 The Eligibility of Package C exceeds the Bidder's Eligibility at the start of the Round, while the Eligibility of the Package in Time Slice 2 is equal to the Bidder's Eligibility at the start of the Round. Therefore, the Bidder maintains its Eligibility at (16,14) going into the next Primary Bid Round.

A 6.66 The outcome of Round 5 is given in Table A6.14.

Table A6.14. Round 5 results and Round 6 prices

Lot Category	Round 5 Price (€)	Excess Demand	Round 6 Price (€)
700 MHz Duplex	148,000	Yes	155,000
2.1 GHz Band (1)	50,000	Yes	60,000
2.1 GHz Band (2)	47,000	No	47,000

A 6.67 Following the fifth Primary Bid Round, the Bidder's Eligibility is 16 in Time Slice 1 and 14 in Time Slice 2.

The Final Primary Bid Round

A 6.68 In the next Round, the Bidder submits a standard Eligibility-reducing Primary Bid for Package E (highlighted in green), which it is eligible to bid for at the start of the Round. Its preferences for this Round are given in the table below.

Table A6.15. Bidder's preferences in Round 6

Package	Eligibility	Valuation	Package Price (€)	Surplus (€)
A	(18,24)	1,300,000	927,000	373,000
B	(18,24)	1,291,000	986,000	305,000
C	(18,14)	1,125,000	751,000	374,000
D	(16,16)	1,121,000	738,000	383,000
E	(12,12)	970,000	583,000	387,000

A 6.69 This means that, going into the next Primary Bid Round, the Bidder's Eligibility would be (12,12), as the Eligibility of Package E is strictly less than the Bidder's Eligibility at the start of the Round in both Time Slices.

A 6.70 However, we assume that there is no excess demand in any Lot Category in this Round, so it is the final Primary Bid Round.

A 6.71 Note that this was the first Round in which there was a reduction in Eligibility since an Eligibility-reducing Relaxed Primary Bid was submitted for Package D (in Round 4). When applying the rules for setting Relative Caps, we therefore know that in order to prevent a disconnection in the chain of constraints generated in the Primary Bid Rounds, a new Relative Cap must be set for Package C or Package D (and the pre-existing Relative Cap on the relevant Package replaced).

A 6.72 Using the same methodology demonstrated above (we do not go through the details here), it can be shown that a Relaxed Primary Bid would have been allowed in Round 6 for Package D, but not for Package C (since the relative prices of the Package C and Package D at Round 6 prices would not be consistent with the decision to bid for Package D in Round 4). As such, a new Relative Cap is created for Package D; Package E is now the Constraining Package for Package D, and Round 6 becomes the Constraining Round relevant for calculating the Relative Cap on the Supplementary Bid for Package D. The previous Relative Cap on Package D, created in Round 3 when the Bidder submitted an Eligibility-reducing Primary Bid for Package C, is replaced and no longer applies.

A 6.73 Table A6.16 gives a summary of all Bids submitted by the Bidder during the Primary Bid Rounds.

Table A6.16. Bids submitted in the Application Stage and Primary Bid Rounds

Round	Eligibility	Activity	Package	Type of Bid	Bid Amount (€)
0 ¹⁸⁵	-	(18,24)	B	Initial	545,000
1	(18,24)	(18,24)	A	Standard	630,000
2	(18,24)	(18,24)	A	Standard	711,000
3	(18,24)	(18,14)	C	Standard	574,000
4	(18,14)	(16,16)	D	Relaxed	636,000
			C	Chain	634,000
5	(16,14)	(18,14)	C	Relaxed	687,000
			D	Chain	682,000
6	(16,14)	(12,12)	E	Standard	583,000

¹⁸⁵ In this example, round 0 refers to the Application Stage in which Bidder's submit their Initial Bids at Reserve Prices.

A 6.74 Notice that some of the Bids submitted in the earlier Primary Bid Rounds are 'dominated' by Bids in a later Primary Bid Round. For example, the Bid for Package A in Round 1 is dominated by the Bid for Package A in Round 2, because it includes a higher Bid Amount for the same Package of Lots. Bids that are dominated in this way can never be selected as winning Bids, so it is informative to look only at the highest Bids that the Bidder has submitted for each Package of Lots.

Table A6.17. Highest Bid Amounts submitted for each Package of Lots at the end of the Primary Bid Rounds

Package	Valuation (€)	Highest Bid Amount (€)	Surplus (€)
A	1,300,000	711,000	589,000
B	1,291,000	545,000	746,000
C	1,125,000	687,000	438,000
D	1,121,000	682,000	439,000
E	970,000	583,000	387,000

A 6.75 For all Packages of Lots the Bidder has a strictly positive surplus at these Bid Amounts, meaning that the Bidder can, subject to relevant caps, make higher Bids in the Supplementary Bids Round in order to increase its chances of winning one of the Packages of Lots without the risk of exceeding valuation for a particular Package of Lots.

Supplementary Bids Round

A 6.76 After the end of the Primary Bid Rounds, there will be one Supplementary Bids Round. In the Supplementary Bids Round Bidders can (subject to relevant caps):

- increase the Bid Amount for Packages of Lots bid for during the Primary Bid Rounds; and/or
- submit Bids for additional Packages of Lots with corresponding Bid Amounts.

A 6.77 All Primary Bids (including Chain Bids) are binding; that is, they will be submitted as Supplementary Bids at the highest Bid Amount specified in either the Primary Bid Rounds or the Supplementary Bids Round. The EAS will automatically add these Packages of Lots to the Bidder's list of Supplementary Bids.

A 6.78 A Bidder is able to submit Supplementary Bids for up to 1,000 Packages of Lots, including the Package of Lots specified in the Bidder's Initial Bid and any Package of Lots the Bidder Bid for during the Primary Bid Rounds. In this example, the Bidder has already submitted Bids for 5 different Packages of Lots, so could submit Supplementary Bids for an additional 995 Packages of Lots.

A 6.79 The Package of Lots bid for in the final Primary Bid Round, the Final Primary Package (FPP), is not subject to a cap and the Bidder could increase the Bid Amount for this Package of Lots by any amount, unless the FPP is a Zero Bid or a Relaxed Primary Bid.

A 6.80 Supplementary Bids for all other Packages of Lots are subject to caps on the Bid Amount.

A 6.81 The rules for calculating these caps are explained in Section 4.2.3. All Supplementary Bids (other than the FPP) are subject to a Final Price Cap. Additionally, all Supplementary Bids for Packages of Lots with Eligibility greater than the Bidder's Eligibility at the start of the final Primary Bid Round are subject to Relative Caps.

A 6.82 This section demonstrates the Supplementary Bid cap rules under three variations of the example Primary Bid Rounds used above:

- Case 1: the Primary Bid Rounds continue beyond Round 6 and end following a Round in which the Bidder submits a Zero Bid;
- Case 2: the Primary Bid Rounds history is exactly as set out in the example above, where the Bidder's FPP is non-zero and within its Eligibility for the final Primary Bid Round; and
- Case 3: the Primary Bid Rounds ended after Round 5, so that the Bidder's FPP is a Relaxed Primary Bid.

A 6.83 These calculations are for illustrative purposes only. Bidders do not necessarily have to perform these calculations themselves. If a Bidder attempts to submit a Bid Amount for a Package that exceeds the Supplementary Bid cap, the EAS will inform the Bidder and prevent the submission of Supplementary Bids until all Bid Amounts are valid.

A 6.84 In this example, the Bidder only has valuations for five Packages of Lots. In Case 1 and Case 2, the Bidder has already submitted Bids for all five Packages of Lots in the Primary Bid Rounds, and therefore simply needs to raise the Bid Amounts in the Supplementary Bids Round. In Case 3, the Bidder will need to raise the Bid Amounts for Packages A, B, C and D, and add a Bid for Package E to its list of Supplementary Bids (by Round 5 it had not already submitted a Bid for package E).

A 6.85 In addition, the Bidder was eligible to bid for all Packages of Lots it is interested in at the start of Round 1. Note, however, that the Supplementary Bid cap calculations for Packages larger than the Package of Lots specified in the Bidder's Initial Bid (in terms of Eligibility Points in at least one Time Slice) work in exactly the same way as the example calculations shown in this section.

A 6.86 The set of Bids submitted to date at the end of the Primary Bid Rounds do not fully express the Bidder's valuations so, in this example, the Bidder submits Supplementary Bids equal to its valuations.

Case 1: Zero Final Primary Package

A 6.87 Suppose that the Primary Bid Rounds continue until the Round Prices are as in the table below. Up to this point, the Bidder has continued to bid for Package E, but now all Packages of Lots offer negative surplus and the Bidder submits a Zero Bid. The Primary Bid Rounds end at this point.

Table A6.18. Case 1 - Round Prices in alternative final Primary Bid Round

Lot Category	Round Prices (€)
700 MHz Duplex	200,000
2.1 GHz Band (1)	100,000
2.1 GHz Band (2)	95,000

A 6.88 The Final Primary Package for the Bidder is therefore the Zero Package (i.e. no Lots in any Lot Category).

A 6.89 According to the Final Price Cap rules, all Supplementary Bids are therefore constrained to be at most the price of the corresponding Package of Lots in the final Primary Bid Round (i.e. there is an absolute cap on each of the Supplementary Bids that the Bidder can submit).

A 6.90 The Relative Caps for each of the five Packages of Lots in the example are determined in the following way.

A 6.91 Relative Cap for Package A:

- a) The last Round in which the Bidder was eligible to bid for Package A was Round 3, and the Constraining Round for Package A was not subsequently reset, so Round 3 is the Constraining Round;
- b) In Round 3, the Bidder submitted a Bid for Package C, so Package C is the Constraining Package;
- c) In the Constraining Round, the price of Package A was €750k and the price of Package C was €574k, with a difference of €176k;
- d) The Supplementary Bid Amount for Package A cannot exceed the highest Bid Amount for Package C **plus** €176k.

A 6.92 Relative Cap for Package B:

- a) The last Round in which the Bidder was eligible to bid for Package B was Round 3, and the Constraining Round for Package B was not subsequently reset, so Round 3 is the Constraining Round;
- b) In Round 3, the Bidder submitted a Bid for Package C, so Package C is the Constraining Package;
- c) In the Constraining Round, the price of Package B was €774k and the price of Package C was €574k, with a difference of €200k;
- d) The Supplementary Bid Amount for Package B cannot exceed the highest Bid Amount for Package C **plus** €200k.

A 6.93 Relative Cap for Package C:

- a) The last Round in which the Bidder was eligible to Bid for Package C was Round 4, and the Constraining Round for Package C was not subsequently reset, therefore, Round 4 is the Constraining Round;
- b) In Round 4, the Bidder submitted a Bid for Package D, so Package D is the Constraining Package;
- c) In the Constraining Round, the price of Package C was €641k and the price of Package D was €636k, with a difference of €5k;
- d) The Supplementary Bid Amount for Package C cannot exceed the highest Bid Amount for Package D **plus** €5k.

A 6.94 Relative Cap for Package D:

- a) The last Round in which the Bidder was eligible to Bid for Package D was Round 3, in which the Bidder instead submitted a Bid for Package C.
- b) However, the Constraining Round for Package D was subsequently reset to be Round 6. Round 6 is therefore the Constraining Round;
- c) In Round 6, the Bidder submitted a Bid for Package E, so Package E is the Constraining Package;
- d) In the Constraining Round, the price of Package D was €738k and the price of Package E was €583k, with a difference of €155k;
- e) The Supplementary Bid Amount for Package D cannot exceed the highest Bid Amount for Package E **plus** €155k.

A 6.95 The Bidder was eligible to bid for Package E in the final Primary Bid Round, so Package E is not subject to a Relative Cap.

A 6.96 The following table provides an overview of the caps that would apply to the Supplementary Bids that the Bidder can submit. In this table, HB(X) stands for the "highest Bid submitted for package X", which is the highest Bid amount from amongst all Primary Bids previously submitted for Package X and any Supplementary Bid entered for Package X.

Table A6.19. Case 1 - Supplementary Bid caps

Package	Relative Cap	Final Price Cap
A	HB(C) + €176,000	€1,470,000
B	HB(C) + €200,000	€1,660,000
C	HB(D) + €5,000	€1,185,000
D	HB(E) + €155,000	€1,180,000
E	None	€980,000

A 6.97 Given these caps, which result from submitting Bids for the most preferred package in each Primary Bid Round, the Bidder can reflect its valuations in its Supplementary Bids. The table below shows the Supplementary Bid Amounts that would reflect the Bidder's valuations, alongside the resulting caps:

Table A6.20. Case 1 - Supplementary Bid Amounts and resulting caps

Package	Supplementary Bid Amount	Relative Cap	Final Price Cap
A	€1,300,000	€1,361,000	€1,470,000
B	€1,291,000	€1,385,000	€1,660,000
C	€1,125,000	€1,185,000	€1,185,000
D	€1,121,000	€1,135,000	€1,180,000
E	€970,000	None	€980,000

Case 2: Standard Primary Bid in the Final Primary Bid Round

A 6.98 Suppose now that Round 6 is the final Primary Bid Round. The Final Primary Package is Package E.

A 6.99 All packages except the Final Primary Package are subject to a Final Price Cap relative to the Final Primary Package (Package E). The Final Price Cap limits the Bid Amount for any Package of Lots other than Package E to be no greater than:

- a) the highest Bid Amount that the Bidder submits for Package E; plus
- b) the difference between the price of the Package of Lots subject to the Final Price Cap and the price of Package E in the final Primary Bid Round.

A 6.100 The price of Package E in the final Primary Bid Round was €583k.

A 6.101 The prices of the other Packages of Lots in the final Primary Bid Round and the corresponding Final Price Caps are as follows:

- The price of Package A was €927k. Therefore, the highest Bid Amount that the Bidder submits for Package A cannot exceed its highest Bid Amount for Package E plus €344k, based on the price difference between the two Packages in the final Primary Bid Round.
- The price of Package B was €986k, so the highest Bid Amount that the Bidder submits for Package B cannot exceed its highest Bid Amount for Package E plus €403k.

- The price of Package C was €751k, so the highest Bid Amount that the Bidder submits for Package C cannot exceed its highest Bid Amount for Package E plus €168k.
- The price of Package D was €738k, so the highest Bid Amount that the Bidder submits for Package D cannot exceed its highest Bid Amount for Package E plus €155k.

A 6.102 The Relative Caps are the same as in Case 1.

A 6.103 In this example, the price of Package E was below the price of the other Packages the Bidder is interested in in the final Primary Bid Round. This is not necessarily always the case, and it is possible that the cap on some packages could be the price of some Package, minus some amount.

A 6.104 The following table provides an overview of the caps that would apply to the Supplementary Bids that the Bidder can submit. In this table, HB(X) stands for the "highest Bid submitted for Package X".

Table A6.21. Case 2 - Supplementary Bid caps

Package	Relative Cap	Final Price Cap
A	HB(C) + €176,000	HB(E) + €344,000
B	HB(C) + €200,000	HB(E) + €403,000
C	HB(D) + €5,000	HB(E) + €168,000
D	HB(E) + €155,000	HB(E) + €155,000
E	None	None

A 6.105 Notice that the Supplementary Bid Amount for Package E is not subject to any cap.

A 6.106 Given these caps, which result from submitting Bids for the most preferred package in each Primary Bid Round, the Bidder can reflect its valuations in its Supplementary Bids. The table below shows the Supplementary Bid Amounts that would reflect the Bidder's valuations and the resulting caps:

Table A6.22. Case 2 - Supplementary Bid Amounts and resulting caps

Package	Supplementary Bid Amount	Relative Cap	Final Price Cap
A	€1,300,000	€1,301,000	€1,314,000
B	€1,291,000	€1,325,000	€1,373,000
C	€1,125,000	€1,126,000	€1,138,000
D	€1,121,000	€1,125,000	€1,125,000
E	€970,000	None	None

Case 3: FPP is a Relaxed Primary Bid

A 6.107 Suppose now that the Primary Bid Rounds ended following Round 5, so the Bidder submitted a Relaxed Primary Bid for Package C in the Final Primary Bid Round.

A 6.108 All packages except the Final Primary Package (Package C) are subject to a Final Price Cap relative to the Final Primary Package. The Final Price Cap limits the Bid Amount for any Package other than Package C to be no greater than:

- a) the highest Bid Amount that the Bidder submits for Package C; plus
- b) the difference between the price of the package subject to the Final Price Cap and the price of Package C in the final Primary Bid Round.

A 6.109 The price of Package C in the final Primary Bid Round was €687k. The final Primary Bid Round prices and Final Price Caps for the other Packages of Lots that the Bidder is interested in are as follows:

- The price of Package A was €876k, so the highest Bid Amount the Bidder submits for Package A cannot exceed its highest Bid Amount for Package C **plus** €189k;
- The price of Package B was €922k, so the highest Bid Amount the Bidder submits for Package B cannot exceed its highest Bid Amount for Package C **plus** €235k;
- The price of Package D was €684k, so the highest Bid Amount the Bidder submits for Package D cannot exceed its highest Bid Amount for Package C **minus** €3k; and

- The price of Package E was €536k, so the highest Bid Amount the Bidder submits for Package E cannot exceed its highest Bid Amount for Package C **minus** €151k.

A 6.110 The Constraining Rounds for Packages A, B and C are the same as in the previous examples, so the Relative Caps for these three Packages of Lots are as described in Case 1. Note that even though Package C is the FPP, it is still subject to a Relative Cap as the Bidder was not eligible to bid for Package C at the start of the final Primary Bid Round.

A 6.111 In this case, the Eligibility-reducing Relaxed Primary Bid for Package D in Round 4 was the last time that the Bidder reduced its Eligibility, and the resetting of the Constraining Round for Package D (which for other examples happens at the end of Round 6) does not occur. The Constraining Round for Package D is therefore Round 3, which was the last Round in which the Bidder was eligible to bid for Package D. The Relative Cap for D is calculated as follows:

- In the Constraining Round, the Bidder submitted a Bid for Package C, so Package C is the Constraining Package;
- In the Constraining Round, the price of Package D was €576k and the price of Package C was €574k, with a difference of €2k;
- The Supplementary Bid Amount for Package D cannot exceed the highest Bid Amount for Package C **plus** €2k.

A 6.112 The Bidder was still eligible to bid for Package E in the final Primary Bid Round, so Package E is not subject to a Relative Cap.

A 6.113 The following table provides an overview of the caps that would apply to the Supplementary Bids that the Bidder can submit. In this table, HB(X) stands for the "highest Bid submitted for Package X".

Table A6.23. Case 3 - Supplementary Bid caps

Package	Relative Cap	Final Price Cap
A	HB(C) + €176,000	HB(C) + €189,000
B	HB(C) + €200,000	HB(C) + €235,000
C	HB(D) + €5,000	None
D	HB(C) + €2,000	HB(C) - €3,000
E	None	HB(C) - €151,000

A 6.114 Notice that all packages are subject to at least one cap.

A 6.115 Given these caps, which result from submitting Bids for the most preferred Package of Lots in each Primary Bid Round, the Bidder can reflect its valuations in its Supplementary Bids. The table below shows the Supplementary Bid Amounts that would reflect the Bidder's valuations and the resulting caps:

Table A6.24. Case 3 - Supplementary Bid Amounts and resulting caps

Package	Supplementary Bid Amount	Relative Cap	Final Price Cap
A	€1,300,000	€1,301,000	€1,314,000
B	€1,291,000	€1,325,000	€1,360,000
C	€1,125,000	€1,126,000	None
D	€1,121,000	€1,127,000	€1,122,000
E	€970,000	None	€974,000

Annex: 7 Implications of the Final Price Cap

A 7.1 This annex considers the implications of the Final Price Cap for bidding strategies in the Supplementary Bids Round. The analysis presented is intended to aid Bidders' consideration of appropriate bidding strategies. However, ComReg makes no warranty or representation that any strategy suggested herein is necessary or sufficient to ensure winning spectrum.

A 7.2 Please note that this annex is not an extension of the example set out in Annex 6 and should be considered separately.

Overview

A 7.3 In the Supplementary Bids Round, the Final Price Cap constrains the possible Bids that can be submitted by each Bidder. For any Package (which we will call Package X) other than the Final Primary Package, the Supplementary Bid Amount cannot exceed the highest Bid submitted for the Final Primary Package plus the price difference between the Final Primary Package and Package X at the Round Prices in the final Primary Bid Round.

A 7.4 If the Bid submitted by a Bidder in the final Primary Bid Round was a standard Primary Bid (i.e. not a Relaxed Primary Bid) for a non-zero Package, then there is no limit on the Supplementary Bid Amount that the Bidder can submit for the Final Primary Package. Bidders should note, however, that if the Bid submitted by a Bidder in the final Primary Bid Round was a Relaxed Primary Bid, the Supplementary Bid Amount that the Bidder can submit for the Final Primary Package will be constrained by a Relative Cap.

A 7.5 We illustrate this with a simple example with only two Lot Categories, A and B, each with ten Lots. Suppose that Reserve Prices are €3,000 for A-Lots and €5,000 for B-Lots, and that the Round Prices in the final Primary Bid Round are €8,000 for A-Lots and €15,000 for B-Lots.

A 7.6 Suppose that a Bidder's Final Primary Package consists of four A-Lots and four B-Lots. If the Bidder's highest Bid for this Package is a Supplementary Bid of €100,000, then the Final Price Cap on the Package of five A-Lots and five B-Lots would be €123,000¹⁸⁶, while the Final Price Cap on the Package containing only four A-Lots would be €40,000¹⁸⁷.

A 7.7 Bidders can use the information disclosed about the Round Prices and the level of Aggregate Demand for each Lot Category in the final Primary Bid Round to assess their likelihood of winning with particular Bids, and in particular the Bid for the Final Primary Package. This is because from the perspective of one Bidder the Final Price Cap¹⁸⁸ limits the amount that rival Bidders can bid to add Lots to their positions in the final Primary Bid Round, and thus the extent to which they can outbid that Bidder for its Final Primary Package.

A 7.8 The Final Price Cap has two implications:

- the outcome in which each Bidder is assigned its Final Primary Package can only be improved upon if it makes it possible to assign more Lots by selecting other Bids, which is only possible if the outcome in which each Bidder is assigned its Final Primary Package does not lead to assigning all Lots;
- the additional value that can be achieved by assigning more Lots is at most (and often will be less than) the Round Price of such Lots in the final Primary Bid Round less the Reserve Price, as any Bid that includes such Lots is at least subject to the Final Price Cap (and might be subject to a tighter Relative Cap).

¹⁸⁶ The highest Bid on the Final Primary Package, which is €100,000, plus the difference between the price of the constrained Package and the Final Primary Package at the Round Prices in the final Primary Bid Round (€115,000 - €92,000 = €23,000).

¹⁸⁷ The highest Bid Amount on the Final Primary Package, which is €100,000, plus the difference between the price of the Package and the price of the Final Primary Package at the Round Prices in the final Primary Bid Round (€32,000 - €92,000 = -€60,000).

¹⁸⁸ Constraints on Supplementary Bids arising from Relative Caps may provide additional constraints on rivals Bids, but these depend on the history of Eligibility reductions made by Bidders. The constraint arising from the Final Price Cap depends on only on the final Round Prices, which are known to all Bidders when preparing their Supplementary Bids.

A 7.9 Given this, there are a number of strategies available for Bidders who wish to mitigate the risk that they may not win their Final Primary Package, which take into account the possibility that the total value of an outcome in which they do not win their Final Primary Package might reflect the value of assigning Lots for which there was no Aggregate Demand in the final Primary Bid Round. We refer to these Lots as 'provisionally unsold Lots'. Such unsold Lots are valued at the Reserve Price when assessing outcomes for the purposes of determining winners.

A 7.10 A first possible strategy is to specify:

- a Supplementary Bid for the Final Primary Package equal to:
 - the value of that Package based on the Round Prices in the final Primary Bid Round;
 - plus the value of provisionally unsold Lots at final Round Prices less their value at Reserve Prices;
 - plus a further positive increment (e.g. €1000)
- Supplementary Bids for other Packages (if any) that do not exceed the value of those Packages based on the Round Prices in the final Primary Bid Round¹⁸⁹.

A 7.11 Following the example above, suppose that Aggregate Demand in the final Primary Bid Round was such that two A Lots and one B-Lot would remain provisionally unsold. The Round Price of provisionally unsold Lots would be $2 \times €8,000 + €15,000 = €31,000$. The Reserve Price of these Lots is $2 \times €3,000 + €5,000 = €11,000$. The difference between the value of the Lots at final Round Prices and Reserve Prices would be $€31,000 - €11,000 = €20,000$. Therefore, if the Bidder in the example followed this first strategy it would make a Supplementary Bid of $€92,000 + €20,000 + €1000 = €113,000$ for its Final Primary Package of four A-Lots and four B-Lots, and ensure that none of its other Supplementary Bids exceed the price of the corresponding Package in the final Primary Bid Round.

A 7.12 With this strategy, the Bidder will win its Final Primary Package regardless of the Supplementary Bids made by other Bidders (provided that their Bids made in the final Primary Bid Round remain valid). For the avoidance of doubt, the Base Price for this Winning Bid would be less than or equal to the Bid Amount submitted.

¹⁸⁹ For the avoidance of doubt, such bids are not a necessary component of the outlined strategy, but if they are included then the Bid Amounts should be limited as described.

A 7.13 A second possible strategy is to specify:

- a Supplementary Bid for the Final Primary Package, again equal to the value of that Package based on the Round Prices in the final Primary Bid Round, plus the value of provisionally unsold Lots at final Round Prices less their value at Reserve Prices, plus a further positive increment (e.g. €1000); and
- Supplementary Bids for other Packages, at least one of which is at least the value of the Package based on the Round Prices in the final Primary Bid Round plus a further positive increment which is no less than the positive increment applied to the Bid for the Final Primary Package.

A 7.14 With this strategy, the Bidder will win either its Final Primary Package or one of the other Packages for which it submitted Bid Amounts that exceed the value of those Packages based on the Round Prices in the final Primary Bid Round (provided that their Bids made in the final Primary Bid Round remain valid). This holds regardless of the Supplementary Bids made by other Bidders due to the effect of the Final Price Cap in limiting the amount that other Bidders can bid. For the avoidance of doubt, the Base Price for this Winning Bid would be less than or equal to the Bid Amount submitted.

A 7.15 Following the example above, if the Bidder followed this second strategy it would make a Supplementary Bid of €113,000 for the Final Primary Package of four A-Lots and four B-Lots, but might then also submit Supplementary Bids above the value of the Package based on the Round Prices in the final Primary Bid Round (plus the corresponding increment) for selected Packages that it might also be willing to win. For example, suppose that the Bidder's Final Primary Package, Package X, was subject to a Relaxed Primary Bid, and its Constraining Package, Package Y, contained three A-Lots and five B-Lots. In the Constraining Round the price of Package Y was €6,000 greater than the price of Package X. If the Bidder makes a Supplementary Bid of €107,000 for Package Y, then it will also be able to submit the Supplementary Bid for Package X, assuming that the Relative Cap on Package Y is satisfied (which may require additional Supplementary Bids).

A 7.16 A Bidder whose Primary Bid in the final Primary Bid Round was neither a Relaxed Primary Bid nor the Zero Bid can always follow either of these strategies. Conversely, a Bidder who made a Relaxed Primary Bid in the final Primary Bid Round may not always be able to adopt the first strategy (depending on the Bids that the Bidder is required to make for Constraining Packages in order to be able to make the required Bid for its Final Primary Package to the level set out above); however, such a Bidder would still be able to adopt the second strategy.

A 7.17 A more formal explanation of the implications of the Final Price Cap, including a mathematical proof, is provided below.

Mathematical derivation

Notation

A 7.18 Suppose there are n Lot Categories and let L denote the set of Lot Categories.

A 7.19 Let $s = (s_1, s_2, \dots, s_n)$ denote the number of Lots available in each Lot Category, where s_i is the number of Lots available in Lot Category i .

A 7.20 We represent a Package of Lots as a vector $q = (q_1, q_2, \dots, q_n)$ where $q_i \geq 0$ is the number of Lots in Lot Category i .

A 7.21 Let J be the set of all Bidders. For any given Bidder, we only need to consider the highest Bid that the Bidder made for any particular package.

A 7.22 Let $\beta^{j,f} = (b^{j,f}, q^{j,f})$ denote the highest Bid that Bidder j made for its Final Primary Package.

A 7.23 Let $u = (u_1, u_2, \dots, u_n)$ denote the number of provisionally unsold Lots in the final Primary Bid Round, given by:

$$u = s - \sum_{j \in J} q^{j,f}$$

A 7.24 Let $\rho = (\rho_1, \rho_2, \dots, \rho_n)$ denote the round prices in the final Primary Bid Round and $r = (r_1, r_2, \dots, r_n)$ be the Reserve Prices.

A 7.25 The value of the feasible outcome in which all Bidders receive their Final Primary Package is then

$$v^f = \sum_{j \in J} b^{j,f} + r \cdot u = \sum_{j \in J} b^{j,f} + r \cdot \left(s - \sum_{j \in J} q^{j,f} \right)$$

where $r \cdot u$ is the total value¹⁹⁰ of the unsold Lots at Reserve Prices r .

¹⁹⁰ $r \cdot u$ is the scalar product $\sum_i r_i u_i$

Analysis

A 7.26 We focus on one particular Bidder $\hat{j} \in J$. We consider the effect if this Bidder increases its Bid for its Final Primary Package by the value of any provisionally unsold Lots at the end of the final Primary Bid Rounds in excess of the reserve price, plus a small increment. This means making a Supplementary Bid for the Final Primary Package of an amount

$$(A) \quad b^{\hat{j},f} = \rho \cdot q^{\hat{j},f} + (\rho - r) \cdot u + \varepsilon$$

where $\varepsilon > 0$ is some small increment. (In the subsequent analysis, this will resolve any ties.) Notice that the Bidder's Bid at the end of the Primary Bid Rounds, $\rho \cdot q^{\hat{j},f}$, is being increased by an amount $(\rho - r) \cdot u$ (plus the small increment) as final Round Prices ρ cannot be lower than Reserve Prices r .

A 7.27 We now compare the value of an outcome in which each Bidder receives its Final Primary Package with some alternative 'test' outcome and identify sufficient conditions for the optimal outcome to be that in which each Bidder is assigned its Final Primary Package.

A 7.28 Let $\beta^{j,t} = (b^{j,t}, q^{j,t})$ be the winning Bid of Bidder j in the alternative 'test' outcome. By assumption this is a feasible outcome, so

$$(B) \quad s_i \geq \sum_{j \in J} q_i^{j,t} \quad \forall i \in L$$

A 7.29 The test outcome has a total value v^t given by

$$v^t = \sum_{j \in J} b^{j,t} + r \cdot \left(s - \sum_{j \in J} q^{j,t} \right)$$

where unsold Lots are valued at Reserve Prices.

A 7.30 The Bid amount of Bidder \hat{j} (as defined in (A) above) is

$$\begin{aligned} b^{\hat{j},f} &= \rho \cdot q^{\hat{j},f} + (\rho - r) \cdot u + \varepsilon \\ &= \rho \cdot q^{\hat{j},f} + (\rho - r) \cdot \left(s - \sum_{j \in J} q^{j,f} \right) + \varepsilon \end{aligned}$$

and so

$$(C) \quad b^{\hat{j},f} \geq \rho \cdot q^{\hat{j},f} + (\rho - r) \cdot \left(\sum_{j \in J} q^{j,t} - \sum_{j \in J} q^{j,f} \right) + \varepsilon$$

where the inequality is obtained by substituting (B) for the supply of Lots s , as $\rho - r \geq 0$.

A 7.31 Now consider the total value of Bids by Bidder \hat{j} 's rivals in the alternative allocation. Regardless of the bidding strategies adopted by rival Bidders, all their Bids are bounded by the Final Price Cap, which requires that:

$$(D) \quad b^{j,f} \geq b^{j,t} + \rho \cdot (q^{j,f} - q^{j,t})$$

A 7.32 Adding together inequality (C) for Bidder \hat{j} and the inequalities (D) for each Bidder $j \neq \hat{j}$ gives that

$$\begin{aligned} \sum_{j \in J} b^{j,f} &\geq \rho \cdot q^{\hat{j},f} + \sum_{j \in J \setminus \hat{j}} [b^{j,t} + \rho \cdot (q^{j,f} - q^{j,t})] + (\rho - r) \cdot \left(\sum_{j \in J} q^{j,t} - \sum_{j \in J} q^{j,f} \right) \\ &\quad + \varepsilon \\ &= \sum_{j \in J \setminus \hat{j}} b^{j,t} + \rho \cdot q^{\hat{j},t} - r \cdot \left(\sum_{j \in J} q^{j,t} - \sum_{j \in J} q^{j,f} \right) + \varepsilon \end{aligned}$$

A 7.33 Rearranging we obtain that

$$\sum_{j \in J} b^{j,f} - r \cdot \sum_{j \in J} q^{j,f} \geq \rho \cdot q^{\hat{j},t} + \sum_{j \in J \setminus \hat{j}} b^{j,t} - r \cdot \sum_{j \in J} q^{j,t} + \varepsilon$$

which can be rewritten in terms of the values of original and test outcomes as

$$v^f \geq \rho \cdot q^{\hat{j},t} - b^{\hat{j},t} + v^t + \varepsilon$$

A 7.34 This demonstrates that provided that Bidder \hat{j} makes a Bid for its Final Primary Package according to the rule set out in (A), then an optimal outcome in which Bidder \hat{j} does not win its Final Primary Package must result in Bidder \hat{j} winning some alternative Package $q^{\hat{j},t}$ for which $b^{\hat{j},t} \geq \rho \cdot q^{\hat{j},t} + \varepsilon$. No assumption has been made about the Bids of other Bidders other than that they satisfy the Final Price Cap. This result also holds irrespective of whether Bidder \hat{j} 's Primary Bid in the final Primary Bid Round was a Relaxed Primary Bid or not.

Implications

Raising bid for Final Primary Package only

A 7.35 An implication of this result is that if Bidder \hat{j} bids for its Final Primary Package according to rule (A) and increases its Bid for no other Package to more than that Package's price in the final Round plus ε , then, provided that the Bids received in the final Primary Bid Round remain valid, the Bidder will win its Final Primary Package regardless of the Supplementary Bids made by other Bidders.

Raising bid for Final Primary Package and other Packages

A 7.36 If Bidder \hat{j} makes a Bid for its Final Primary Package according to rule (A), then it cannot win any other Package for which it has made a Primary Bid, but for which it has not made a Supplementary Bid. This is because such a Primary Bid must have been placed in a round prior to the final Primary Bid Round, at prices no greater than ρ and so this Bid cannot exceed the price of the Package in the final Primary Bids Round plus ε .

The case of a Relaxed Primary Bid for the Final Primary Package

A 7.37 In the case that a Bidder's Primary Bid in the final Primary Bid Round is not a Relaxed Primary Bid, then it is possible for the Bidder to raise its Bid for its Final Primary Package according to rule (A) and make no other Supplementary Bids. Therefore, the Bidder can ensure that it wins its Final Primary Package (provided that all the Bids submitted in the final Primary Bid Round remain valid) if it is prepared to raise its Bid by a sufficient amount.

A 7.38 However, in the case that a Bidder's Primary Bid in the final Primary Bid Round is a Relaxed Primary Bid, there will be a Package $q^{\hat{j},k}$ that is a Constraining Package setting a Relative Cap on Bidder \hat{j} 's Final Primary Package. In turn, $q^{\hat{j},k}$ may be subject to a Relative Cap with a Constraining Package $q^{\hat{j},k'}$ and so on. In this case, it is possible that in order to increase its Bid for its Final Primary Package as specified by rule (A), Bidder \hat{j} might need to increase one or more of its Bids for these Constraining Packages to a level exceeding the price of the corresponding Package in the final Primary Bid Round plus ε .

A 7.39 In such a case, Bidder \hat{j} does not have an available strategy that will ensure that it will win its Final Primary Package regardless of the Supplementary Bids submitted by other Bidders (provided that all the Bids submitted in the final Primary Bid Round remain valid). However, even in this case if Bidder \hat{j} makes no Supplementary Bids for any other Packages, then it will win either its Final Primary Package or one of these Constraining Packages for which it submitted a Supplementary Bid that exceeds the price of the corresponding Package in the final Primary Bids Round plus ε .

Cautionary remarks

A 7.40 The analysis presented in this annex holds in theory but in practice might be affected by exceptional circumstances.

A 7.41 For example, if an exceptional event were to occur after the Supplementary Bids Round, resulting in certain Bids or Bidders being excluded from consideration, this could affect the analysis above by altering the number of provisionally unsold Lots as of the end of the Primary Bid Rounds. Though unlikely, such an event or any other unanticipated event cannot be ruled out. ComReg maintains the right to make a Deposit Call after the Supplementary Bids Round and in the case that one or more Bidders failed to meet this Deposit Call it is possible that some or all of their Bids could be excluded from the determination of Winning Bids.

A 7.42 Therefore, the analysis in this annex does not provide an absolute guarantee in relation to particular winning outcomes. ComReg makes no warranty or representation that any strategy suggested herein is necessary or sufficient to ensure the winning of spectrum.

Annex: 8 Relative Caps in the Primary Bid Rounds

A 8.1 This annex provides further details on the structure of the Relative Caps that are created during the Primary Bid Rounds, with a focus on the consequences of submitting Eligibility-reducing Relaxed Primary Bids.

Treatment of Initial Bids

A 8.2 With respect to the rules on Relative Caps, the Initial Bid submitted by a Bidder is effectively treated in the same way as a Primary Bid submitted during the Primary Bid Rounds, but with Round Prices equal to Reserve Prices. Under the Auction Rules, a Bidder's Initial Eligibility is set by its Initial Bid.

A 8.3 It is possible for Bidders to submit Relaxed Primary Bids for Packages of Lots with Activity in excess of the Bidder's Initial Eligibility in one or both Time Slices. For such Relaxed Bids, the last occasion when a Bidder would have been able to make this bid without exceeding Eligibility would have been as an Initial Bid (subject to not exceeding the Competition Caps). Therefore, the Application Stage acts as if it were the corresponding Constraining Round in such cases and the Initial Bid as a Constraining Package. Informally, this is the same as the Application Stage being a hypothetical "zeroth" Primary Bid Round in which an eligibility-reducing Bid had been made, setting the Initial Eligibility going into the first proper Primary Bid Round.

A 8.4 For these reasons and for simplicity, in this annex we do not explicitly differentiate between the Initial Bid and Primary Bids submitted during a Primary Bid Round as it does not affect the issues discussed.

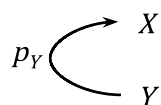
Arrow notation

A 8.5 The features of Relative Caps can be helpfully visualised using the following "arrow" representation.

A 8.6 Consider the case where a Bidder first bids for a Package of Lots X at price p_X and then, in the subsequent Round drops Eligibility to bid for a Package of Lots Y at price p_Y . This sets a Relative Cap on any subsequent bid $\beta(X)$ for Package of Lots X relative to the bid $\beta(Y)$ for Package of Lots Y , with the maximum difference in Bid Amounts determined by the difference in the prices for the two Packages of Lots in the Constraining Round (the Round in which the Bidder submitted the Bid for Y , i.e

$$\beta(X) \leq \beta(Y) + (X - Y) \cdot p_Y$$

A 8.7 We represent this diagrammatically as



A 8.8 The sequence of Rounds runs *down* the page (i.e. we first bid for X then for Y). An arrow runs *from* a Package of Lots *to* a Package of Lots it constrains. Therefore, in the diagram above, to move from the Package of Lots X to its corresponding Constraining Package Y , we need to move *backwards* along the arrow.

A 8.9 The arrow is associated with a price differential, i.e. $(X - Y) \cdot p_Y$. This is the quantity change moving from the Constraining Package Y to the constrained Package X valued at the prices p_Y in force when the Constraining Package was chosen. We can label the arrow with p_Y to emphasise that the quantity difference is valued at p_Y (which is in any case implicit without the label, as these are the Round Prices applying in the Constraining Round).

A 8.10 Key points to note are that:

- the link has a direction, running from a Constraining Package to a constrained Package;
- because each package has at most one Constraining Package, it follows that the Package of Lots chosen in any Round has at most one incoming arrow arriving at that Package of Lots;
- a single Package of Lots may (and typically will) constrain more than one other Package of Lots, and therefore there may be multiple outgoing arrows from a Package of Lots.

A 8.11 To indicate different types of bids made in the diagrams that follow:

- Let S denote a standard Primary Bid (i.e. not a Relaxed Primary Bid) where Eligibility is maintained in both Time Slices;
- Let S_- denote a standard Primary Bid where Eligibility is strictly reduced going forward for at least one Time Slice (and Activity is no greater than the Bidder's Eligibility in either Time Slice as this is not a Relaxed Primary Bid);
- Let R denote a Relaxed Primary Bid where Eligibility is maintained going forward (i.e. a Bid with Activity that is at least equal to the Bidder's Eligibility in both Time Slices, and strictly exceeds it in at least one); and

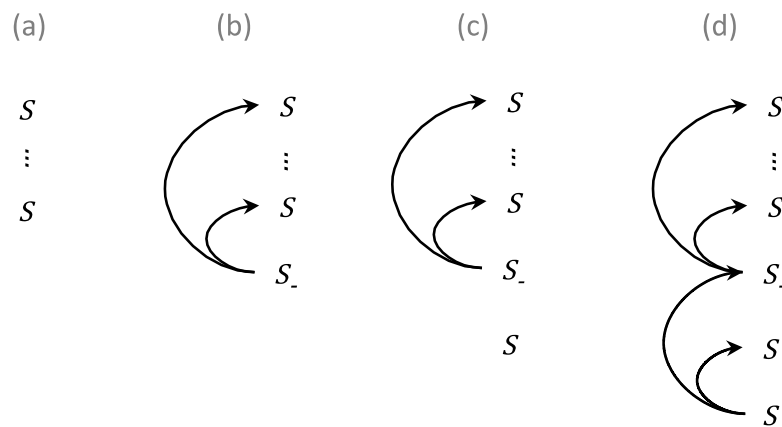
- Let R_- denote an Eligibility-reducing Relaxed Primary Bid i.e. a Bid with Activity that strictly exceeds the Bidder's current Eligibility in one Time Slice but is strictly less than the Bidder's current Eligibility in the other Time Slice.

	Eligibility-maintaining	Eligibility-reducing
Standard Primary Bid	S	S_-
Relaxed Primary Bid	R	R_-

A 8.12 The four categories are summarised in the table above. In these diagrams, we are largely concerned with the type of bid made in each Round (i.e. which of the four categories above occurs) rather than the exact composition of the Package of Lots bid for each in Round.

A simple example

A 8.13 We start with a very simple example in which Eligibility is reduced in steps and there are no Relaxed Primary Bids. The diagram below shows how the Relative Caps build up over successive Rounds as Eligibility is dropped.



A 8.14 In the diagram above:

- The Bidder starts by making a number of standard Primary Bids without dropping Eligibility, shown as a sequence of S 's. At first, no Relative Caps are in force, as the Bidder is maintaining its Initial Eligibility.

- b) The Bidder reduces Eligibility for the first time (shown as a Bid labelled S_1). This reduction in Eligibility establishes Relative Caps on all Package of Lots bid for in the previous Rounds.
- c) Suppose that the Bidder then makes a further standard Primary Bid without reducing Eligibility; a further S is added. This Package of Lots is uncapped at this point. (Note that if the Primary Bid Rounds stopped at this point, then bids on the Final Primary Package would constrain Supplementary Bids made on those packages subject to previous Primary Bids due to effect of the Final Price Cap).
- d) With the next reduction of Eligibility, which occurs in the next Round, a Relative Cap is established on each previous Package of Lots not already having a Relative Cap, including the Package of Lots subject to the previous Eligibility-reducing Primary Bid (i.e. the previous S_1).

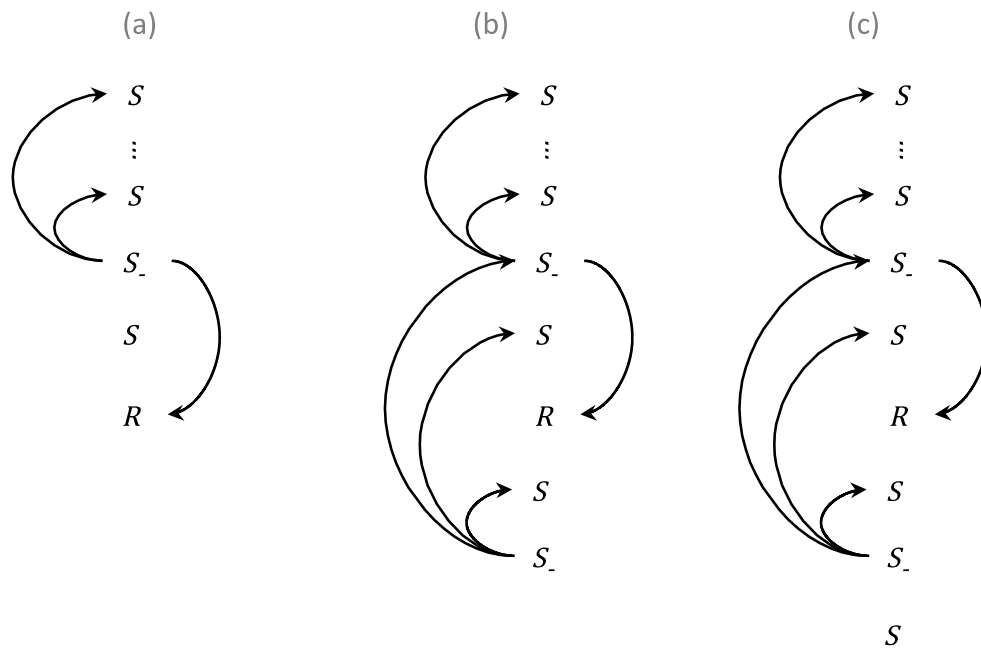
A 8.15 The key feature in this example is that the Relative Caps are chained from one Eligibility-reducing Primary Bid to the next. There are arrows connecting each S_1 back to the previous one in the diagram above.

Relaxed Primary Bids

A 8.16 We now consider the situation when we add Relaxed Primary Bids to these diagrams. In this subsection, we consider only the case of Relaxed Primary Bids that do not also lead to a reduction in Eligibility; Eligibility-reducing Relaxed Primary Bids will be considered in the following Section.

A 8.17 Any Package of Lots X subject to a Relaxed Primary Bid could have been subject to a standard (non-relaxed) Primary Bid in some previous Constraining Round when the Bidder was eligible to bid for X (but did not). A Relative Cap is established on X with regard to the Constraining Package Y that was subject to the Primary Bid submitted in that Constraining Round. By definition, Y must have been first bid for in some Round in which the Bidder reduced Eligibility, otherwise a Relative Cap would not have been set for X .

A 8.18 This is shown in the following example.



- a) *R* shows a Round in which a Relaxed Primary Bid was submitted for Package of Lots we call *X*. In this example, the Bidder has only made one reduction in Eligibility. The corresponding Constraining Package *Y* is, therefore, either that bid for in the only Round in which Eligibility was dropped (shown as the one *S₋* in case (a) above) or the Initial Bid if Eligibility for Package *X* exceeds Initial Eligibility in either Time Slice; for the purposes of the example, we will assume the former case. The arrow runs from *S₋* to *R*, as the Relative Cap applies to the Package of Lots subject to the Relaxed Primary Bid (*R*), and the Constraining Package is the previous Eligibility-reducing Primary Bid (*S₋*) made in the last Primary Bid Round when the Bidder was eligible to bid for Package *X*.
- b) The Bidder makes a further standard Primary Bid after the Relaxed Primary Bid, and then a further (non-relaxed) Eligibility-reducing Primary Bid (i.e. the lowest *S₋* shown in case (b)). This imposes Relative Caps on all previous uncapped Packages of Lots up to and including the preceding *S₋* bid.
- c) Notice that we obtain an unbroken chain of Relative Caps linking the *S₋* Eligibility-reducing Primary Bids. The Package of Lots subject to the Relaxed Primary Bid *R* is then capped in relation to a Constraining Package subject to one of the Bidder's standard Eligibility-reducing Primary Bids (*S₋*). This Constraining Package is whichever Package of Lots the Bidder bid for when it was last eligible to bid for *R*.

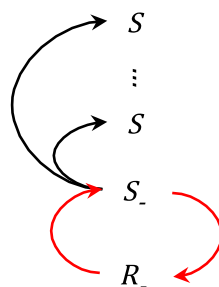
A 8.19 This unbroken chain of Relative Caps arises because each Constraining Package for which the Bidder is no longer eligible to bid in turn has a Constraining Package that is strictly smaller (in terms of Eligibility) in at least one Time Slice and no greater in the other Time Slice. This example allows all the Constraining Packages to be naturally ranked in relation to their size (in terms of Eligibility). Further Eligibility reductions will then append to the chain of Constraining Packages, forming a chain of Constraining Packages ultimately anchored to the smallest Constraining Package.

Eligibility-reducing Relaxed Primary Bids

A 8.20 We now consider the case where a Bidder submits an Eligibility-reducing Relaxed Primary Bid. This is a more complex situation and always creates a loop of Relative Caps. This is because:

- a) the Package of Lots subject to the Eligibility-reducing Relaxed Primary Bid is subject to a Relative Cap, as it is a Relaxed Primary Bid; and
- b) the submission of this bid also creates a Relative Cap on a Package of Lots subject to a previous Eligibility-reducing Primary Bid, as a consequence of this further reduction in Eligibility.

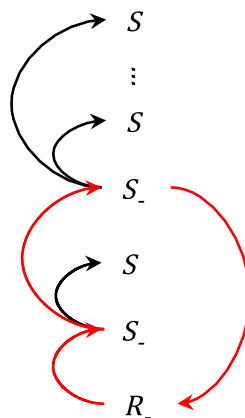
A 8.21 A simple example of an Eligibility-reducing Relaxed Primary Bid is shown below. Here the Bidder first makes a number of standard Primary Bids and maintains its Initial Eligibility (shown as the initial S 's). It then makes a standard Eligibility-reducing Primary Bid (the S_-). This drop in Eligibility creates Relative Caps on the Packages of Lots subject to previous Bids, as in our previous examples.



A 8.22 In the next Round, the Bidder then submits an Eligibility-reducing Relaxed Primary Bid (shown as R_-). As this is a Relaxed Primary Bid, it is subject to a Relative Cap, with the Constraining Package in this case being the Package of Lots bid for in the previous Round (supposing that the Bidder had sufficient Eligibility in that Round to bid for the Package of Lots that is now the subject of R_- as a standard Primary Bid, otherwise the Constraining Package would be the Initial Bid). This gives rise to the downward arrow (from S_- to R_-).

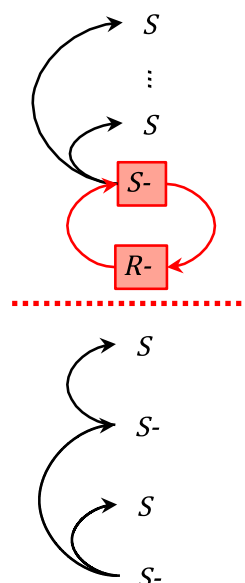
A 8.23 As this is an Eligibility-reducing Round, Relative Caps are also created on all previous uncapped Packages of Lots the Bidder is no longer eligible to bid for after submitting the Relaxed Primary Bid. This creates the upward arrow from R_- to S_- . Therefore, there is a loop of constraints created between R_- and S_- .

A 8.24 In general, any Eligibility-reducing Relaxed Primary Bid will create a loop, but it may involve multiple "steps" depending on how many Eligibility reductions there have been since the Bidder first bid for the Constraining Package. The example below illustrates a case in which the Constraining Package is two steps back in the sequence of Eligibility reductions. The loop is shown in red.



Bids following an Eligibility-reducing Relaxed Primary Bid

A 8.25 What happens after an Eligibility-reducing Relaxed Primary Bid? The example below shows a Bidder making a number of standard Primary Bids, followed by a standard Eligibility-reducing Primary Bid (S_-) and then an Eligibility-reducing Relaxed Primary Bid (shown as R_-). This creates a loop of constraints between R_- and the first S_- , as described above.



A 8.26 In this example, there are then two subsequent drops in Eligibility after the $R_$ bid. Consider the first Eligibility-maintaining standard Primary Bid (i.e. $S_$) following the $R_$ Bid. As there is no reduction in Eligibility, no additional Relative Caps are created.

A 8.27 In the next Round, the Bidder reduces Eligibility (i.e. it submits an $S_$ Bid). This creates a Relative Cap on all Packages of Lots with Eligibility greater than the Activity of the Package of Lots bid for in that Round that were not yet subject to a Relative Cap, as per part a) of paragraph 4.69. Note, however, that the Bidder was not eligible in that Round to bid for the $R_$ Package of Lots (which was thus already subject to a Relative Cap), nor for any other Package of Lots for which it submitted a Primary Bid prior to having made the $R_$ bid). Without any further provisions for setting Relative Caps, this creates a disconnection in the Relative Caps, as bids for the smaller Packages of Lots below the red dashed line do not constrain those above the line.

A 8.28 Such a disconnection always happens immediately after an Eligibility-reducing Relaxed Primary Bid. This can be seen by considering the arrow coming into the $R_$ bid, representing its Relative Cap. It is necessarily an arrow from above; because this is a Relaxed Primary Bid it is constrained by some Package of Lots already bid for in a previous eligibility-reducing Round. Because each Package of Lots receives at most one incoming arrow (i.e. has at most one Constraining Package), it follows that the $R_$ bid cannot be constrained by subsequent Bids.

A 8.29 Such a disconnection would be contrary to the intention of the Activity Rules that are designed to impose constraints on the Primary Bids and Supplementary Bids Bidders can submit based on their bidding behaviour in earlier Primary Bid Rounds.

A 8.30 We, therefore, apply part b) of paragraph 4.69, which states that submission of an Eligibility-reducing Bid will set a Relative Cap for one (if any exist) of the Packages of Lots for which the Bidder has already submitted an Eligibility-reducing Primary Bid in an earlier Round (potentially replacing a pre-existing Relative Cap on that Package of Lots)¹⁹¹. This ensures that the chain of Relative Caps remains connected following an Eligibility-reducing Relaxed Primary Bid and a subsequent further reduction in Eligibility. The effectiveness of this rule relies on the property that, whenever a loop of constraints exists, it is *always* possible in a subsequent Round to submit a Relaxed Primary Bid for at least one of the Packages of Lots included in the loop.

¹⁹¹ In particular, we choose the Package of Lots most recently subject to an Eligibility-reducing Primary Bid out of the Packages of Lots that the Bidder could have bid for in the current Eligibility-reducing round.

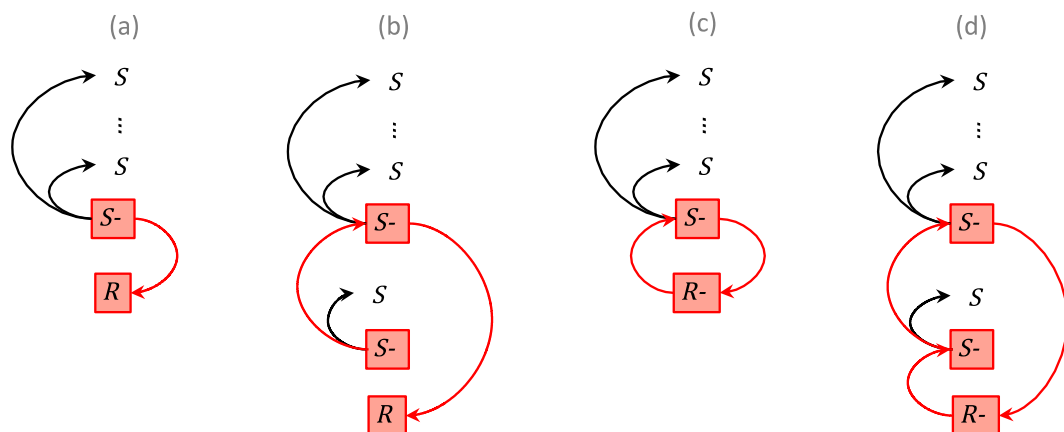
A 8.31 In order to demonstrate how this rule works, we first need to explore the consequences of there being a "loop" of Relative Caps in a little more detail.

Permissibility of Relaxed Primary Bids

A 8.32 Relaxed Primary Bids are only possible in situations where these are consistent with the Relative Caps that result from previously submitted bids. In particular, in order to be able to make a Relaxed Primary Bid, it is necessary that any required Chain Bids do not exceed the current Round Prices.

A 8.33 The Packages of Lots potentially subject to Chain Bids are easily identifiable in these arrow diagrams, by following the arrows backwards from the Relaxed Primary Bid until a Package of Lots is reached that the Bidder is currently eligible to bid for. The first step backwards identifies the Constraining Package of the Package of Lots subject to the Relaxed Primary Bid. The second step backwards identifies the Constraining Package of the first Constraining Package and so on.

A 8.34 Consider first cases (a) and (b) in the illustration below. These are examples in which a Relaxed Primary Bid does not reduce Eligibility. The Relaxed Primary Bid is at current Round Prices. The Relative Cap on the Relaxed Primary Bid requires a minimum Bid Amount for its Constraining Package. In turn, there is a required minimum Bid Amount for that package's Constraining Package and so on. These are the Chain Bids, which are found by backtracking along the arrows (shown in red). For the Relaxed Primary Bid to be allowed, none of these implied Chain Bids may exceed the price of the corresponding Package of Lots in the current Round.

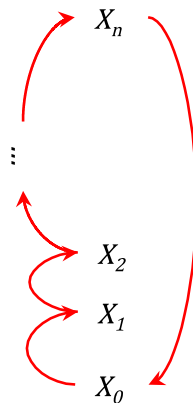


A 8.35 Consider now cases (c) and (d). These are similar to cases (a) and (b), except now the Relaxed Primary Bid is assumed to be eligibility-reducing. In these examples, the Package of Lots subject to the preceding Eligibility-reducing Primary Bid, which was uncapped prior to the submission of the Eligibility-reducing Relaxed Primary Bid, becomes subject to a Relative Cap once the Relaxed Primary Bid is made. The result is the loop of Relative Caps shown in red.

A 8.36 We can still apply the same procedure following arrows backwards from the Relaxed Primary Bid, but when this is also an eligibility-reducing Bid, we will eventually return back to the Package of Lots subject to the Relaxed Primary Bid from which we initially started. In order for the Relaxed Primary Bid to be possible, we need:

- a) the loop of Relative Caps to be mutually compatible; and
- b) the minimum Bid Amounts (which would apply to any necessary Chain Bids) not to exceed the prices for each Constraining Package traversed at current Round Prices.

A 8.37 A general example of the loop of Relative Caps that results from the submission of an Eligibility-reducing Relaxed Primary Bid is shown below, where X_0 is the Package of Lots subject to the Eligibility-reducing Relaxed Primary Bid. X_n is the Constraining Package of X_0 . Then X_r has a Constraining Package X_{1-r} for $r = 1, \dots, n$.



A 8.38 In order to make this Relaxed Primary Bid for X_0 , the Relative Caps will need to be mutually consistent. This has a simple geometric interpretation. Each arrow has an associated "length", which is the price difference between the constrained Package of Lots and the Constraining Package valued at the prices applying in the relevant Constraining Round.

A 8.39 A condition for the loop of Relative Caps to be consistent is that:

The price difference associated with the Relative Cap that results from the submission of X_0 (i.e. the new "arrow" from X_0 to X_1) cannot exceed the sum of price differences associated with the Relative Caps that link X_0 back to X_1 (implied by the "arrows" that go from X_1 to X_n and ultimately to X_0)¹⁹².

A 8.40 Consider first the sum of price differences associated with the arrows linking X_0 to X_1 (anticlockwise). If X_0 receives a Bid at the current Round Prices, then the Relative Cap imposed by X_n on X_0 implies a minimum Bid Amount needed for X_n . This minimum is the Bid Amount for X_0 plus the price difference represented by the down arrow from X_n to X_0 . Then, a Bid for X_n requires a minimum Bid Amount for X_{n-1} (an up arrow); a Bid for X_{n-1} requires a minimum Bid Amount for X_{n-2} (an up arrow) and so on. Eventually, having travelled completely around the loop, we find an implied minimum Bid Amount for X_n . Therefore, the sum of these price differences represents the maximum price difference between X_0 and X_1 that is consistent with these Relative Caps.

A 8.41 Consider now the price difference represented by the arrow going from X_0 to X_1 . This price difference is the difference between X_0 and X_1 at current Round Prices. However, if the price difference between X_0 and X_1 at current Round Prices were greater than the maximum price difference between X_0 and X_1 that is consistent with these Relative Caps, then a Relaxed Primary Bid for X_0 would not have been possible.

A 8.42 Note also that we can generalise this condition as follows:

The price difference associated with a Relative Cap that is chained within a loop of Relative Caps cannot exceed the sum of price differences associated with all other Relative Caps within the loop¹⁹³.

A 8.43 In other words, the price difference associated with any one arrow within a loop cannot exceed the sum of price differences associated with all other arrows within the loop. If this requirement were not satisfied, the Relative Caps would not be mutually consistent.

¹⁹² Note that differentials may be positive or negative.

¹⁹³ Again, note that price differences may be positive or negative.

Consequences of looped Relative Caps

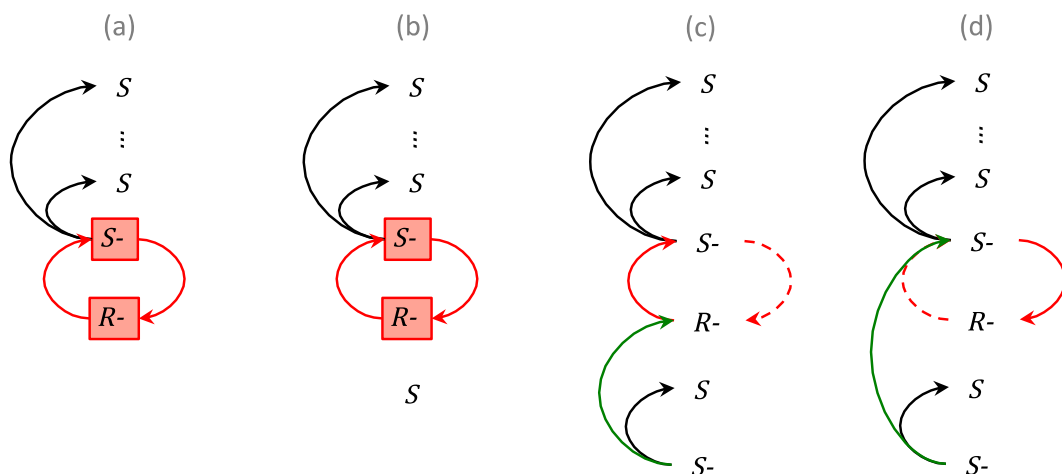
- A 8.44 As we have demonstrated above, whenever an Eligibility-reducing Relaxed Primary Bid is made, a loop of Relative Caps will result. Starting from the Package of Lots bid for, if we find its Constraining Package, then that package's Constraining Package and so on, we will always eventually loop back to the original Package of Lots that is subject to the Relaxed Primary Bid. Moreover, for any permissible Relaxed Primary Bid, the differentials associated with these Relative Caps must be consistent when traversing the loop.
- A 8.45 As a result of this loop of constraints, it follows as a direct logical consequence that in any subsequent Round it will be possible to make a Relaxed Primary Bid for at least one of the Packages of Lots within this loop. This is true for every subsequent Round as long as the loop is maintained. Which specific Package of Lots within the loop could be the subject of a Relaxed Primary Bid may depend on the Round Prices, and in some cases, a Relaxed Primary Bid may be possible for more than one of the Packages of Lots in the loop. However, it will always be possible to bid for *at least one* Package of Lots in the loop regardless of the Round Prices.
- A 8.46 Therefore, in the loop shown above, in any Round subsequent to the Eligibility-reducing Relaxed Primary Bid for X_0 , it will always be possible to make a Relaxed Primary Bid for at least one of the Packages of Lots X_0, X_1, \dots, X_n . An elementary proof of this is provided at the end of this Annex.
- A 8.47 A direct consequence of this property is that, following an Eligibility-reducing Relaxed Primary Bid for a Package of Lots X_0 , in the first subsequent Round in which Eligibility is reduced further (by submitting an Eligibility-reducing Primary Bid for some Package of Lots Y), a Relaxed Primary Bid could have been made on at least one of the Packages of Lots X_0, X_1, \dots, X_n within the loop of Relative Caps.
- A 8.48 Specifically, let us suppose that the Bidder could have bid for X_j . As the Bidder has chosen Y in preference to X_j in an Eligibility-reducing Round, it is possible to impose a Relative Cap on X_j (with Y as the Constraining Package) to reflect this preference. This in turn would mean that the chain of Relative Caps before and after an Eligibility-reducing Relaxed Primary Bid remains connected.

A 8.49 Note, however, that Package of Lots X_j will already be subject to a Relative Cap. This must be so as, by definition, it is a member of a loop of Relative Caps. However, if X_j is then subject to a Relative Cap from Y , then X_j would be subject to two Relative Caps. This is an undesirable feature as it would place unnecessary constraints on the Bidder. Also, if further Eligibility-reducing Relaxed Primary Bids were made that resulted in a loop that again included X_j , it would be possible that X_j could end up having even more than two Relative Caps, creating significant complexity.

A 8.50 To avoid this problem, the existing Relative Cap on X_j can simply be replaced by the new Relative Cap against Y . This amounts to re-setting the Constraining Package (and Constraining Round) for X_j .

Examples of resetting the Constraining Package

A 8.51 An example is provided in the illustration below. Case (a) shows the situation directly after the Bidder has made an Eligibility-reducing Relaxed Primary Bid (R_-). A loop of Relative Caps is created (shaded red), which means that in any subsequent Round it will always be possible to make a Relaxed Primary Bid for at least one Package of Lots in the loop.



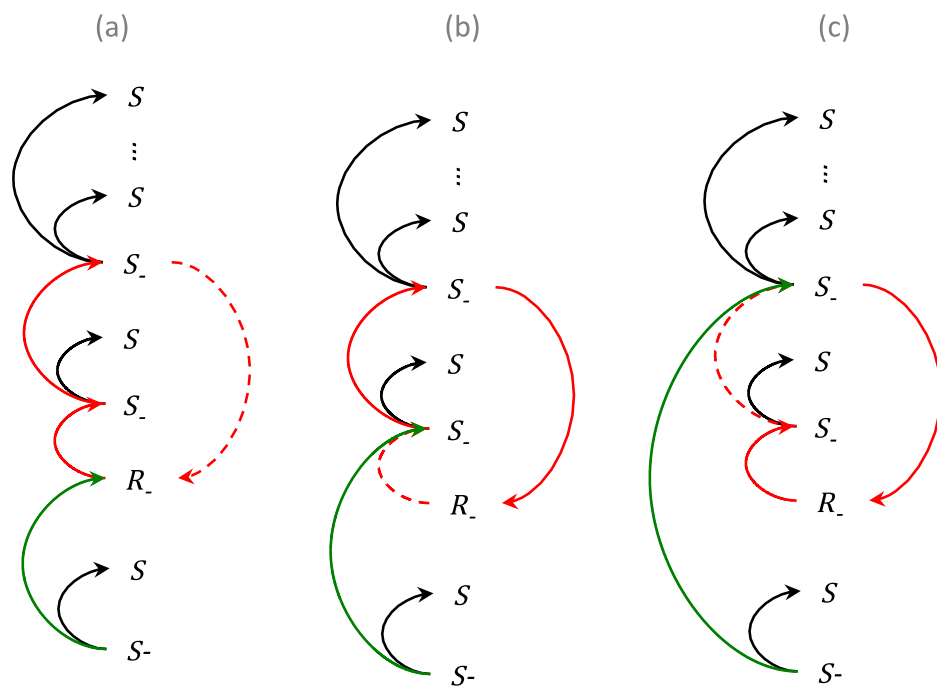
A 8.52 The Bidder then makes a standard Primary Bid that does not reduce Eligibility, shown as case (b). As there has been no reduction in Eligibility, no new Relative Caps are introduced. The Package of Lots subject to the last Primary Bid remains uncapped until such time as there is a subsequent reduction in Eligibility. The loop of Relative Caps involving R_- remains for now.

A 8.53 Now suppose that the Bidder drops Eligibility (by submitting an S_- bid). We know that the Bidder is also able to make a Relaxed Primary Bid in this Round for at least one of the two Packages of Lots within the loop of Relative Caps.

A 8.54 In case (c), let us suppose that the Bidder would be able to submit a Relaxed Primary Bid for the Package of Lots in the loop most recently bid for (i.e. the $R_$ package). We can impose a new Relative Cap (the green arrow) and remove the previous Relative Cap (shown as a red dashed arrow).

A 8.55 Conversely, if the Bidder cannot bid for the $R_$ Package of Lots, it will be able to make a Relaxed Primary Bid for the other Package of Lots in the loop (the first $S_$ package). This is shown as case (d). Notice that in both cases (c) and (d) the loop of Relative Caps is eliminated and the disconnection issues discussed above do not occur.

A 8.56 In the diagram below, we illustrate the same approach at work in a slightly more complex example in which there are three Packages of Lots in a loop of Relative Caps. Once this loop is established, we know that it will always be possible to make a Relaxed Primary Bid for at least one of the three Packages of Lots in the loop; however, we do not know in advance which one, as this will depend on Round Prices.



A 8.57 As any of the three Packages of Lots within the loop might be subject to a Relaxed Primary Bid in the most recent Round, we show three cases. The green arrow shows the new Relative Cap. A Relative Cap is then dropped (dashed red arrow) such that each Package of Lots receives just one incoming arrow.

A 8.60 We start with a loop of two Relative Caps, which is then followed by an Eligibility-reducing Relaxed Primary Bid. This causes the previous loop of constraints to be cut, but a new constraint is then established. There are two cases to consider, depending on whether the new R_Bid is capped by the previous R_Bid , establishing a new loop of three Relative Caps, or capped by the previous S_Bid , resulting in a new loop of two Relative Caps (in the diagram above we show the latter case).

A 8.61 Whichever of these two cases occurs, suppose that the Bidder then makes a standard Eligibility-reducing Primary Bid, shown as the final S_Bid in the lowest tier of diagrams above. This will then cut the existing loop of constraints, depending on which preceding Package of Lots establishes the Relative Cap. Therefore, in all cases we end up with all Packages of Lots being part of a chain of Relative Caps and there being no loops.

Auction rules for setting Relative Caps

A 8.62 The principles for creating Relative Caps discussed above, including the replacement of Relative Caps to break loops of constraints, can be neatly condensed into the rules specified in paragraphs 4.69 – 4.70 of the Information Memorandum. These specify that:

“The submission of Eligibility-reducing Primary Bids will result in a Relative Cap being created on certain Packages of Lots that the Bidder could have bid for in that Round, but chose not to. Specifically, when a Bidder submits an Eligibility-reducing Primary Bid Z, then:

- a) this will set a Relative Cap with respect to that Round on any Packages of Lots with Eligibility greater than the Activity of Z in any of the Time Slices and which were not yet subject to a Relative Cap; and*
- b) if the Bidder had already submitted any Eligibility-reducing Primary Bids in earlier Rounds, then this will set a Relative Cap for one of the Packages of Lots for which the Bidder has already submitted an Eligibility-reducing Primary Bid - specifically the Package of Lots for which the Bidder submitted its most recent Eligibility-reducing Primary Bid (prior to Z) out of those Packages of Lots for which the Bidder would have been able to submit a Primary Bid (relaxed or ordinary) in the in the Round in which the Bidder submits a Bid for Z.*

If the Package of Lots identified in part b) of Paragraph 4.69 above

is already subject to a Relative Cap (set by an Eligibility-reducing Primary Bid submitted in an earlier Round), that pre-existing Relative Cap is replaced by the new Relative Cap created by the Eligibility-reducing Primary Bid for Z.”

A 8.63 To demonstrate how these rules work, suppose that Package of Lots Y is the Package of Lots subject to the most recently submitted Eligibility-reducing Primary Bid. There are two cases to consider when a Bidder subsequently reduces Eligibility further by submitting an Eligibility-reducing Primary Bid for a Package of Lots Z:

- 1) **The Eligibility-reducing Primary Bid for Y was *not* a Relaxed Primary Bid:** Part a) of the Relative Cap setting rules sets new Relative Caps for all Packages of Lots the Bidder was eligible to bid for at the start of the Round, but is no longer eligible to bid for following the Eligibility-reducing Primary Bid for Z. Note that these Packages of Lots must include the Package of Lots subject to the most recent previous Eligibility-reducing Primary Bid, which is the Package of Lots that would be identified for a new Relative Cap under part b) of the rules.¹⁹⁴ In this case, part b) therefore has no additional impact on the Relative Caps that are created.

¹⁹⁴ If Y is the Package of Lots subject to the most recent Eligibility-reducing Primary Bid prior to bidding for Z, and the Bid for Y was a standard Primary Bid (i.e. not a Relaxed Primary Bid) the Bidder would have had sufficient Eligibility (in both Time Slices) to submit a Primary Bid for Y instead of Z. We also know that no other Eligibility-reducing Primary Bids were submitted between the Bids for Y and Z. Package Y therefore meets the criteria for being “*the Package of Lots for which the Bidder submitted its most recent Eligibility-reducing Primary Bid (prior to Z) out of those Packages of Lots for which the Bidder would have been able to submit a Primary Bid (relaxed or ordinary) in the in the Round in which the Bidder submits a Bid for Z*”.

- 2) **The Eligibility-reducing Primary Bid for Y was a Relaxed Primary Bid:** Part a) again sets new Relative Caps for all Packages of Lots the Bidder was eligible to bid for at the start of the Round, but is no longer eligible to bid for following the Eligibility-reducing Primary Bid for Z. However, without any further rules there would be a loop of constraints (created by the Eligibility-reducing Relaxed Primary Bid for Y) and we would face the problem of a disconnection in the Relative Caps, as described above. This is resolved by applying the rules set out in paragraph 4.69 part b) and paragraph 4.70¹⁹⁵. We know that in the Round in which the Bidder bid for Z, it would have been possible to instead have submitted a Relaxed-Primary Bid for at least one of the Packages included in the loop of constraints. We know also that there were no reductions in Eligibility between the most recent Eligibility-reducing Primary Bid within the loop of constraints (i.e. the Bid for Y) and the Bid for Z. Consequently, the Package of Lots for which the Bidder submitted its most recent Eligibility-reducing Primary Bid (prior to Z) out of those Packages of Lots for which the Bidder would have been able to submit a Primary Bid in the in the Round in which the Bidder submits a Bid for Z *must* be one of the Packages of Lots within the loop. This is the Package of Lots that would be identified under part b) of the rules for setting Relative Caps. Therefore, where a loop of constraints exists and the Bidder subsequently submits an Eligibility-reducing Primary Bid, we know that a new Relative Cap will always be set for one of the Packages of Lots within the loop. The pre-existing Relative Cap on that Package of Lots will be replaced, the loop will be broken, and connection across the Relative Caps created during the Primary Bid Rounds will be maintained.

Proof of possibility of a relaxed bid given a loop of Relative Caps

A 8.64 Suppose that a loop of Relative Caps has become established amongst the Packages of Lots X_0, X_1, \dots, X_n . The Constraining Package of X_r is X_{r-1} for $r = 1, \dots, n$ and the prices in the Constraining Round p_{r-1} . The Constraining Package of X_0 is X_n and the prices in the Constraining Round p_n .

A 8.65 Let X_0 be the Package of Lots within the loop that was subject to the most recent Eligibility-reducing Relaxed Primary Bid. Such a bid must exist within the loop, otherwise the loop of constraints would not have formed.

A 8.66 The Relative Caps in force amongst X_0, X_1, \dots, X_n are then:

$$\beta(X_1) \leq \beta(X_0) + p_0 \cdot (X_1 - X_0)$$

¹⁹⁵ Relating to the replacement of pre-existing Relative Caps.

$$\beta(X_2) \leq \beta(X_1) + p_1 \cdot (X_2 - X_1)$$

⋮

$$\beta(X_n) \leq \beta(X_{n-1}) + p_{n-1} \cdot (X_n - X_{n-1})$$

$$\beta(X_0) \leq \beta(X_n) + p_n \cdot (X_0 - X_n)$$

where $\beta(X_i)$ is the highest Bid so far for X_i .

A 8.67 These constraints are mutually compatible. In particular, as a Relaxed Primary Bid for X_0 was possible at prices p_0 , the Relative Caps admit a solution where

$$\beta(X_0) = p_0 \cdot X_0 \text{ and } \beta(X_r) = p_0 \cdot X_0 + d_i \text{ for } i = 1, \dots, n$$

for some differences d_1, \dots, d_n with the solution satisfying $\beta(X_i) \leq p_0 \cdot X_i$ (i.e. none of the Chain Bids exceed the price of the corresponding Package of Lots at prices p_0 in force when the Bid for X_0 is made).

A 8.68 Now consider the possibility of a Relaxed Primary Bid in some subsequent Round where the Round Prices $p \geq p_0$.

A 8.69 As the Relative Caps only constrain *differences* between Packages of Lots, for any choice of b the Bids defined by

$$\beta(X_0) = b \text{ and } \beta(X_r) = b + d_i \text{ for } i = 1, \dots, n$$

must satisfy the Relative Caps. On setting $b = p_0 \cdot X_0$, we know already from above that $\beta(X_i) \leq p_0 \cdot X_i \leq p \cdot X_i$.

A 8.70 Now increase b until one of the constraints $\beta(X_i) \leq p \cdot X_i$ first becomes an equality, which occurs when

$$b = \min_{i=0, \dots, n} (p \cdot X_i - d_i)$$

where $d_0 = 0$. Let j be the Package of Lots on which this minimum is achieved.

A 8.71 The Relative Caps will still be satisfied for this higher b (as these constraints are independent of b). We have thus a situation in which X_j receives at Bid at Round Prices p and no other Package of Lots in the loop exceeds Round Prices p , i.e.

$$\beta(X_i) = b + d_i \leq p \cdot X_i \text{ for all } i = 0, \dots, X_n \text{ and}$$

$$\beta(X_j) = b + d_j = p \cdot X_j \text{ for some } j$$

A 8.72 Therefore, a Relaxed Primary Bid for X_j is possible at Round Prices p .

A 8.73 This demonstrates that at least one of X_0, X_1, \dots, X_n will allow a Relaxed Primary Bid at Round Prices p . However, notice that X_j is not necessarily unique, as there may be multiple choices of d_1, \dots, d_n consistent with the Relative Caps.

Annex: 9 Worked example of Winner and Price Determination

A 9.1 This annex provides a very simple example of the winner and price determination process¹⁹⁶.

A 9.2 There are four Bidders and two Lot Categories (A and B), with two Lots in Lot Category A and two Lots in Lot Category B. All Valid Bids at the end of the Supplementary Bids Round are shown in Table A9.1, with the optimal allocation highlighted in green. For the purposes of simplifying the example, we assume that reserve prices are zero for all Lots and that bid amounts can be any whole number.

Table A9.1 Valid bids at the end of the Supplementary Bids Round

Bidder	Lot Category A	Lot Category B	Bid Amount
Bidder 1	1	0	8
Bidder 1	1	1	10
Bidder 1	0	2	12
Bidder 2	2	0	16
Bidder 2	1	1	15
Bidder 3	1	1	15
Bidder 4	2	2	24

A 9.3 In this simple case it is easy to verify that the combination giving the highest total Bid value (the Winning Combination of Bids) is Bidder 3's Bid for (1,1) and Bidder 2's Bid for (1,1), generating a total value of 30. The notation (x,y) refers to x A Lots and y B Lots.

A 9.4 If we were to accept Bidder 1's Bid for (1,0), we could only additionally accept either Bidder 2's Bid for (1,1), producing a total value of 23, or Bidder 3's Bid for (1,1), producing a total value of 23 (and leaving one B Lot unsold).

¹⁹⁶ The example is for illustrative purposes only and, for simplicity, ignores the requirements that Bid Amounts and Base Prices will be in multiples of EUR 1,000.

A 9.5 If we were to accept Bidder 1's Bid for (1,1), we could also accept a Bid for (1,1) from either Bidder 2 or Bidder 3, creating a total value of 25 in each case.

A 9.6 If we were to accept Bidder 1's Bid for (0,2), we could only accommodate Bidder 2's Bid for (2,0) (and vice versa), producing a total value of 28.

A 9.7 If we were to accept Bidder 4's Bid for (2,2), we could not accommodate any other Bidder, giving a total value of 24.

A 9.8 This means that accepting Bids for (1,1) from Bidder 2 and (1,1) from Bidder 3 is the unique Winning Combination of Bids.

Base Price determination

A 9.9 Taking the example provided above, we establish the Base Prices that must be paid by the Winning Bidders (Bidder 2 and Bidder 3), based on Opportunity Cost.

A 9.10 We first calculate the Winning Bidders' individual Opportunity Costs, starting with Bidder 2.

Table A9.2. Outcome when excluding Bidder 2 (difference to optimal outcome)

Bidder	Lot Category A (Difference to optimal outcome)	Lot Category B (Difference to optimal outcome)	Bid Amount (Difference to optimal outcome)
Bidder 1	1 (+1)	1 (+1)	10 (+10)
Bidder 2	0 (-1)	0 (-1)	0 (-15)
Bidder 3	1 (0)	1 (0)	15 (0)
Total	2 (0)	2 (0)	25 (-5)

A 9.11 If we eliminated Bidder 2 completely from the Auction, the Winning Combination of Bids would be to take the same Bid from Bidder 3 as in the optimal allocation, together with the Bid for (1,1) from Bidder 1 at a Bid Amount of 10, creating a total value of 25. From this, we have to subtract the amount in the winning combination that comes from the Winning Bids of Bidders other than Bidder 2, which in this case is the 15 from Bidder 3's Winning Bid. This means that the Opportunity Cost of accepting Bidder 2's Winning Bid is $25 - 15 = 10$. Equally, this can be obtained by adding the differences in Bid Amounts relative to the optimal outcome in Table A9.2 above for all Bidders except Bidder 2. This gives +10 (from Bidder 1) and 0 (from Bidder 3), giving Bidder 2's individual Opportunity Cost of 10.

A 9.12 Similarly, if we eliminated Bidder 3 from the Auction, our best option would be to accept Bidder 1's Bid for (0,2) together with Bidder 2's Bid for (2,0), creating a total value of 28. The Opportunity Cost of accepting Bidder 3's Bid is therefore given by $28 - 15 = 13$. This is shown in Table A6.3; Bidder 1 is better off by 12 and Bidder 2 is better off by 1 compared to the optimal outcome. The total individual Opportunity Cost imposed by Bidder 3 is therefore 13.

Table A9.3. Outcome when excluding Bidder 3 (difference to optimal outcome)

Bidder	Lot Category A (Difference to optimal outcome)	Lot Category B (Difference to optimal outcome)	Bid Amount (Difference to optimal outcome)
Bidder 1	0 (0)	2 (+2)	12 (+12)
Bidder 2	2 (+1)	0 (-1)	16 (+1)
Bidder 3	0 (-1)	0 (-1)	0 (-15)
Total	2 (0)	2 (0)	28 (-2)

A 9.13 We then need to calculate the joint Opportunity Cost for both Winning Bidders. If we eliminate both Winning Bidders, the best option is to give both A Lots and both B Lots to Bidder 4. This generates a total bid value of 24, so the joint Opportunity Cost is 24.

Table A9.4. Jointly excluding Bidder 2 and Bidder 3 (difference to optimal outcome)

Bidder	Lot Category A (Difference to optimal outcome)	Lot Category B (Difference to optimal outcome)	Bid Amount (Difference to optimal outcome)
Bidder 2	0 (-1)	0 (-1)	0 (-15)
Bidder 3	0 (-1)	0 (-1)	0 (-15)
Bidder 4	2 (+2)	2 (+2)	24 (+24)
Total	2 (0)	2 (0)	24 (-6)

A 9.14 This means that individual Opportunity Costs are 10 for Bidder 2 and 13 for Bidder 3 respectively, and 24 for both Bidders together. Base Prices cannot be lower than individual Opportunity Costs.

A 9.15 However, setting Base Prices at individual Opportunity Cost is not sufficient in this case, as the Bidders would not cover their joint Opportunity Cost (because $10 + 13 = 23 < 24$). That is, the Winning Bidders would be jointly paying 23 for the Lots they have been awarded, but Bidder 4 would be willing to pay more (24). Together, they therefore need to pay an additional 1 over and above the sum of their individual Opportunity Costs.

A 9.16 Any set of prices for Bidder 2 and 3 that ensures Bidder 2 pays at least 10, Bidder 3 pays at least 13, and Bidders 2 and 3 jointly pay 24 minimises the sum of Base Prices. In this case, the pricing rule¹⁹⁷ splits the additional cost above the sum of individual Opportunity Costs equally. Therefore, Bidder 2's Base Price is 10.5 and Bidder 3's Base Price is 13.5.

¹⁹⁷ Which minimises the sum of squares of differences between the Base Prices for each Winner and the individual Opportunity Cost for that Winner.

Annex: 10 Exposure Pricing

A 10.1 This Annex describes the implementation of Exposure Prices. An Exposure Price is an upper bound on the price that a particular Bidder would pay if it were to win a particular package made as a Primary Bid under certain hypothetical assumptions:

- That the current Primary Bid Round would be final one;
- That other Bidders made Primary Bids such that there would be no unallocated lots in that Primary Bid Round (i.e. supply and demand exactly match).

A 10.2 Therefore, an Exposure Price is calculated for a particular Bidder and a particular Package of Lots in a particular Primary Bid Round.

A 10.3 As explained below, Exposure Prices for different Packages of Lots for the same Bidder in a particular Primary Bid Round take the form of a uniform Discount applied to price of a Package at the current Round Prices. This Discount is the same for all Packages. However, the Discount typically varies across Bidders in any given Primary Bid Round. For any given Bidder, the Discount will typically vary from one Primary Bid Round to the next (and may increase or decrease).

Derivation of Exposure Prices

A 10.4 Take a particular Bidder who makes a Primary Bid for a quantity q at a Round Prices p , and suppose hypothetically that this Round became the final Primary Bid Round.

A 10.5 Because it is the final Primary Bid Round, demand due to other Bidders' Primary Bids sums to no more than $s - q$, where s is the total supply of Lots (expressed as a vector across Lot Categories). Suppose that these other Bidders had made Primary Bids that sum to the entire quantity $s - q$, so that no Lots go unallocated in the final Primary Bid Round.

A 10.6 A feasible (though not necessarily optimal) winning outcome is to accept all the Primary Bids submitted in the final Primary Bid Round. This would have total winning value $p \cdot q$. The other Bidders would receive at least a total value of $p \cdot (s - q)$ from their winning bids. This sets a lower bound on the value that the other Bidders receive in the winning outcome, on the assumption of no unsold Lots in the final Primary Bid Round.

A 10.7 The price that the Bidder pays for a Package of Lots q can be no more than

$$E(q) = V(s | p, q, H) - p \cdot (s - q)$$

where $V(s | p, q, H)$ is defined to be the greatest value that other Bidders could collectively express for the total supply of Lots s :

- given the actual Primary Bid Round history H for the other Bidders up to and preceding the current Primary Bid Round;
- assuming that the other Bidders submit Primary Bids in this Primary Bid Round for a total amount $s - q$ (leading to no unallocated Lots in the final Primary Bid Round); and
- given the rules for Supplementary Bids and any other bidding constraints applying to those Bidders.

A 10.8 For the purposes of calculating V , as a convenience we can assume that the other Bidders maintain the Bid Amounts for their Final Primary Packages at the assumed Round Prices in the final Primary Bid Round p . This is because if the other Bidders were to increase their Bids for their Final Primary Packages, then there would be an equal increase in lower bound for their winning value given by accepting all their Primary Bids submitted in the final Primary Bid Round. Therefore, there would be no effect on the definition of the Exposure Price E defined above.

A 10.9 Note that it is possible for the Bidder to choose a Package of Lots q that is sufficiently small in one or more Lot Categories that it may not be feasible for the other Bidders to express a demand $s - q$ in the current Primary Bid Round given the auction history H . Such Packages of Lots are incompatible with the assumptions above and the exposure price does not apply to such Packages of Lots.

A 10.10 The value $V(s | p, q, H)$ is independent of q due to the structure of the activity rules. To see this, suppose that one of the other Bidders made a Primary Bid in the final Primary Bid Round for a Package of Lots z and maintained the Bid Amount at $p \cdot z$. Through the activity rules, this sets caps on the Bid Amounts for other Packages of Lots. Suppose instead that this Bidder had submitted a Zero Bid in the final Primary Bid Round. It would still be able to make a Supplementary Bid for Package of Lots z at a Bid Amount $p \cdot z$. Therefore, any Relative Caps for which z was the Constraining Package remain the same as if the Bidder had bid for z as its final Primary Package. The Final Price Cap for any Package of Lots other than z is also the same whether the Bidder bid for z or submitted a Zero Bid in the final Primary Bid Round.

A 10.11 Therefore, we can suppress any dependency of V on q and write $V(s | p, H)$ instead. Moreover, we can calculate V by assuming hypothetically that all the other Bidders reduced demand to zero in the current Primary Bid Round at Round Prices p and given previous bidding history H .

A 10.12 Given this structure, we may express the Exposure Price as $E(q) = p \cdot q - \Delta$ where $\Delta = p \cdot s - V(s | p, H)$ can be interpreted as the Discount that is independent of q .

Assumption of no unallocated Lots in the final Primary Bid Round

A 10.13 The argument above is dependent on the assumption that the final Primary Bid Round completes with no unallocated Lots. Without this assumption, it is possible that a bidder could pay more than the Exposure Price as defined above.

A 10.14 Suppose instead that there were u unallocated Lots and that the Reserve Price is r . In this case, the other bidders would have Primary Bids in the final Primary Bid Round that would express a total demand $s - q - u$. Therefore, the lower bound on the value that the other Bidders will receive in the winning outcome would be reduced to

$$r \cdot u + p \cdot (s - q - u) = p \cdot (s - q) - (p - r) \cdot u$$

and the exposure price would increase to

$$E(q) = p \cdot q - \Delta + (p - r) \cdot u$$

A 10.15 Therefore, the previously derived formula for the Exposure Price is modified by the addition of the term $(p - r) \cdot u$, which is the cost of the unallocated Lots at the final Round Prices less their cost at Reserve Prices.

Potential for unsold lots

A 10.16 We emphasise that Exposure Prices are intended to provide additional information to bidders. There is no guarantee that if Bidder wins its Final Primary Package it will pay no more than its Exposure Price, as the assumption that there are no unallocated Lots in the final Primary Round may not hold.

A 10.17 Bidders are reminded that even if the final Primary Round itself completes with no unallocated Lots, it is still possible that, in exceptional circumstances, one or more bids could be voided by ComReg (e.g. for failure to meet deposit requirements or failures to comply with auction rules) leading to a revision of the position in the final Primary Bid Round and unallocated Lots.

Annex: 11 Determination of Winning Bids and Base Prices in the Main Stage

Winner determination

A 11.1 This section provides a formal description of the procedure for determining Winning Bidders, Winning Bids and Base Prices in the Main Stage.

Packages, Bidders and Bids

A 11.2 Suppose there are n Lot Categories, and Let L denote the set of all Lot Categories.

A 11.3 Let s_i denote the number of Lots available in Lot Category i .

A 11.4 We represent a Package of Lots as a vector $q = (q_1, q_2, \dots, q_n)$ where $q_i \geq 0$ is the number of Lots in Lot Category i . Therefore, $q_i \geq 0 \forall i \in L$.

A 11.5 Let J be the set of all Bidders. We will use $J' \subseteq J$ to denote subsets of the set of all Bidders at certain points below.

A 11.6 For any given Bidder, we only need to consider the highest Bid that the Bidder has made for any particular Package. Let B^j be the set of Bids made by Bidder j for non-zero Packages, including only the highest Bid for each of the Packages on which it has bid. $K^j = |B^j|$ is the number of different non-zero Packages for which Bidder j has bid. Let $\beta^{j,k} = (b^{j,k}, q^{j,k})$ denote bid $k \in \{1, \dots, K^j\}$ from Bidder j , in which Bidder j offers to pay up to $b^{j,k}$ for non-zero Package $q^{j,k}$.

A 11.7 A combination of Bids (across all the Bids made by Bidders) is represented as a vector

$$x = (x^{1,1}, x^{1,2}, \dots, x^{1,K^1}, x^{2,1}, \dots, x^{J,K^J})$$

where $x^{j,k}$ is a binary variable equal to 1 if the Bid $\beta^{j,k}$ of Bidder j is included in the combination and zero otherwise.

Feasible Combinations of Bids

A 11.8 A combination of Bids x is a Feasible Combination of Bids if and only if it satisfies the following two conditions:

$$\sum_{j \in J} \sum_{k \in B^j} x^{j,k} q^{j,k} \leq s_i \quad \forall i \in L$$

$$\sum_{k=1}^{K^j} x^{j,k} \leq 1 \quad \forall j \in J$$

These conditions require that:

1. the number of Lots allocated in each Lot Category is no more than the number of Lots available in that Lot Category; and
2. each Bidder wins at most one of the Packages on which it has Bid.

A 11.9 Let F denote the set of all Feasible Combinations of Bids.

Value of a Feasible Combination of Bids

A 11.10 Let r_i denote the reserve price for Lots in Lot Category i . A Feasible Combination of Bids $x \in F$ has a value $v(x)$ calculated as the sum of the included bid amounts plus the Reserve Price of any unsold Lots:

$$v(x) = \sum_{j \in J} \sum_{k \in B^j} x^{j,k} b^{j,k} + \sum_{i \in L} r_i \left(s_i - \sum_{j \in J} \sum_{k \in B^j} x^{j,k} q_i^{j,k} \right)$$

Winning Assignment

A 11.11 The winning assignment (i.e. the winning Feasible Combination of Bids) must belong to the set

$$F^* = \arg \max_{x \in F} v(x)$$

of Feasible Combinations of maximum value.

A 11.12 The first tie-breaking rule requires that the winning assignment must belong to the set

$$F^{**} = \arg \max_{x \in F^*} \sum_{i \in L} r_i \left(\sum_{j \in J} \sum_{k \in B^j} x^{j,k} q_i^{j,k} \right)$$

If there are multiple Feasible Winning Combinations of Bids in the set F^{**} , one of these will be selected at random as the winning assignment.

A 11.13 Let $\omega = (\omega^{1,1}, \omega^{1,2}, \dots, \omega^{1,K^1}, \omega^{2,1}, \dots, \omega^{J,K^J})$ denote the winning feasible bid combination.

A 11.14 Let W be the set of Winning Bidders. If $\omega^{j,k} = 1$ for some k , then $j \in W$. Otherwise, if $\omega^{j,k} = 0$ for all k , then $j \notin W$.

Opportunity Cost

A 11.15 The Opportunity Cost of a group of Bidders $J' \subseteq J$, denoted as $C(J')$ is calculated as follows.

Let $F^{J'}$ denote the set of all Feasible Combinations of Bids that do not include any Bid from the set of Bidders J' , i.e.

$$F^{J'} = \{x \in F \mid x^{j,k} = 0 \quad \forall k \in B^j, \forall j \in J'\}$$

Let $V(J')$ denote the maximum value that is achieved across all of the Feasible Combinations of Bids in $F^{J'}$ where Bidders in the set J' are excluded from these combinations, i.e.

$$V(J') = \max_{x \in F^{J'}} v(x)$$

The Opportunity Cost of the set of Bidders J' is then defined as

$$C(J') = V(J') - \left(v(\omega) - \sum_{j \in J'} \sum_{k \in B^j} \omega^{j,k} b^{j,k} \right)$$

Determination of Base Prices

A 11.16 We denote the Base Prices as a price vector $p^* = (p^1, \dots, p^J)$, where p^j is the Base Price for Bidder j .

A 11.17 Base Prices must satisfy the (first) requirement that:

$$\sum_{i \in L} r_i \left(\sum_{k \in B^j} \omega^{j,k} q_i^{j,k} \right) \leq p^j \leq \sum_{k \in B^j} \omega^{j,k} b^{j,k} \quad \forall j \in J$$

As the Opportunity Cost for Bidders who have not been assigned any Lots is zero, this requires that the Base Price for Bidders who have not been assigned any Lots is also zero.

A 11.18 Base Prices must satisfy the (second) requirement that:

$$C(W') \leq \sum_{j \in W'} p^j \quad \forall W' \subseteq W$$

A 11.19 Let P denote the set of price vectors that satisfy the previous two conditions. Let P^* denote the set of price vectors that satisfy the previous two conditions, and which minimise the sum of prices across all price vectors in P , so

$$P^* = \arg \min_{p \in P} \sum_{j \in W} p^j$$

The Base Prices must satisfy the (third) requirement that they must belong to the set P^* .

A 11.20 The Base Price must satisfy the (fourth) requirement that:

$$p^* = \arg \min_{p \in P^*} \sum_{j \in W} (p^j - C(\{j\}))^2$$

As this is a strictly convex quadratic optimisation subject to linear constraints, it has a unique solution.

Annex: 12 Methodology for generating Assignment Options

A 12.1 Assignment Options are determined independently for each band.

A 12.2 An Assignment Round will be required for a particular band whenever there is more than one Assignment Option for at least one winner of frequency-generic Lots in that Band.

A 12.3 The approach set out below is to broadly give Bidders who have not won frequency-specific Lots a variety of options for location of contiguous frequency-generic blocks across the band, but also controls the misalignment of frequencies between Time Slices where Bidders have won frequency-generic blocks in both Time Slices;

700 MHz Duplex with no Time Slices

A 12.4 For the 700 MHz Duplex, the Assignment Options for an Assignment Bidder comprise the set of frequency ranges that could feasibly be assigned to the Assignment Bidder and meet the requirements already set out in Section 4.3.2. These requirements are that:

- each Assignment Bidder is awarded contiguous blocks of spectrum, equal in number to the number of 700 MHz Duplex Lots it won;
- any option for assigning frequencies to a particular Assignment Bidder is consistent with all other Assignment Bidders each receiving contiguous spectrum in the band
- a winner of more than 2×10 MHz and less than 2×30 MHz is not assigned the lowest 2×5 MHz block, provided no other Assignment Bidder has won more than 2×10 MHz in the 700 MHz Duplex; and,
- any unsold 700 MHz Duplex Lots form a contiguous block including the lowest block starting from 703/758 MHz.

Bands with Time Slices

A 12.5 For the 2.1 GHz, 2.3 GHz, 2.6 GHz FDD and 2.6 GHz TDD Bands in the Assignment Stage, an algorithm will be used for the generation of Assignment Options such that:

- for each Time Slice in which the Assignment Bidder won B-Lots in the band, the Assignment Bidder is awarded a contiguous block of

spectrum in that Time Slice, in accordance with the number of B-Lots it won in that Time Slice;

- any option for assigning frequencies to a particular Assignment Bidder is consistent with all other Assignment Bidders each receiving contiguous spectrum in each Time Slice in the band according to the number of B-Lots they won;
- in the event that at least one Winning Bidder wins 2.1 GHz Band Lots in either Time Slice, Eir's current 2.1 GHz holdings in Time Slice 1 will be included in the Assignment Option generation process and may be repositioned within the band, subject to the requirement that it forms a contiguous block of spectrum with any 2.1 GHz Band Lots won by Eir in Time Slice 1;
- for each of the 2.1 GHz Band and 2.6 GHz FDD Band (which have no fixed frequency Lots), any Assignment Bidder¹⁹⁸ that wins exactly the same number of frequency-generic Lots in the band in both Time Slices will be awarded the same frequencies in that band in each Time Slice;
- for the 2.6 GHz TDD Band, for a given Time Slice, if the Assignment Bidder wins a single fixed frequency A-Lot in the band¹⁹⁹, any frequency-generic B-Lots won by that Assignment Bidder in the same band and Time Slice are positioned next to the single fixed frequency Lot won;
- for the 2.6 GHz TDD Band:
 - if just one of the A-Lots in Time Slice 2 is unsold, any unsold 2.6 GHz TDD B-Lots in Time Slice 2 will be positioned next to that unsold A-Lot;
 - if both 2.6 GHz TDD A-Lots in Time Slice 2 are unsold and some, but not all, of the 2.6 GHz TDD B-Lots in Time Slice 2 are unsold, the unsold B-Lots will be positioned next to one of the unsold A-Lots.
- for the 2.3 GHz Band
 - any frequency-generic B-Lots won by Eir in either Time Slice will form a contiguous block of spectrum starting at 2300 MHz,

¹⁹⁸ This may include Eir in relation to its existing 2.1 GHz holdings in Time Slice 1.

¹⁹⁹ Interested Parties are reminded of the Bidding Restriction that applies in respect of the 2.6 GHz TDD Band (See Section 4.1.3).

irrespective of whether Eir also wins the 2.3 GHz fixed frequency A-Lot in one or both Time Slices;

- for a given Time Slice, if an Assignment Bidder other than Eir wins the single fixed frequency A-Lot in the band, any frequency-generic B-Lots also won by that Assignment Bidder in the same band and Time Slice will be next to the fixed frequency A-Lot;
- if the fixed frequency A-Lot in Time Slice 2 is unsold, any unsold 2.3 GHz B-Lots in Time Slice 2 will be positioned next to that A-Lot;
- ensures that any unsold B-Lots in Time Slice 2, form a single contiguous frequency block and, where infeasible, that unsold Time Slice 2 lots are kept together as far as possible.
- subject to the previous requirements being satisfied, for Assignment Bidders that win frequency-generic Lots in the band in both Time Slices, the options generated will be those that maximise the extent to which the same frequencies are assigned in each Time Slice²⁰⁰; and
- subject to the previous requirements being satisfied, the extent to which unsold B-Lots in Time Slice 1 can be combined into the fewest number of contiguous blocks is maximised²⁰¹.

Definition of Edge Lots and Edge Winners

A 12.6 Where a Lot Category consisting of frequency-generic Lots has frequency-specific Lots at adjacent frequencies, we will call these frequency-specific Lots the *Edge Lots* associated with that particular Lot Category. Therefore:

- the 2.1 GHz and 2.6 GHz FDD Bands do not have Edge Lots;
- the 2.3 GHz Band has one Edge Lot in each Time Slice; and
- the 2.6 GHz TDD Band has two Edge Lots in each Time Slice.

A 12.7 For bands with Edge Lots, the upper Edge Lots are the two fixed frequency Lots (one for each Time Slice) immediately above the frequency-generic Lots in that band. Similarly, for the 2.6 GHz TDD Band, the lower Edge Lots are those immediately below the frequency-generic Lots.

²⁰⁰ This is implemented through the procedure presented in this Annex 12.

²⁰¹ The unassigned B-Lots in Time Slice 1 may be used to improve the alignment of frequencies assigned to winning Bidders across the two Time Slices, and as such may be split into multiple non-contiguous blocks.

A 12.8 For a band with Edge Lots, we define an Edge Winner in that band to be a winner of frequency-generic Lots in that band who is *also* a winner of *any* Edge Lots in that band in *either* Time Slice. Therefore, an Edge Winner might win an Edge Lot in one Time Slice, but frequency-generic lots in the other Time Slice where these are all in the same band.

A 12.9 If a Bidder wins only Edge Lots in a band and no corresponding frequency-generic Lots in that band, this Bidder is *not* an Edge Winner in respect of that band. It does not need to take part in any frequency assignment for that band, as it has not won any frequency-generic Lots. The Edge Lots it has won are frequency-specific and can be directly assigned.

Measurement of mismatch across Time Slices

A 12.10 For the purposes of calculations described in this annex, frequency-generic Lots within a band (which are identical for the purposes of the Main Stage) will be identified with specific frequencies within that band for the purposes of the Assignment Stage and numbered sequentially from lowest frequency Lot to highest frequency Lot. For example, in the 2.3 GHz Band, the 18 frequency-generic Lots will be numbered 1 to 18 inclusive. An assignment of contiguous Lots to a winner will have a lowest and a highest numbered Lot.

A 12.11 Given an assignment of specific frequencies to a winner's frequency-generic Lots within a band, the Time Slice Variation (TSV) is defined as:

- the number of the highest frequency Lot assigned to that winner in either Time Slice plus one, less the number of the lowest frequency Lot assigned to that winner in either Time Slice;
- minus the maximum number of frequency Lots assigned to that winner across either Time Slice.

A 12.12 This definition means that the TSV for a Bidder who wins Lots in only one Time Slice is always zero. Also, if a Bidder is allocated the same numbered frequency Lots in both Time Slices, its TSV will also be zero. An example of calculating the TSV for a Bidder is shown below.

Example 1: Calculating TSV

Consider a band with six Lots in each of two Time Slices, and a particular Bidder who is assigned the Lots shaded in green:

Time Slice 1	1	2	3	4	5	6
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Time Slice 2	1	2	3	4	5	6
--------------	---	---	---	---	---	---

To calculate the TSV for this Bidder:

- The highest number frequency Lot assigned to the Bidder across either Time Slice is 4;
- The lowest number frequency Lot assigned to the Bidder across either Time Slice is 1; and
- The maximum number of Lots assigned to the Bidder in either Time Slice is 3, in Time Slice 1.

Therefore, $TSV = 4 + 1 - 1 - 3 = 1$.

In the diagram above, it can be seen that, across the two Time Slices taken together, the bidder occupies 4 Lots, whereas this could be reduced to 3 Lots if the range assigned for Time Slice 2 fell within that assigned for Time Slice 1. Therefore, this assignment occupies one more Lot across the two Time Slices than the minimum possible, so has a TSV of 1.

A 12.13 For a band assigned in two Time Slices, the Total Time Slice Variation (TTSV) is the sum of the Time Slice Variations of all winners of frequency-generic Lots in that band. Unsold Lots are not considered when evaluating the TTSV.

Partitions of winners

A 12.14 We define *partitions* of winners and various mismatch metrics applied to partitions:

- A *partition* of winners is a set of subsets of winners such that every winner is in exactly one subset. For example, given four winners A, B, C and D, there are 15 possible partitions, of which $\{\{A,B\}, \{C\}, \{D\}\}$ and $\{\{A,B,C\}, \{D\}\}$ are two examples, containing 3 and 2 subsets of winners respectively. Possible partitions also include individual winners all being in singleton sets, i.e. $\{\{A\},\{B\},\{C\},\{D\}\}$ ²⁰², which contains 4 winner subsets, and the trivial partition containing just a single winner subset, i.e. $\{\{A,B,C,D\}\}$. The non-trivial partitions of a set of winners are all the partitions except for the trivial one (i.e. all partitions containing two or more subsets of winners).
- The *Partition Score* of a partition of winners is the sum, across the subsets of the partition, of the absolute value of the difference between Time Slices in the total number of Lots assigned to the winners within a particular subset. Therefore, given a partition $\{S_1, S_2, \dots, S_n\}$ consisting of n subsets of winners, the Partition Score is $\sum_{i=1}^n |\sum_{b \in S_i} N_b^1 - \sum_{b \in S_i} N_b^2|$, where N_b^1 and N_b^2 are the number of Lots won by Bidder b in the first and second Time Slice respectively.

A 12.15 The Partition Score is a measure of whether a partition of winners splits the available frequency-generic Lots evenly across the two Time Slices.

A 12.16 Any unsold frequency-generic Lots in the first Time Slice (if available) may be used as padding to improve alignment of frequencies assigned to Bidders across the two Time Slices. An algorithm for generation of Assignment Options is set out subsequently, in which unsold Time Slice 1 Lots are placed within a band plan to minimise misalignment measured by the TTSV (this being Step 2 in the algorithm). However, the band plans themselves are first generated by a process of successively partitioning the winners in the band, arranging them into a tree that is then used as the basis for creating various orderings of the winners (this being Step 1 in the algorithm). The Partition Score defined above measures how evenly a particular partitioning of winners splits the band across the two Time Slices. However, given that unsold Time Slice 1 lots may be available to improve alignment subsequently (in Step 2 of the algorithm), this possibility needs to be taken into account when choosing how best to partition the winners (in Step 1 of the algorithm).

A 12.17 Therefore, we make the following definitions:

²⁰² For the avoidance of doubt, a partition does not imply any particular ordering of its subsets; it is just a set of subsets of winners.

- Given a partition of winners and some specified number of unsold Time Slice 1 Lots, the *Corrected Partition Score* (CPS) of a partition of winners is the lowest value of the Partition Score that can be achieved by hypothetically assigning these unsold Lots in the first Time Slice (if any) to these winners in some way. If there are no unsold Lots in the first Time Slice, the CPS is equal to the Partition Score.
- A hypothetical assignment of unsold Time Slice 1 Lots to winners that achieves the CPS has the effect of associating a certain number of those unsold Lots in the first Time Slice to each subset of winners within the partition. Therefore, any partition of winners has an *Associated Unsold Allocation* (AUA) of all unsold Time Slice 1 Lots to the subsets of that partition that achieves the CPS.²⁰³

Sequential filling procedure for unsold Time Slice 1 Lots

A 12.18 We next set out some properties of the CPS that are important to the recursive algorithm set out below.

A 12.19 Suppose (following the notation above used to define the Partition Score) that we have a partition of winners $\{S_1, S_2, \dots, S_n\}$ with $M_i^t = \sum_{b \in S_i} N_b^t$ Lots allocated to the i th subset of winners in Time Slice t . Suppose that u unsold Time Slice 1 Lots are available. Assume that $u + \sum_i M_i^1 \leq \sum_i M_i^2$, so that, including unsold Lots, there are no more Lots in Time Slice 1 than Time Slice 2 won in total by these winners.

A 12.20 Some of these subsets of winners may have won fewer Time Slice 1 Lots than Time Slice 2 Lots. Let $D = \sum_i \max(0, M_i^2 - M_i^1)$ be the total number of Lots by which these particular subsets of winners are short of Time Slice 1 Lots relative to Time Slice 2. It follows immediately that

$$u \leq \sum_i M_i^2 - \sum_i M_i^1 = \sum_i \max(0, M_i^2 - M_i^1) - \sum_i \max(0, M_i^1 - M_i^2) \leq D$$

Therefore, provided there are no more Lots (including unsold Lots) in total in Time Slice 1 than Time Slice 2, it follows that the subsets of winners that are

²⁰³ For clarity, the AUA only associates some number of unsold first Time Slice Lots (including possibly no such Lots) to each subset of winners. It does not specify how unsold Lots might be interleaved between those winners within a subset. The AUA is used only as a device for assessing the desirability of different partitioning schemes for the purposes of creating orderings of winners within the band. We will subsequently fit any unsold first Time Slice Lots into band plans between winners in order to minimise misalignment measured by the TTSV without any restriction on where these unsold lots are located (i.e. the unsold lots are not required to confirm the AUA of the partitioning scheme used to create the ordering of bidders).

deficient in Time Slice 1 Lots are, in total, short of no more Time Slice 1 Lots than are available as unsold Lots.

A 12.21 Next, suppose that the winner subsets $\{S_1, S_2, \dots, S_n\}$ are arranged in decreasing order of their deficiency in Time Slice 1 lots relative to Time Slice 2 lots, $M_i^2 - M_i^1$. (If two or more subsets have the same value of $M_i^2 - M_i^1$, order them randomly.) Associate $M_1^2 - M_1^1$ unsold Lots to the first subset S_1 , or all u unsold Lots if $M_1^2 - M_1^1 > u$. If any unsold Lots remain, then associate up to $M_2^2 - M_2^1$ unsold Lots to the next subset S_2 (or as many as are available if this is fewer). If any unsold remain move on to S_3 and so on. Because $u \leq D$, this procedure will run out of unsold Lots before reaching any subset of winners which has (in total amongst its constituent Bidders) at least as many Time Slice 2 Lots as Time Slice 1 Lots.

A 12.22 This filling procedure reduces the Partition Score by u . No greater improvement can be achieved, so the CPS is the Partition Score less u , the number of unsold Lots available in Time Slice 1. Therefore, the filling procedure generates an AUA – an assignment of unsold Lots – that achieves the CPS. Each of the subsets S_i of bidders within the partition has either:

- no unsold Time Slice 1 Lots associated with it; or
- at least one Time Slice 1 Lot associated with it, but no more than $M_i^2 - M_i^1$, in which case the total number of Lots in Time Slice 1 won by Bidders in S_i together with the associated unsold Time Slice 1 Lots does not exceed the number of Lots won by those Bidders in Time Slice 2.

A 12.23 The property above is important for application of the recursive algorithm for partitioning winners set out below. Start with a set of winners and some number of unsold Time Slice 1 Lots such that there are no more Lots in Time Slice 1 than Time Slice 2. Partition these winners and apply the filling procedure set out above to create an AUA (i.e. an association of the unsold lots to subsets of the partition). Any resulting subset with associated unsold lots will, including those unsold lots, contain no more Lots in Time Slice 1 than Time Slice 2.

A 12.24 The example below shows the calculation of the CPS using this filling procedure.

Example 2: Partition Scores, CPS and AUA

Suppose the number of Lots won in a particular band is as set out in the table below:

Bidder	Time Slice 1 Lots	Time Slice 2 Lots
A	1	3
B	1	1
C, D, E	1	2
F, G	1	0
H	0	2
Unsold	5	0

Consider the partition $\{\{A\},\{B\},\{C,F\},\{D,G\},\{E\},\{H\}\}$. The absolute value of the difference between the number of Lots associated with each subset across Time Slices is:

- 2 for $\{A\}$;
- 2 for $\{H\}$.
- 1 for $\{E\}$; and
- zero for $\{B\}$, $\{C,F\}$ and $\{D,G\}$;

The Partition Score is therefore $2 + 2 + 1 + 0 + 0 + 0 = 5$.

We then associate the five available unsold Time Slice 1 Lots with the subsets of winners in the partition to calculate the Corrected Partition Score (CPS). The subsets are listed above in order of decreasing deficiency in Time Slice 1 Lots.

The filling procedure creates an Associated Unsold Allocation (AUA) for this partition that minimises the Partition Score is:

- two unsold Lots associated with $\{A\}$;
- two unsold Lots associated with $\{H\}$;
- one unsold Lot associated with $\{E\}$;
- no unsold Lots associated with the other subsets $\{B\}$, $\{C,F\}$ and $\{D,G\}$.

In this case, the CPS is zero because the difference in the Lots associated with each subset across the two Time Slices can be reduced to zero by associating unsold lots appropriately. In particular, after associating unsold Time Slice 1 Lots:

- $\{A\}$ now includes three Lots in each Time Slice; and
- $\{E\}$ and $\{H\}$ now include two Lots in each Time Slice.

Treatment of unsold Lots

A 12.25 Any unsold Lots (including unsold Edge Lots) in Time Slice 2 are treated as if they had all been won by a single Bidder, which will be called the TS2 Notional Winner. This ensures that (with an exception for the 2.6 GHz TDD band set out immediately below) if there are multiple unsold Lots in Time Slice 2, then they will be assigned contiguous frequencies.

A 12.26 For the 2.6 GHz TDD band (where there are Edge Lots at both ends of the band) it is impossible for unsold Lots to form a contiguous range if they include both Time Slice 2 Edge Lots, but not all of the frequency-generic Time Slice 2 Lots are unsold. There are two possibilities when both Time Slice 2 Edge Lots are unsold but not all of the frequency-generic Time Slice 2 Lots are unsold:

- If none of the frequency-generic Time Slice 2 Lots are unsold, we do not need to form a TS2 Notional Winner;
- If some, but not, all of the frequency-generic Time Slice 2 Lots are unsold, the unsold frequency-generic Lots will form a contiguous range next to either the upper or the lower Edge Lot, with the other Edge Lot not being required to be contiguous. This process is set out in further detail below, but in summary requires consideration of two cases for the TS2 Notional Winner according to which of the two unsold Edge Lots is made contiguous with the unsold frequency-generic Lots.

A 12.27 There is no requirement for multiple unsold Lots in Time Slice 1 to form a contiguous range. Unsold frequency-generic Time Slice 1 Lots are used as padding to improve frequency alignment across the two Time Slices, rather than being held together through the use of a notional winner. Nevertheless, unsold Edge Lots in Time Slice 1 may be relevant in certain cases for creating hypothetical Bidders when the Edge Lot at the same end of the band in Time Slice 2 has been won by an Edge Winner (see the subsequent explanation of how Assignment Options are created in Case 2 below).

Cases for Edge Lots

A 12.28 We identify three exhaustive and mutually exclusive cases with respect to Edge Lots:

- **Case 1:** Bands without Edge Lots (i.e. the 2.6 GHz FDD Band and 2.1 GHz Band) *or* bands with Edge Lots (i.e. the 2.3 GHz Band and 2.6 GHz TDD Band) but where there are no Edge Winners;

- **Case 2:** A band with Edge Lots (i.e. the 2.3 GHz Band and 2.6 GHz TDD Band), where there is *at least one* Edge Winner, but no Edge Winner has won *both* lower and upper Edge Lots (if present in that band) regardless of which Time Slice those Edge Lots fall into;
- **Case 3:** For the 2.6 GHz TDD band, situations in which there is *at least one* Edge Winner in that band who has won *both* lower and upper Edge Lots, regardless of which Time Slice the Edge Lots fall into.

A 12.29 Recalling the earlier definition of an Edge Winner, in Case 1 any winners of Edge Lots in a band are not also winners of frequency-generic lots in the same band in either Time Slice. In Case 1, the assignment of frequencies to frequency-generic Lots is unaffected by who has won the Edge Lots in that band.

A 12.30 We consider these three cases below in this order. Note that Case 3 can only occur for the 2.6 GHz TDD Band, as this is the only band with Edge Lots at both the top and bottom.

Case 1: No Edge Lots or Edge Winners

A 12.31 This case covers two scenarios:

- the band in question does not have any Edge Lots (i.e. the 2.1 GHz band or the 2.6 GHz FDD band); or
- the band in question has Edge Lots, but there is no winner of an Edge Lot that has also won frequency-generic Lots in the band (i.e. there are no Edge Winners, with the result that we do not need to consider Edge Lots for the purposes of generating Assignment Options and can treat the band as if it had no Edge Lots).

A 12.32 For the avoidance of doubt, no scenario in which an Edge Lot in Time Slice 2 is unsold and there are also unsold frequency-generic Lots in Time Slice 2 would fall under Case 1, as the TS2 Notional Winner would then be considered an Edge Winner.

A 12.33 Bidders that have won frequency-generic Lots in both Time Slices will be placed in a common ordering within the band across both Time Slices. This means that if Bidder A receives a lower frequency assignment than Bidder B in Time Slice 1, and if both Bidders have also won Lots in Time Slice 2, Bidder A will also be placed below Bidder B in Time Slice 2.

A 12.34 The algorithm for generating Assignment Options proceeds in three steps:

1. Establishing the various possible orderings for winners of frequency-generic Lots within the band;
2. Constructing Candidate Frequency Plans for each winner ordering, using any unsold Time Slice 1 Lots as padding to improve alignment across the time slices as measured by the TTSV; then
3. Deriving frequency Assignment Options for each winner of frequency-generic Lots from the Candidate Frequency Plans.

Step 1: Possible winner orderings

A 12.35 We start with all winners of frequency-generic Lots, plus the TS2 Notional Winner if there are any unsold Lots in Time Slice 2. The following recursive algorithm will be used to arrange winners into a tree by successively partitioning the winners into smaller groups.

A 12.36 If, for at least one Time Slice, all frequency-generic Lots in that Time Slice have been won by a single Assignment Bidder, the set of possible winner orderings is the full set of permutations of all Assignment Bidders that have won frequency-generic Lots in the band. In this case, continue to Step 2 below.

A 12.37 Otherwise, the set of possible winner orderings is determined based on the following partitioning process.

A 12.38 A recursive algorithm will first be used to arrange winners into a tree by successively partitioning the winners into smaller groups.

A 12.39 The algorithm builds a tree where each node is associated with a set of winners and some number of unsold Lots for Time Slice 1. A worked example is given below.

A 12.40 Start with the set of all winners (including the TS2 Notional Winner, if there is one), which is set as the initial node of the tree. If there is just a single winner, the algorithm stops immediately, as no branching of the tree is possible.

A 12.41 If there are two or more winners, then (using the definitions set out above):

- Form all possible partitions of those winners, excluding the trivial partition (containing just the single set of those winners);
- Select the partition with the lowest possible CPS. Use the filling procedure (detailed above) to create an AUA than achieves the CPS.
- If there are multiple partitions with the same lowest possible CPS, then:

- Select, from amongst these, those partitions containing the greatest number of subsets of winners;
- If there are still multiple partitions, select from amongst these to minimise the number of winners within the largest subset within a partition;
- If there are still multiple partitions, select one at random.

A 12.42 The selected partition and its AUA define a branching from the initial node such that each new node is a subset of winners within the partition. Each new node will have a certain number of unsold Time Slice 1 Lots associated with its subset of winners given by the AUA of that partition.

A 12.43 The initial node has the property that the number of Time Slice 1 Lots allocated to winners, plus the number of unsold Time Slice 1 Lots is equal to the number of Time Slice 2 Lots. This is because (i) each band includes the same number of Lots in each Time Slice and (ii) any unsold Lots in Time Slice will be considered as if they were won by the TS2 Notional Winner. Therefore, due to properties of the filling procedure set out above, at any subsequent node with at least one associated unsold Time Slice 1 Lot, it must be that the number of Time Slice 1 Lots allocated to that node's winners, plus the number of unsold Time Slice 1 Lots associated with that node, does not exceed the number of Time Slice 2 Lots at that node.

A 12.44 We then reapply this algorithm recursively to any new nodes consisting of two or more Bidders, using the set of winners at that node and the relevant number of associated unsold Time Slice 1 Lots (if any), until all branches lead to a singleton set consisting of an individual Bidder.

A 12.45 The set of possible winner orderings is created by combining all possible orderings of the branches within the constructed tree.

Example 3: Partitioning Bidders

Consider a band with 12 frequency-generic Lots in each Time Slice, where the outcome of the Main Stage is as given below:

Bidders	Time Slice 1	Time Slice 2
A, B, C, D	1	2
E, F	2	1
G, H	1	0
Unsold	2	2

We refer to the TS2 Notional Winner (who wins two Lots in Time Slice 2, but none in Time Slice 1) as U. Including, U, there are nine winners.

The two unsold Time Slice 1 lots are not required to be contiguous.

There are 21,147 partitions of the 9 winners (including the hypothetical unsold Time Slice 2 winner U). Some of these partitions have a Corrected Partition Score of zero, and one of these partitions would be chosen.

For example, consider the partition $\{\{A,E\}, \{B,F\}, \{C\}, \{D\}, \{G,H,U\}\}$. There are five subsets in this partition and its Partition Score is two, because:

- the subsets $\{A,E\}$ and $\{B,F\}$ are both assigned three lots in each time slice, so the difference is zero;
- the singleton subsets $\{C\}$ and $\{D\}$ are both assigned one lot in Time Slice 1 and two lots in Time Slice 2, so the absolute difference is one for both subsets;
- the subset $\{G,H,U\}$ is assigned two lots in total in each Time Slice, so the difference is zero.

Therefore, the sum of differences across the subsets is $0+0+1+1+0=2$, so the Partition Score is 2 before any correction with unsold lots.

The filling procedure assigns one Time Slice 1 unsold Lot to each of C and D. These subsets would then each be assigned two Lots in total in each Time Slice, so the CPS is zero.

The largest subset in the partition identified above, $\{G,H,U\}$, contains three Bidders. However, there are partitions with a CPS of zero, five subsets of winners and a largest subset of two Bidders. Such partitions are preferred to the example partition above, as their largest subset is smaller. An example of one such partition is $\{\{A,E\}, \{B,F\}, \{C,G\}, \{D,H\}, \{U\}\}$, where its CPS is zero and its AUA (given by the filling procedure) is to give both unsold Time Slice 1 Lots to the TS2 Notional Winner, U.

Therefore, for the first iteration of the partitioning process (i.e. starting from the set of all winners), the algorithm selects a partition with:

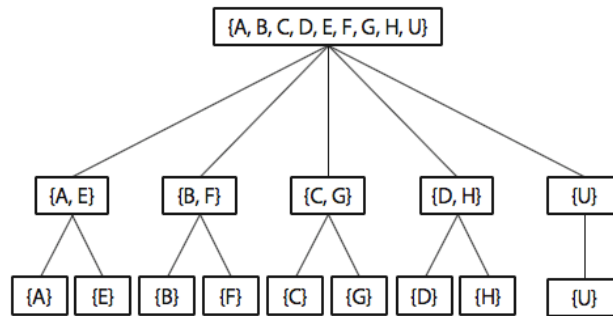
- a CPS of zero;

- five subsets of Bidders, of which the largest contains two Bidders; and
- an AUA that gives both unsold Time Slice 1 Lots to the TS2 Notional Winner U.

Note that there are many partitions with all three properties above. For example, we could also have the partition $\{\{B,E\}, \{A,F\}, \{C,G\}, \{D,H\}, \{U\}\}$. Therefore, one partition of these will be selected at random, but for definiteness we assume $\{\{A,E\}, \{B,F\}, \{C,G\}, \{D,H\}, \{U\}\}$ is selected at random.

For the second iteration of the partitioning process, we look individually at each subset of winners formed by the first partition. Since each of these subsets contains at most two bidders, these will each be partitioned into two singleton subsets (and no further iterations are required).

Assuming the partition $\{\{A,E\}, \{B,F\}, \{C,G\}, \{D,H\}, \{U\}\}$ is selected as the first partition, the resulting tree is as follows:



As a result, there are 1920 winner orderings, generated by all the possible orderings of the five subsets from the first iteration and, for each of these, all orderings of the pairs of Bidders within the subsets. However, the number of Bidder Assignment Options will be considerably smaller, as illustrated in the later examples.

Step 2: Construction of Candidate Frequency Plans for each winner ordering

A 12.46 For each winner ordering generated by Step 1, first place the winners into the band in the order specified. This order is common across both Time Slices.

A 12.47 Any unsold Time Slice 1 Lots are then placed between or next to contiguous frequency ranges of winners in Time Slice 1 in order to minimise the Total Time Slice Variation (TTSV, as defined above). If there are a number of band plans giving the same lowest TTSV, but with different assignments of the unsold Time Slice 1 Lots, then those with the greatest value of the maximum number of Time Slice 1 unsold Lots forming one contiguous range are taken. These are the Candidate Frequency Plans for that particular winner ordering.

Step 3: Determination of Assignment Options

A 12.48 The Assignment Options presented to a Bidder will be:

- the frequency options that the Bidder would receive in any of the possible Candidate Frequency Plans; and
- the frequency options that any other Bidder winning the same number of frequency-generic Lots in the band as that Bidder in both Time Slices would receive in any of the possible Candidate Frequency Plans.

A 12.49 This process ensures that the same Assignment Options are presented to two Bidders who are not Edge Winners and win the same number of frequency-generic Lots in each Time Slice.

Example 4: Steps 1-3 with two Bidders

Consider a band that has 12 Lots in each of the two Time Slices, and two winners (A and B), who each win two Time Slice 1 Lots and four Time Slice 2 Lots.

Again, refer to the TS2 Notional Winner of four Time Slice 2 Lots as U.

Step 1

There are a number of ways of partitioning the winners to achieve a CPS of zero. Of these, the partition $\{\{A\},\{B\},\{U\}\}$, with an AUA giving two unsold Time Slice 1 lots to each of $\{A\}$ and $\{B\}$, and four unsold Time Slice 1 Lots to $\{U\}$, would be selected as it has the greatest number of subsets (i.e. three).

This gives us six winner orderings (i.e. all possible orderings of A, B and U), set out below.

Step 2 (A's blocks are red, B's are blue, U's are green)

Winner ordering 1: (A,B,U; TTSV = 2)

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

Winner ordering 2: (A,U,B; TTSV = 6)

1	2	3	4	5	6	7	8	9	10	11	12
1	2	3	4	5	6	7	8	9	10	11	12

Winner ordering 3: (B,A,U; TTSV = 2)

1	2	3	4	5	6	7	8	9	10	11	12
1	2	3	4	5	6	7	8	9	10	11	12

Winner ordering 4: (B,U,A; TTSV = 6)

1	2	3	4	5	6	7	8	9	10	11	12
1	2	3	4	5	6	7	8	9	10	11	12

Winner ordering 5: (U,A,B; TTSV = 6)

1	2	3	4	5	6	7	8	9	10	11	12
1	2	3	4	5	6	7	8	9	10	11	12

Winner ordering 6: (U,B,A; TTSV = 6)

1	2	3	4	5	6	7	8	9	10	11	12
1	2	3	4	5	6	7	8	9	10	11	12

In each case we can improve the TTSV by moving unsold Lots in Time Slice 1.

Consider winner ordering 1. There are nine ways we could move unsold Time Slice 1 Lots and reduce the TTSV to zero:

1	2	3	4	5	6	7	8	9	10	11	12
1	2	3	4	5	6	7	8	9	10	11	12

1	2	3	4	5	6	7	8	9	10	11	12
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Similarly, there are different ways we could move the Lots for the other orderings to reduce TTSV to zero. We end up with the following Candidate Frequency Plans:

Winner ordering 1 Candidate Frequency Plans

1	2	3	4	5	6	7	8	9	10	11	12
1	2	3	4	5	6	7	8	9	10	11	12

1	2	3	4	5	6	7	8	9	10	11	12
1	2	3	4	5	6	7	8	9	10	11	12

1	2	3	4	5	6	7	8	9	10	11	12
1	2	3	4	5	6	7	8	9	10	11	12

Winner ordering 2 Candidate Frequency Plan

1	2	3	4	5	6	7	8	9	10	11	12
1	2	3	4	5	6	7	8	9	10	11	12

Winner ordering 3 Candidate Frequency Plans

1	2	3	4	5	6	7	8	9	10	11	12
1	2	3	4	5	6	7	8	9	10	11	12

1	2	3	4	5	6	7	8	9	10	11	12
1	2	3	4	5	6	7	8	9	10	11	12

1	2	3	4	5	6	7	8	9	10	11	12
1	2	3	4	5	6	7	8	9	10	11	12

Winner ordering 4 Candidate Frequency Plan

1	2	3	4	5	6	7	8	9	10	11	12
1	2	3	4	5	6	7	8	9	10	11	12

Winner ordering 5 Candidate Frequency Plans

1	2	3	4	5	6	7	8	9	10	11	12
1	2	3	4	5	6	7	8	9	10	11	12

1	2	3	4	5	6	7	8	9	10	11	12
1	2	3	4	5	6	7	8	9	10	11	12

1	2	3	4	5	6	7	8	9	10	11	12
1	2	3	4	5	6	7	8	9	10	11	12

Winner ordering 6 Candidate Frequency Plans

1	2	3	4	5	6	7	8	9	10	11	12
1	2	3	4	5	6	7	8	9	10	11	12

1	2	3	4	5	6	7	8	9	10	11	12
1	2	3	4	5	6	7	8	9	10	11	12

1	2	3	4	5	6	7	8	9	10	11	12
1	2	3	4	5	6	7	8	9	10	11	12

Step 3

The Assignment Options are the same for Bidders A and B, because they won the same amount as each other in each Time Slice. They are given by the frequency assignments that would be given to either Bidder in any of the Candidate Frequency Plans above:

1	2	3	4	5	6	7	8	9	10	11	12
1	2	3	4	5	6	7	8	9	10	11	12

A 12.51 If an Edge Winner has also won one or more frequency-generic Lots within the band in the same Time Slice, these need to be contiguous with its Edge Lot in that Time Slice. This requirement determines the assignment of frequencies to those frequency-generic Lots won by the Edge Winner.

Winner of Edge Lot changing between Time Slices

A 12.52 Where the same Edge Winner has won both lower Edge Lots, or both upper Edge Lots across the two Time Slices, there is no conflict between the principles of (i) assigning that bidder its frequency-generic Lots across one or both Time Slices contiguous with its Edge Lots and (ii) limiting misalignment of frequencies across the two Time Slices.

A 12.53 However, in the case that two different Bidders have won the lower Edge Lots, one in each Time Slice, and at least one of these Bidders is an Edge Winner, some conflict may arise between these principles (and similarly for upper Edge Lots). In particular, consider the diagram below, where bidder A has won an Edge Lot in the first Time Slice (shown as shaded) and bidder B has won an Edge Lot in the second Time Slice. Both are Edge Winners and have won some frequency-generic Lots as well. To achieve adjacency of the frequency-generic Lots with each winner’s Edge Lot, we need to place bidder A lowest in the frequency-generic Lots for the first Time Slice, but bidder B lowest for the second Time Slice. This requirement is inconsistent with placing bidders winning frequency-generic Lots in both Time Slices in a common order.

	Edge	Frequency-generic lots...				
TS1	A	A	B
TS2	B	B	A

A 12.54 In the example above, the approach taken is to first place bidders A and B adjacent to their Edge Lots. This fixes bidder A’s frequency-generic Lots in the first Time Slice and bidder B’s frequency-generic Lots in the second Time Slice (shown in red). We then treat bidder B’s first Time Slice Lots and bidder A’s second Time Slice Lots (shown in green) as if they were won by the same hypothetical winner and place this within the band using the process already set out above for Case 1 situations. The effect is that where a Bidder wins one Edge Lot in one Time Slice, but not the corresponding Edge Lot in the other Time Slice, together with frequency-generic Lots in both Time Slices, priority is given to ensuring adjacency with the Edge Lot of frequency-generic Lots in the same Time Slice, rather than alignment of the frequency-generic Lots across Time Slices.

Substitution procedure when the Edge Lot winner changes

A 12.55 The rules are first set out for the case of upper Edge Lots. Corresponding rules apply for lower Edge Lots (where present).

A 12.56 If the upper Edge Lots in the two Time Slices have been won by two different winners, call them A and B in the first and second Time Slices respectively, and at least one of A and B is an Edge Winner, then we replace these two Bidders with two hypothetical Bidders for the purposes of determining frequency options:

- a hypothetical Bidder (called AB) with A's Time Slice 1 Lots and B's Time Slice 2 Lots; and
- a hypothetical Bidder (called BA) with B's Time Slice 1 Lots and A's Time Slice 2 Lots.

A 12.57 Therefore, AB is an upper Edge Winner and must be located adjacent to the upper Edge Lot to provide frequency contiguity.

A 12.58 For the avoidance of doubt, if one of A or B is not an Edge Winner (but the other is), it is still used to create hypothetical bidders for the purpose of generating frequency options. In this case, the hypothetical Bidders will only have frequency-generic Lots that have been won by the Edge Winner. This scenario occurs if:

- the upper Edge Lots have been won by two different Bidders, where one of those Bidders has won frequency-generic Lots in at least one Time Slice (making it an Edge Winner), but the other has not won any frequency-generic Lots in either Time Slice (so it is not an Edge Winner); or
- the upper edge Lot in Time Slice 1 has been won by an Edge Winner, but the upper Edge Lot in Time Slice 2 is unsold and there are no unsold frequency-generic Time Slice 2 Lots (in which case the TS2 Notional Winner is not an Edge Winner but is still used to form the hypothetical Bidders).

A 12.59 An additional subcase occurs if the upper Edge Lot in Time Slice 1 is unsold and the upper Edge Lot in Time Slice 2 has been won by an Edge Winner (which could be the TS2 Notional Winner). In this scenario, we introduce a Hypothetical Edge Holder that is treated as *if* it had won the upper Edge Lot in Time Slice 1. Since there is no requirement to keep unsold Time Slice 1 Lots contiguous, the Hypothetical Edge Holder is assumed to only ever win that individual Time Slice 1 Edge Lot, irrelevant of whether or not there are unsold frequency-generic Time Slice 1 Lots. For determining Assignment Options, two hypothetical Bidders are then created (as above) based on the Lots won by the Edge Winner and the Hypothetical Edge Holder.

Example 5: Hypothetical Bidders with only one Edge Winner

If the upper Edge Lot has only been won by an Edge Winner in one Time Slice, we still apply the methodology of creating the hypothetical Bidders for generating Assignment Options, as set out above (even if the other Edge Lot is unsold).

There are two cases that need to be considered under this scenario.

The Edge Winner wins the TS1 upper Edge Lot:

Suppose a Bidder is an Edge Winner that has won the upper Edge Lot in Time Slice 1 plus some frequency-generic Lots in each Time Slice. Using the terminology above, call this Bidder A. The upper Edge Lot in Time Slice 2 is assigned to another Bidder (call this Bidder B), but this Bidder is not an Edge Winner.

B has therefore been assigned the upper Edge Lot in Time Slice 2, but no other Lots in the band. B can be either another Bidder that won the Time Slice 2 Edge Lot in the Main Stage of the Auction, or the TS2 Notional Winner (in which case there must be no unsold frequency-generic Time Slice 2 Lots).

B will not participate in the Assignment Round for this band as its frequencies are fixed. However, two hypothetical bidders are created for the purpose of generating frequency options for other winners:

- a hypothetical Bidder (AB) with A's Time Slice 1 Lots and no frequency-generic Lots in Time Slice 2 - this is the upper Edge Winner in this scenario; and
- a hypothetical Bidder (BA) with A's frequency-generic Lots in Time Slice 2 and no Lots at all in Time Slice 1.

The Edge Winner wins the TS2 upper Edge Lot:

Suppose B is an Edge Winner that has won the upper Edge Lot in Time Slice 2, plus some frequency-generic Lots in each Time Slice.

The upper Edge Lot in Time Slice 1 was either won by another Bidder that is not an Edge Winner (i.e. the Bidder did not win any other Lots in the band), or was unsold. If unsold, we treat the Lot as having been won by a Hypothetical Edge Holder that has won only that Edge Lot. Call the winner of the upper Edge Lot in Time Slice 1 (or the Hypothetical Edge Holder if the upper Edge Lot in Time Slice 1 was unsold) A.

Again, two hypothetical bidders are created for the purpose of generating Assignment Options:

- a hypothetical Bidder (AB) with B's frequency-generic Time Slice 1 Lots and no Lots at all in Time Slice 2; and
- a hypothetical Bidder (BA) with B's Time Slice 2 Lots and no frequency-generic Lots in Time Slice 1 - this is the upper Edge Winner in this scenario.

Note that if the upper Edge Lot in Time Slice 1 was unsold, whether or not there are unsold frequency-generic Time Slice 1 Lots is irrelevant for the formation of hypothetical Bidders. There is no requirement to keep the unsold Time Slice 1 Lots contiguous, and the Hypothetical Edge Holder is assumed to only ever win that one Edge Lot.

A 12.60 Similarly, for the 2.6 GHz TDD band, if the lower Edge Lots in the two Time Slices have been won by two different winners, call them C and D in the first and second Time Slices respectively, and at least one of C and D is an Edge Winner, then we replace these two Bidders by two hypothetical Bidders for the purposes of determining frequency options:

- a hypothetical Bidder (called CD) with C's Time Slice 1 Lots and D's Time Slice 2 Lots; and
- a hypothetical Bidder (called DC) with D's Time Slice 1 Lots and C's Time Slice 2 Lots.

A 12.61 Therefore, CD is a lower Edge Winner and must be located adjacent to the lower Edge Lot to provide frequency contiguity.

Procedure after any substitution with hypothetical winners

A 12.62 After these substitutions by hypothetical Bidders, if necessary, we have that:

- for the 2.3 GHz band, the Edge Winner (which may be a hypothetical Bidder as described above) gets the upper Edge Lot in both Time Slices; or
- in the case of the 2.6 GHz TDD band, either:

- there are two Edge Winners (one or both of which may be hypothetical Bidders) that each get both of the Edge Lots at one end of the band; or
- there is one Edge Winner (which may be a hypothetical Bidder) that gets both Edge Lots at one end of the band, and there is no Edge Winner at the other end of the band.

A 12.63 The same procedure is now applied to create Assignment Options as described in Case 1, with the exceptions that:

- during the winner partitioning process (if required), only partitions which keep Edge Winners (which may be hypothetical Bidders) in separate subsets will be considered (as if there are two Edge Winners, they will necessarily get Edge Lots at opposite ends after the substitution process and the winner orderings need to be compatible with this requirement);
- an additional restriction will apply to the Candidate Frequency Plans, in that only winner orderings that respect the contiguity requirements between the Edge Lots and the frequency-generic Lots will be considered; and
- the provisions for giving a Bidder the same frequency options as any other Bidder winning the same number of frequency-generic Lots in the band under the Candidate Frequency Plans generated will apply only in relation to Bidders that are not Edge Winners.

A 12.64 If any hypothetical Bidders have been introduced using the substitution procedure set out above, then the resulting Assignment Options will be re-mapped to the actual winners. In particular:

- If hypothetical Bidders AB and BA had been introduced, then A's Assignment Options will be AB's Time Slice 1 option (i.e. only at the top of the band, adjacent to the upper Edge Lot) and BA's Time Slice 2 options. B's Assignment Options will be BA's Time Slice 1 options and AB's Time Slice 2 option (i.e. only at the top of the band, adjacent to the upper Edge Lot).
- If hypothetical Bidders CD and DC had been introduced, then C's Assignment Options will be CD's Time Slice 1 option (i.e. only at the bottom of the band, adjacent to the lower Edge Lot) and DC's Time Slice 2 options. D's Assignment Options will be DC's Time Slice 1 options and CD's Time Slice 2 option (i.e. only at the bottom of the band, adjacent to the lower Edge Lot).

A 12.65 Any winner of upper (lower) Edge Lots in both Time Slices will necessarily be placed at the top (bottom) of the frequency-generic Lots in both Time Slices and so does not need to make Assignment Bids (for that band).

Example 6: Case 2 with no unsold Lots

Consider a band with Edge Lots at both ends, plus eight frequency-generic Lots in each Time Slice. The winners are as set out below:

Winner	Lower Edge Lots	Frequency-generic Lots	Upper Edge Lots
A	TS1	2 Lots in TS1 3 Lots in TS2	
B	TS2	3 Lots in TS1 2 Lots in TS2	
C		2 Lots in TS1 2 Lots in TS2	
D		1 Lot in TS1 1 Lot in TS2	TS1 TS2

D will be placed at the top of the band and does not participate in the Assignment Stage.

We introduce two hypothetical Bidders:

- AB has two frequency-generic Lots in each Time Slice and both lower Edge Lots; and
- BA has three frequency-generic Lots in each Time Slice.

The partition of singleton subsets of all (hypothetical) bidders has a CPS of zero and is selected.

AB is placed at the bottom of the band under the contiguity requirements.

There are two possible orderings of the remaining Bidders, BA and C, with no unsold Time Slice 1 Lots, and so there are two Candidate Frequency Plans. These are shown in the diagrams below (where red blocks are A's, blue blocks are B's, green blocks are C's and yellow Lots are D's). Un-numbered blocks are the Edge Lots.

Winner ordering 1: (AB, BA, C, D; TTSV = 4)



Winner ordering 2: (AB, C, BA, D; TTSV = 8)

1	2	3	4	5	6	7	8	
1	2	3	4	5	6	7	8	

Bidders A, B and C each have two Assignment Options in this case, which correspond to the blocks shaded in their respective colours in the band plans above.

Note that winner ordering 2 has a higher TTSV, but nothing can be done to reduce it as there are no unsold Lots in this example.

Example 7: Case 2 with unsold lots and restrictions on partitioning

Suppose, in a band with Edge Lots at both ends and eight frequency-generic Lots, the outcome of the Main Stage was as set out below, with two lots being unsold in each Time Slice:

Winner	Lower Edge Lots	Frequency-generic Lots	Upper Edge Lots
A	TS1	1 Lot in TS1 1 Lot in TS2	
B	TS2	2 Lots in TS1 2 Lots in TS2	
C		2 Lots in TS1 1 Lot in TS2	TS1 TS2
D, E		1 Lot in TS2	
F		1 Lot in TS1	

Again, we refer to the TS2 Notional Winner (which is assumed to have won the two unsold Lots in Time Slice 2) as U. Including U, there are seven winners.

In step 1, we replace Bidders A and B with two hypothetical Bidders:

- AB, who wins both lower Edge Lots, one frequency-generic Lot in Time Slice 1 and two frequency-generic Lots in Time Slice 2; and
- BA, who wins two frequency-generic Lots in Time Slice 1 and one frequency-generic Lot in Time Slice 2.

This gives the following set of winners for the purpose of determining winner orderings:

(Hypothetical) Bidder	Edge Lots	TS1 generic Lots	TS2 generic Lots
AB	Both lower	1	2
BA	None	2	1
C	Both upper	2	1
D	None	0	1
E	None	0	1
F	None	1	0
U	None	0	2

There are additional restrictions, relative to Case 1, to ensure that we only consider winner orderings that put the lower edge winner first and the upper edge winner last.

For example, consider the partition $\{\{AB,C\},\{D,BA\},\{E,F\},\{U\}\}$.

This has a CPS of zero (with the AUA assigning two unsold Time Slice 1 Lots to U), the greatest possible number of subsets (amongst the partitions with CPS of zero) and keeps all of the unsold Time Slice 1 Lots together in the same partition. However, it is ruled out as a valid partition in this case because AB and C are in the same subset, which would make it impossible to place them at opposite ends of the band and ensure contiguity between their frequency-generic Lots and their Edge Lots.

Assume that the first partition selected by the algorithm is $\{\{AB,BA\},\{D,C\},\{E,F\},\{U\}\}$.

The second iteration puts all winners into singleton subsets.

We then calculate all possible winner orderings based on the resulting tree but keep only the four winner orderings that have AB first, BA second, D second to last, and C last.

Note that because D has won the same as Bidder E in both Time Slices, it will still have multiple Assignment Options that coincide with those generated for both Bidders.

Case 3: Upper and lower Edge Lots won by the same winner

A 12.66 Case 3 is only possible for the 2.6 GHz TDD band, as it is the only band with Edge Lots at both ends of the band.

A 12.67 Bidding constraints relating to the 2.6 GHz TDD band mean that a Bidder cannot win both the upper and lower 2.6 GHz TDD Edge Lots in the same Time Slice without also winning all of the 2.6 GHz TDD frequency-generic Lots in the same Time Slice. However:

- it is feasible for a Bidder to win the Edge Lot at one end of the band in one Time Slice and the Edge Lot at the opposite end of the band in the other Time Slice; and
- it is feasible for the TS2 Notional Winner to be assigned both Time Slice 2 Edge Lots and some, but not all, frequency-generic Time Slice 2 Lots, in which case it is possible to guarantee contiguity of the unsold frequency-generic Lots with either the lower or upper Edge Lot, but not both at the same time.

There are four sub-cases, which we consider in turn below. We do not include the case where a Bidder has won all four Edge Lots. In that scenario, the winner must also have won all frequency-generic Lots in the band, so an Assignment Round would not be required.

Case 3a

A 12.68 In this case, a winner has won a lower (or upper) Edge Lot in one Time Slice and an upper (or lower) Edge Lot in the other Time Slice, but no other Edge Lots. If there is a single Bidder (labelled X) in this situation, the configuration of Edge Lots is as shown below:

X	...	
	...	X

	...	X
X	...	

A 12.69 Notice that it is possible we could have two Bidders (labelled X and Y) in this situation, in which case the configuration is as shown below.

X	...	Y
Y	...	X

Y	...	X
X	...	Y

A 12.70 In this subcase, contiguity between Edge Lots and frequency-generic Lots can be guaranteed in both Time Slices for any Bidder in this situation. Such a Bidder does not bid in the Assignment Stage, as the assignment of its frequency-generic Lots is determined by its Edge Lots.

A 12.71 For the purposes of determining frequency options for other Bidders, this Bidder is treated as two separate hypothetical Bidders, one winning Time Slice 1 Lots and the other Time Slice 2 Lots. The procedure for Case 1 or Case 2 is then applied, depending on whether there are any Edge Winners.

Example 8: Case 3a

Consider again an example with Edge Lots at both ends of the band and eight frequency-generic Lots, and suppose that the winners are as follows:

Winner	Lower Edge Lots	Frequency-generic Lots	Upper Edge Lots
A	TS1	3 Lots in TS1 3 Lots in TS2	TS2
B		2 Lots in TS1 2 Lots in TS2	
C	TS2	2 Lots in TS1 1 Lot in TS2	
D		1 Lot in TS1 2 Lots in TS2	TS1

Let A1 and A2 be the hypothetical Bidders winning A’s Lots in Time Slice 1 and Time Slice 2 respectively.

We can then apply the Case 2 procedure, creating four further hypothetical Bidders to deal with C and D. The Bidders are then:

(Hypothetical) Bidder	Edge Lots	TS1 generic lots	TS2 generic lots
A1C	Both lower	3	1
CA1	None	2	0
B	None	2	2
A2D	None	0	2
DA2	Both upper	1	3

We select the partition $\{\{A1C,A2D\},\{B\},\{CA1,DA2\}\}$, which has a CPS of zero and three subsets. All other partitions with a CPS of zero contain only two subsets of Bidders (i.e. those with B added to one of the other subsets).

In calculating the winner orderings, the contiguity requirements imply that:

- $\{A1C,A2D\}$ must come first, with A1C being placed before A2D; and
- $\{CA1,DA2\}$ must come last, with DA2 being placed after CA1.

Therefore, in this example the algorithm only generates one winner ordering and one Candidate Frequency Plan, shown below (red = A, blue = B, green = C, yellow = D).

Candidate Frequency Plan: (A1C, A2D, B, CA1, DA2; TTSV = 15)

1	2	3	4	5	6	7	8	
1	2	3	4	5	6	7	8	

Winning Bidders are simply assigned the frequencies corresponding to this Candidate Frequency Plan, and no Assignment Round is required (for this particular band).

Case 3b

A 12.72 In this case, a winner has won all Lots (i.e. the lower and upper Edge Lots and all frequency-generic Lots) in one Time Slice, and no other Edge Lots.

A 12.73 The possible configurations are:

X	X	X
	...	

	...	
X	X	X

It is possible to have two winners in this situation:

X	X	X
Y	Y	Y

Y	Y	Y
X	X	X

A 12.74 If there is only one winner in this situation, Assignment Options for the band can be generated as if there was only one Time Slice.

A 12.75 For the Time Slice where the winner has won all Lots, the frequency assignment is fixed.

A 12.76 For the other Time Slice:

- Apply the edge contiguity requirement at each end of the band positioning any frequency-generic Lots won by the winner of an Edge Lot next to that Edge Lot.
- This leaves a single contiguous block between the Edge Winners in which all other winners must be placed. The Assignment Options for these other winners comprise the set of frequency ranges that could feasibly be assigned to them within the remaining frequencies once the edge contiguity requirements have been met, subject to the requirements set out in Section 4.3.2.

A 12.77 If there are two winners in this situation (which may include the TS2 Notional Winner provided all frequency-generic Time Slice 2 Lots in the band are unsold) all frequency assignments for the winning Bidders are fixed in both Time Slices, and there is no need for an Assignment Round.

A 12.78 In the case that all Time Slice 1 Lots (including the Edge Lots) have been won by a single winner, and in Time Slice 2 both Edge Lots and some (but not all) frequency-generic Lots are unsold, there remains a need for an Assignment Round. The unsold Time Slice 2 Lots are treated as if won by the TS2 Notional Winner. However, it is not possible for all of the unsold Lots to form a contiguous block. In this case:

- Apply the edge contiguity requirement for the TS2 Notional Bidder at the lower end of the band.
- The Assignment Options for the other winners comprise the set of frequency ranges that could feasibly be assigned to them within the remaining frequencies at the upper end of the band, subject to the requirements set out in Section 4.3.2.
- Repeat the process, but with the contiguity requirement applied only at the upper end of the band.
- For each Bidder, the Assignment Options generated under the different contiguity requirements are merged.

Example 9: Case 3b with no unsold Time Slice 2 Lots

Suppose that, in a band with Edge Lots at both ends of the band and eight frequency-generic Lots, we have the following set of winners:

Bidder	Edge Lots	TS1 generic lots	TS2 generic lots
A	Both TS1	8	0
B	None	0	2
C	None	0	2
D	Lower TS2	0	2
E	Upper TS2	0	2

A has won two Time Slice 1 Lots, so its frequency assignment is fixed and it is then only necessary to consider the frequency assignments for the other winners in Time Slice 2.

Applying the contiguity requirements:

- the Time Slice 2 frequency-generic Lots won by D are positioned next to the Time Slice 2 lower Edge Lot; and

- the Time Slice 2 frequency-generic Lots won by E are positioned next to the Time Slice 2 upper Edge Lot.

D and E’s frequency assignments are therefore also fixed. It remains only to determine the Assignment Options for B and C, which correspond to all possible ways of positioning those winners within the remaining frequencies.

This process yields two Candidate Frequency Plans (red = A, blue = B, green = C, yellow = D, purple = E).

	1	2	3	4	5	6	7	8	
1	2	3	4	5	6	7	8		

	1	2	3	4	5	6	7	8	
1	2	3	4	5	6	7	8		

B and C will then each have two Assignment Options in the Assignment Round (one comprising Lots 3 and 4, the other comprising Lots 5 and 6).

Example 10: Case 3b with unsold Time Slice 2 Edge Lots

Consider a similar scenario as in Example 9 above, but in this case suppose that all of the Lots won by D and E (the Edge Winners in Time Slice 2) were instead unsold. Those unsold Time Slice 2 Lots are therefore associated with the TS2 Notional Winner (U), and we have the following set of winners:

Bidder	Edge Lots	TS1 generic lots	TS2 generic lots
A	Both TS1	8	0
B	None	0	2
C	None	0	2
U	Both TS2	0	4

Again, since A has won all of the Time Slice 1 Lots, its frequency assignment is fixed and it is only necessary to consider the frequency assignments for Time Slice 2.

Note that in this case, it is impossible to give the TS2 Notional Winner a contiguous block of spectrum including all of its associated Lots. The unsold frequency-generic Time Slice 2 Lots can be contiguous to the lower Time Slice 2 Edge Lot or the upper Time Slice 2 Edge Lot, but not both.

We first apply the contiguity requirement for the TS2 Notional Winner at the top of the band (ignoring the lower Edge Lot) and establish the corresponding Candidate Frequency Plans based on all possible ways of positioning B and C within the remaining Time Slice 2 frequencies. This gives two Candidate Frequency Plans (red = A, blue = B, green = C, white = U):

	1	2	3	4	5	6	7	8	
	1	2	3	4	5	6	7	8	

	1	2	3	4	5	6	7	8	
	1	2	3	4	5	6	7	8	

We then repeat the process, but applying the contiguity requirement for the TS2 Notional winner at the bottom of the band. This also yields two Candidate Frequency Plans (red = A, blue = B, green = C, white = U):

	1	2	3	4	5	6	7	8	
	1	2	3	4	5	6	7	8	

	1	2	3	4	5	6	7	8	
	1	2	3	4	5	6	7	8	

Combining the various different ways of positioning B and C in the band under the upper/lower edge contiguity requirements gives each of B and C the following four Assignment Options:

	1	2	3	4	5	6	7	8	
	1	2	3	4	5	6	7	8	

	1	2	3	4	5	6	7	8	
	1	2	3	4	5	6	7	8	
	1	2	3	4	5	6	7	8	
	1	2	3	4	5	6	7	8	
	1	2	3	4	5	6	7	8	
	1	2	3	4	5	6	7	8	

Case 3c

A 12.79 In this case, as illustrated below:

- both Edge Lots and some (but not all) frequency-generic Lots in Time Slice 2 are unsold, and therefore treated as if won by the TS2 Notional Winner; and
- the Edge Lots in Time Slice 1 have different winners.

X		Y
Unsold		Unsold

A 12.80 In this subcase, we generate Assignment Options for all Bidders by either applying the edge contiguity requirement for the TS2 Notional Winner at the lower end and disregarding it at the upper end or vice versa. We then apply the procedure set out for Case 2. This is then repeated, but with the contiguity requirement applied at the end previously disregarded (and ignored at the end contiguity was previously applied). In each case, for the purpose of generating Assignment Options, the Edge Lot at the end of the band that is disregarded with respect to the contiguity requirements is treated as if won by a Hypothetical Edge Holder that has won only that Edge Lot.

A 12.81 For each Bidder, the Assignment Options generated under the different contiguity requirements are merged.

Example 11: Case 3c

Suppose that, in a band with Edge Lots at both ends of the band and eight frequency-generic Lots, we have the outcome from the Main Stage as set out in the table below. In this case, both Edge Lots and two frequency-generic Lots in Time Slice 2 are unsold. These are therefore associated with the TS2 Notional Winner (which we again call U)

Bidder	Edge Lots	TS1 generic lots	TS2 generic lots
A	Lower TS1	2	2
B	Upper TS1	2	2
C	None	4	2
U	Both TS2	0	2

Note that because the Edge Lots are fixed and only some, but not all, of the frequency-generic Time Slice 2 lots were unsold, it is not possible to have all of the spectrum associated with the TS2 Notional Winner in a single contiguous block. Assignment Options will be generated with the requirement that the unsold frequency-generic Time Slice 2 Lots form a contiguous block adjacent to either the lower Edge Lot *or* the upper Edge Lot.

To generate Assignment Options, we first establish Candidate Frequency Plans with the contiguity requirement for the TS2 Notional Winner applied at the top of the band. We then repeat the process but with the contiguity requirement applied at the bottom of the band. The Assignment Options for each winner are then determined based on the combined set of resulting Candidate Frequency Plans.

Contiguity requirement at the top of the band

We first apply the contiguity requirement for the TS2 Notional Winner at the top of the band. The lower Edge Lot in Time Slice 2 is treated as if won by a separate Hypothetical Edge Holder that has only won that Lot – call this winner U'.

This gives us four different winners of the Edge Lots for the purpose of generating Candidate Frequency Plans (with U' being the only one of the four that is not an Edge Winner).

Applying the methodology set out for Case2, we create four hypothetical bidders:

- AU' gets the lower Edge Lot in both Time Slices, plus two frequency-generic Time Slice 1 Lots;
- U'A gets nothing in Time Slice 1 and two frequency-generic Lots in Time Slice 2;

- BU gets the upper Edge Lot in both Time Slices, plus two frequency-generic Lots in each Time Slice; and
- UB gets nothing in Time Slice 1 and two frequency-generic Lots in Time Slice 2.

This gives the following set of winners for determining Candidate Frequency Plans:

Bidder	Edge Lots	TS1 generic lots	TS2 generic lots
AU'	Both lower	2	0
U'A	None	0	2
BU	Both upper	2	2
UB	None	0	2
C	None	4	2

There are two partitions with a CPS of zero that have three subsets and a largest subset of two Bidders:

{AU', U'A}, {UB, C}, {BU} and

{AU', UB}, {U'A, C}, {BU}

There is no partition with a CPS of zero that has a greater number of subsets or a smaller largest subset, and there are no unsold Time Slice 1 Lots to consider. We therefore pick one of these two partitions at random – suppose we use the first i.e. {AU', U'A}, {UB, C}, {BU}.

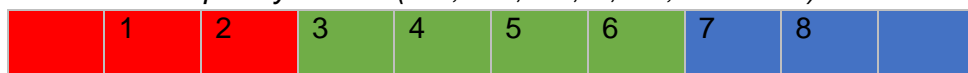
The following iteration in the partitioning process then puts all of the winners into singleton subsets.

Under the contiguity requirements, the winner orderings are restricted to those where:

- AU' is first and U'A is second; and
- BU is last.

That results in two possible bidder orderings (switching UB and C around in the middle), yielding the following Candidate Frequency Plans (where red = A, blue = B, green = C, white = U):

Candidate Frequency Plan 1: (AU', U'A, UB, C, BU; TTSV = 4)



	1	2	3	4	5	6	7	8	
--	---	---	---	---	---	---	---	---	--

Candidate Frequency Plan 2: (AU', U'A, C, UB, BU; TTSSV = 2)

	1	2	3	4	5	6	7	8	
	1	2	3	4	5	6	7	8	

Contiguity requirement at the bottom of the band

We then repeat the process above, but with the requirement that the unsold frequency-generic Time Slice 2 Lots are positioned next to the lower Time Slice 2 Edge Lot.

After creating the relevant hypothetical bidders, we have the following set of winners for determining Candidate Frequency Plans (where U' in this case represents a Hypothetical Edge Holder that wins the upper Edge Lot in Time Slice 2 and only that Lot):

Bidder	Edge Lots	TS1 generic lots	TS2 generic lots
AU	Both lower	2	2
UA	None	0	2
BU'	Both upper	2	0
U'B	None	0	2
C	None	4	2

Again, there are two partitions with a CPS of zero that have three subsets and a largest subset of two Bidders:

{AU}, {UA, BU'}, {U'B, C} and

{AU}, {UA, C}, {BU', U'B}

Suppose the first of these is selected i.e. {AU}, {UA, BU'}, {U'B, C}.

The second partitioning then puts all winners into singleton subsets.

The winner orderings are now restricted to those where:

- AU is first; and
- BU' is last and UA is second to last.

Again, we have two possible bidder orderings (switching U'B and C around in the middle), yielding the following Candidate Frequency Plans (where red = A, blue = B, green = C, white = U):

Candidate Frequency Plan 3: (AU, U'B, C, UA, BU'; TTSV = 10)

	1	2	3	4	5	6	7	8	
	1	2	3	4	5	6	7	8	

Candidate Frequency Plan 4: (AU, C, U'B, UA, BU'; TTSV = 8)

	1	2	3	4	5	6	7	8	
	1	2	3	4	5	6	7	8	

Assignment Options

The Assignment Options for any given winning Bidder comprise all of the different frequency assignments that Bidder would get under any of the four Candidate Frequency Plans set out above.

A will have the following two Assignment Options for the Assignment Round:

	1	2	3	4	5	6	7	8	
	1	2	3	4	5	6	7	8	

	1	2	3	4	5	6	7	8	
	1	2	3	4	5	6	7	8	

B will have the following two Assignment Options for the Assignment Round:

	1	2	3	4	5	6	7	8	
	1	2	3	4	5	6	7	8	

	1	2	3	4	5	6	7	8	
	1	2	3	4	5	6	7	8	

C will have the following two Assignment Options for the Assignment Round:

	1	2	3	4	5	6	7	8	
	1	2	3	4	5	6	7	8	

	1	2	3	4	5	6	7	8	
	1	2	3	4	5	6	7	8	

Case 3d

A 12.82 In this case, an Edge Winner has won three different Edge Lots in the band. The various possible configurations are set out below.

X	X	X
	...	X

	...	X
X	X	X

X	X	X
X	...	

X	...	
X	X	X

A 12.83 It is not possible to have more than one winner in this situation, and such a Bidder does not participate in the Assignment Round. If it has won any frequency-generic Time Slice 1 Lots, it is assigned spectrum contiguous with its Time Slice 1 Edge Lot.

A 12.84 For other winners in the band, Assignment Options are generated in the same way as for Case 3b:

- If necessary, apply the contiguity requirement with regard to the winner of the fourth Edge Lot and any frequency-generic Lots it has won.
- For all other winners, the Assignment Options comprise the set of frequency ranges that could feasibly be assigned to them within the remaining frequencies once all edge contiguity requirements have been met, subject to the requirements set out in Section 4.3.2.

Alignment of Eir with RurTel

A 12.85 If Eir has won frequency-generic Lots in the 2.3 GHz band in Time Slice 1, the Assignment Options will be generated to ensure a reasonable overlap between the specific frequencies assigned to Eir and the frequencies currently being used by RurTel (2307 - 2327 MHz).

A 12.86 Specifically, for each Time Slice in which Eir has won at least one frequency-generic Lot, Eir's frequency assignment associated with those frequency-generic Lots will form a contiguous block starting at 2300 MHz.

A 12.87 If Eir has won either or both of the 2.3 GHz Edge Lots in addition to at least one frequency-generic Lot, the contiguity requirements between the Edge Lot(s) won by Eir and the frequencies associated with frequency-generic 2.3 GHz Lots won by Eir in the same Time Slice will be disregarded for the purpose of generating Assignment Options. Any 2.3 GHz Edge Lots won by Eir will be considered to have been won by a separate Hypothetical Edge Holder that has won only those Lots. Following this substitution (if necessary) then, subject to the constraints on where Eir's frequency-generic Lots can be located in the band:

- if there are no Edge Winners, Assignment Options will be generated in accordance with the procedure set out for Case 1, with the exception that the provisions for giving a Bidder the same frequency options as any other Bidder winning the same number of frequency-generic Lots in the band under the Candidate Frequency Plans generated will not apply with respect to Eir; or
- if there are Edge Winners, Assignment Options will then be generated in accordance with the procedure set out for Case 2 above.

Example 12: Applicable Assignment Option generation procedures when Eir's options are constrained

If Eir has won frequency-generic Lots in the 2.3 GHz band, the specific frequencies assigned to Eir in relation to those frequency-generic Lots are constrained to form a contiguous block beginning at 2300 MHz in each applicable Time Slice.

This constraint is prioritised over ensuring Eir's frequency-generic Lots are contiguous with any Edge Lots it might also have won.

When determining the appropriate procedure for determining Assignment Options for the 2.3 GHz band in this scenario, there are a number of cases that need to be considered. In all cases, the set of Assignment Options generated must comply with the constraint on where Eir can be located in the band. Note that an implication of this is that even if another Bidder has won the same number of frequency-generic Lots in each Time Slice as Eir and is not an Edge Winner, these Bidders will not have common Assignment Options i.e. Eir's frequency assignment will be fixed, and the options for the other Bidder will not (and could not) include the frequencies to be assigned to Eir.

Eir has won both Edge Lots:

This is a simple scenario as there are no Edge Winners for the purpose of generating Assignment Options (recalling that by definition an Edge Winner has to have won frequency-generic Lots as well as at least one Edge Lot). Assignment Options can therefore be generated as if for a band with no Edge Lots, in accordance with the procedure described for Case 1,

Eir has not won either of the Edge Lots:

In this case, the constraints on Eir's location in the band do not affect how we need to deal with the Edge Lots and Edge Winners. Subject to the constraints on Eir, Assignment Options can be determined in line with the procedures set out for Case 1 or Case 2, depending on whether there are Edge Winners for the band.

Eir has won the Edge Lot for one Time Slice and another Bidder has won the Edge Lot for the other Time Slice:

If the winner of the other Edge Lot is not an Edge Winner, there are no Edge Winners and Assignment Options are generated as in Case 1.

If the winner of the other Edge Lot is an Edge Winner, then the procedure for Case 2 applies, with Eir's Edge Lot treated as if won by a Hypothetical Edge Holder that has only won that Lot.

Eir has won the Edge Lot for Time Slice 1 and the Edge Lot for Time Slice 2 is unsold:

Since the Edge Lot in Time Slice 2 would be assigned to the TS2 Notional Winner, this case is analogous to the scenario above where another Bidder won that Time Slice 2 Edge Lot.

If there are no unsold frequency-generic Time Slice 2 Lots, the Case 1 procedure is applied. If there are unsold frequency-generic Time Slice 2 Lots, these are assigned to the TS2 Notional Winner which is then an Edge Winner, so the Case 2 procedure is used.

Eir has won the Edge Lot for Time Slice 2 and the Edge Lot for Time Slice 1 is unsold:

In this case, the Time Slice 2 Edge Lot won by Eir would be treated as if won by a Hypothetical Edge Holder that has won only that Lot. Note that this Hypothetical Edge Holder is not the same as the TS2 Notional Winner (which would be introduced independently if there were unsold frequency-generic Time Slice 2 Lots). For the avoidance of doubt, there would be no objective to keep the Time Slice 2 Edge Lot won by Eir contiguous to any unsold frequency-generic Time Slice 2 Lots.

Since the Time Slice 1 Edge Lot is unsold and the Time Slice 2 Edge Lot is treated as won by the Hypothetical Edge Holder that has won only that Lot, in this scenario there are no Edge Winners. The procedure set out for Case 1 can therefore be used to generate Assignment Options.

Example 13: Restrictions on Eir's 2.3 GHz frequency assignment apply

Consider the 2.3 GHz band, and suppose that Eir has won the (upper) Edge Lot in Time Slice 1 plus ten frequency-generic Lots in each Time Slice.

The restriction on the placement of Eir within the band means that, in relation to its frequency-generic Lots, Eir would be assigned the frequency range 2300 – 2350 MHz in each Time Slice.

Suppose that the full set of winning bidders is as follows (with Eir denoted as E for notational purposes):

Bidder	Edge Lots	TS1 generic lots	TS2 generic lots
E (Eir)	TS1	10	10
A	TS2	4	4

B	None	2	2
C	None	2	2

If there were no restrictions on where Eir’s frequency-generic Lots are placed, we would simply apply the procedure set out for Case 2 using hypothetical bidders EA and AE²⁰⁴ for dealing with the edge contiguity requirements.

However, with the restrictions on Eir, it is not feasible for Eir’s frequency assignment (in each Time Slice) to begin at 2300 MHz and for Eir to have contiguity between its Edge Lot and its frequency-generic Lots in Time Slice 1.

In this case, contiguity with the Edge Lot for Eir is not a consideration for the generation of Assignment Options. We instead assume that the Time Slice 1 Edge Lot has been won by a Hypothetical Edge Holder that has won only that Lot – we call this Hypothetical Edge Holder E’.

We can then apply the Case 2 process, since we have two different winners of the Edge Lots, and one of them (A) is an Edge Winner.

First create the following hypothetical bidders:

- E'A gets both Edge Lots and four frequency-generic Time Slice 2 Lots; and
- AE' gets four frequency-generic Time Slice 1 Lots and nothing in Time Slice 2.

We then have the following set of winners for generating Assignment Options:

Bidder	Edge Lots	TS1 generic lots	TS2 generic lots
E	None	10	10
E'A	Both	0	4
AE'	None	4	0
B	None	2	2
C	None	2	2

²⁰⁴ Using the same notation as before, where EA gets E’s Time Slice 1 Lots and A’s Time Slice 2 Lots, and AE gets A’s Time Slice 1 Lots and E’s Time Slice 2 Lots.

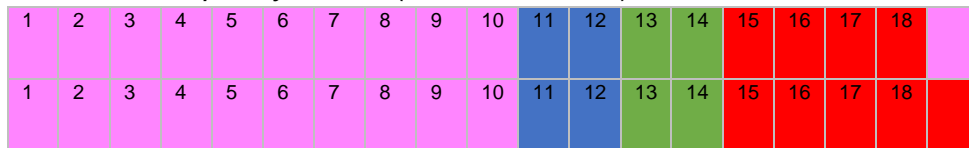
The partition {E}, {E'A, AE'}, {B}, {C} is the unique partition that has the maximum the number of subsets out of the partitions that have a CPS of zero and so is selected. The subsequent partitioning simply splits E'A and AE' into singletons.

The winner orderings are restricted to those that have E first, E'A last and AE' second to last.

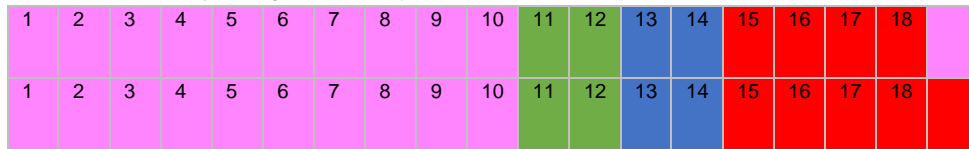
There are two ways of ordering the remaining two bidders: BC and CB.

We therefore have two valid winner orderings that satisfy the restriction on the placement of Eir and the edge contiguity requirement for E'A, which give the following Candidate Frequency Plans (pink = Eir, red = A, blue = B, green = C):

Candidate Frequency Plan 1: (E, B, C, AE', E'A)



Candidate Frequency Plan 2: (E, C, B, AE', E'A)



Bidders B and C will then have two Assignment Options each. The frequency assignments for Eir and A are fixed, so neither of these Bidders will participate in the Assignment Round for the 2.3 GHz band in this example.

Annex: 13 Relocation Rebate

A 13.1 This annex sets out details of the Relocation Rebate that applies to Eir in relation to its Existing 2.1 GHz Band Licence where it incurs Relocation costs as a result of the Assignment Stage that it would not have incurred otherwise.

A 13.2 A Relocation Rebate will be granted to compensate Eir for Relocation costs in the following circumstances:

- *Scenario 1:* where Eir does not apply for and obtain early liberalisation for its Existing 2.1 GHz Band Licence and does not win spectrum rights of use in the 2.1 GHz Band in Time Slice 2. In such cases, the Relocation Rebate will be equal to the Relocation costs necessitated as a result of the Assignment Stage. The Relocation costs incurred by Eir will be examined by ComReg, as set out below, to determine the Relocation Rebate.
- *Scenario 2:* where Eir does not apply for and obtain early liberalisation for its Existing 2.1 GHz Band Licence and wins spectrum rights of use in the 2.1 GHz Band in Time Slice 2. In such cases, the Relocation Rebate will consist of the additional time-value-of-money costs associated with bringing forward the Relocation activities necessitated as a result of the Assignment Stage, but not the Relocation costs themselves. To determine the Relocation Rebate under Scenario 2, the Relocation costs incurred by Eir will be examined by ComReg as set out below.

When the total Relocation costs have been determined, a time-value-of-money adjustment factor will be calculated based on the quantum of time involved, i.e. the period of time by which Relocation activities are brought forward such that they occur before the commencement date of new rights of use for spectrum in the 2.1 GHz Band in Time Slice 1, rather than before the original licence expiry date²⁰⁵. The time-value-of-money adjustment factor will be based on an appropriate discount factor. ComReg will consider whether it is appropriate to consider changes to the level of Relocation costs for the time period

²⁰⁵ Based on Eir's existing licence expiry date of 11 March 2027 and the expected commencement date of 16 October 2022 for new rights of use for spectrum in the 2.1 GHz Band in Time Slice 1, Eir's Relocation activities would be brought forward by approximately 4 years 5 months.

between when these costs are actually incurred and when they would have been incurred in the future²⁰⁶.

- *Scenario 3:* If Eir can reasonably prove to ComReg that it has directly incurred Relocation costs as a result of the Assignment Stage that it would not have otherwise incurred at some point in time, ComReg will consider an application for a Relocation Rebate. The Relocation costs incurred by Eir will be examined by ComReg, as set out below, to determine the Relocation Rebate.

A 13.3 To the extent that additional costs result from a negotiated assignment (resulting from the Negotiation Phase), ComReg considers that such costs are a matter for the Winning Bidders themselves and will not provide compensation.

ComReg's examination of Relocation costs

A 13.4 In order for ComReg to grant a Relocation Rebate, Eir must pre-notify ComReg of its expected Relocation costs for information purposes.

A 13.5 ComReg will examine these Relocation costs to determine if such costs are objectively justified and proportionate. Eir must demonstrate to ComReg that any costs submitted as part of a Relocation Rebate application have been incurred directly as a result of the Assignment Stage and these costs would not have otherwise been incurred as a result of the Award Process or would only have been incurred at a later date. If Relocation costs include upgrades of equipment that are not required exclusively for the purpose of the Assignment Stage, these costs may be disallowed, or appropriately discounted by ComReg. ComReg reserves the right to have the relocation costs independently evaluated and/or verified.

A 13.6 Subject to the provisions of ComReg's guidelines on the treatment of confidential information as set out in ComReg Document 05/24, ComReg will publish on its website all Relocation cost information received from Eir of a Relocation Rebate and details of any Relocation Rebate granted by ComReg.

²⁰⁶ ComReg recognises that it will be necessary to make certain assumptions about the future cost of Relocation activities in 2026 or 2027 (i.e. the time Eir would have been required to relocate in advance of its licence expiry date of 11 March 2027) compared to contemporaneous cost levels, as these future costs are unknown.

Annex: 14 Liberalisation fees

A 14.1 This annex sets out the approach to calculating whether Eir would be required to pay a liberalisation fee, and in the event that it did, the amount to fall due.

Overview of calculation steps

A 14.2 The process for determining the liberalisation fee (if any) to be paid by Eir consists of a number of steps:

- Extract a price estimate for a 2 × 5 MHz 2.1 GHz Time Slice 1 Lot from the award outcome. This is the '**Award Price**'.
- Adjust the total price paid by Eir for its current unliberalised licence for differences in licence duration, inflation and spectrum endowment to make it comparable with the Award Price. This is the '**Previous Price**'.
- Compare the Previous Price with the Award Price:
 - If the Previous Price is at least as much the Award Price, no liberalisation fee will be due (regardless of when Eir might choose to exercise its option to liberalise).
 - If the Previous Price is less than the Award Price, a surcharge needs to be calculated, based on the difference between the Award Price and the Previous Price, and taking into account the period for which the licence will be liberalised and when the liberalisation option is exercised.

Timing

A 14.3 Eir has the option to liberalise its current 2.1 GHz licence at any time from the award Regulations coming into force until the expiry of that licence on 11 March 2027.

A 14.4 For the avoidance of doubt, a liberalisation fee (if any) would apply only for the period 16 October 2022 to 11 March 2027 (or for whatever portion of that period Eir was to liberalise its current licence). Liberalisation fees would not be charged to any licensee for the period up to and including 15 October 2022.

A 14.5 Calculation of the liberalisation fee (if any) would be completed following the Assignment Round of the Award and Eir would be informed of:

- whether or not a fee would apply in the event that Eir liberalises (or has already liberalised) its current 2.1 GHz licence; and

- where applicable, the ‘Calculated Liberalisation Fee’ for a 2 × 5 MHz block, which is the Award Price less the Previous Price.

A 14.6 The date on which Eir receives notification of the Calculated Liberalisation Fee is called the ‘LF Notification Date’ and will be used:

- as the base date when adjusting the total fees for Eir’s current licence for inflation; and
- for the purposes of the liberalisation fee calculations, the start date of the period between the Award and 16 October 2022.

Calculating the Award Price

A 14.7 The first step is to estimate the Award Price for liberalised 2.1 GHz Time Slice 1 spectrum from the auction outcome in the following way:

- Sum the Base Prices paid by each Winning Bidder to obtain total revenue for the Main Stage of the award.
- Allocate the total revenue to each Lot Category in proportion to the number of Lots in that Lot Category multiplied by that Lot Category’s Round Price in the final Primary Bid Round.²⁰⁷ This gives an estimate of the auction revenue associated with the 2.1 GHz Time Slice 1 Lot Category (B2.1/1).
- Divide the auction revenue allocated to the B2.1/1 Lots by nine (the number of B2.1/1 Lots available in the award) to give an estimated auction price for a single B2.1/1 Lot.
- Add the discounted sum of future SUFs for a 2 × 5 MHz 2.1 GHz Time Slice 1 licence to the estimated auction price to give a total price for a B2.1/1 Lot in the award; this gives the Award Price of 2.1 GHz Time Slice 1 licences. As future SUFs are inflation-indexed, a real discount rate of 4.35% per annum is used.²⁰⁸

A 14.8 Note that the Award Price, calculated as detailed above, will be expressed in real terms at the end of the award. The Award Price is not affected by when Eir might choose to exercise its liberalisation option.

²⁰⁷ For the avoidance of doubt, the number of available Lots is used even if total demand for a Lot Category in the final Primary Bid Round is strictly less than the number of Lots available.

²⁰⁸ For discounting the future SUFs to be paid for a new licence won in the award, a real discount rate of 4.35% per annum would be used. This is based on a nominal discount rate of 5.85% per annum (the current mobile WACC estimate for Ireland published in ComReg 20/96) and estimated inflation of 1.5%.

Calculating the Previous Price

A 14.9 The second step is to calculate a comparable price for a 2 × 5 MHz block of 2.1 GHz spectrum using the discounted fees (SAFs and SUFs) for Eir's current 2.1 GHz licence, adjusting for inflation and difference in the duration of the current licence and Time Slice 1. This is the Previous Price.

A 14.10 The fees paid by Eir for its current 2 × 15 MHz 2.1 GHz licence comprise:

- a spectrum access fee (SAF) paid over a number of instalments during the first 15 years of the licence term; plus
- annual spectrum usage fees (SUFs), which are not inflation indexed for Eir's current licence.

A 14.11 The nominal payments made (and yet to be made) by Eir over the course of the licence are summarised in Table A14.1 below.

Table A14.1: Fees for Eir's current 2.1 GHz FDD licence

Year	Date of payment	SAF (€)	SUF (€)	Total (€)
0	30 June 2007	44,400,000	1,904,610	46,304,610
1	30 June 2008	0	1,904,610	1,904,610
2	30 June 2009	0	1,904,610	1,904,610
3	30 June 2010	0	1,904,610	1,904,610
4	30 June 2011	3,800,000	1,904,610	5,704,610
5	30 June 2012	3,800,000	1,904,610	5,704,610
6	30 June 2013	3,800,000	1,904,610	5,704,610
7	30 June 2014	3,800,000	1,904,610	5,704,610
8	30 June 2015	3,800,000	1,904,610	5,704,610
9	30 June 2016	3,800,000	1,904,610	5,704,610
10	30 June 2017	7,600,000	1,904,610	9,504,610
11	30 June 2018	7,600,000	1,904,610	9,504,610
12	30 June 2019	7,600,000	1,904,610	9,504,610
13	30 June 2020	7,600,000	1,904,610	9,504,610
14	30 June 2021	7,600,000	1,904,610	9,504,610
15	30 June 2022	9,100,000	1,904,610	11,004,610
16	30 June 2023	0	1,904,610	1,904,610
17	30 June 2024	0	1,904,610	1,904,610
18	30 June 2025	0	1,904,610	1,904,610
19	30 June 2026	0	1,904,610	1,904,610
Total	-	114,300,000	38,092,200	152,392,200

A 14.12 For determining the liberalisation fee (if any) to be paid by Eir, the price for a 2 × 5 MHz block based on the fees paid by Eir for its current licence is calculated as follows:

- Adjust the payments set out in Table A14.1 for inflation to put them into current terms as on the LF Notification Date. For historic payments, the latest CPI data provided on the Central Statistics Office website²⁰⁹ as on the LF Notification Date will be used to make the adjustment. For future payments, an inflation rate of 1.5% per annum is assumed.²¹⁰
- Sum the discounted payments using a real discount rate of 4.35% per annum to get the net present value (NPV) of the 2 × 15 MHz licence fees in real terms at the end of the award (i.e. on the LF Notification Date).
- Divide the NPV for the 2 × 15 MHz licence fees by three, to give the price of a 20-year 2 × 5 MHz licence.
- Adjust the 2 × 5 MHz price to account for the fact that the term for new licences over Time Slice 1 is 4 years and 147 days by multiplying the total fee by the ratio of the sum of real discount factors (assuming a real discount rate of 4.35% per annum, applied on a daily basis) across the two different licence durations.²¹¹
- Finally, discount this price using a real discount rate of 4.35% per annum applied for the number of days from the LF Notification Date to 16 October 2022 (the start of the liberalisation period covered by any liberalisation fee).
- This is the **Previous Price** that will be compared against the estimated Award Price for a 2 × 5 MHz Time Slice 1 licence based on the award results.

Example calculation of Previous Price

A 14.13 Below is an example of the process for calculating the Previous Price. This is

²⁰⁹ <https://data.cso.ie/>

²¹⁰ Using an assumed annual inflation rate of 1.5% is consistent with our approach to estimating the real discount rate for other calculations in relation to the liberalisation fee and also for determining the level of spectrum usage fees (SUFs).

²¹¹ This ratio is calculated as $\left(\sum_{i=0}^{1607} \frac{1}{(1+r)^{\frac{i}{365}}}\right) / \left(\sum_{i=0}^{7304} \frac{1}{(1+r)^{\frac{i}{365}}}\right) = \left(1 - \left(\frac{1}{1+r}\right)^{\frac{1607}{365}}\right) / \left(1 - \left(\frac{1}{1+r}\right)^{\frac{7304}{365}}\right)$ where r is the real annual discount rate. For $r = 4.35\%$ this ratio is approximately 0.298.

based on:

- the assumption of a LF Notification Date of 1 January 2022; and
- CPI data provided on the Central Statistics Office website (which at the time of writing covered the period up to and including March 2021), put into 1 January 2022 terms assuming a future annual inflation rate of 1.5% per annum.

A 14.14 For the avoidance of doubt, the assumed LF Notification Date is for example purposes only, and is neither fixed nor reflective of ComReg's expectations over when the LF Notification Date will occur in reality. Consequently, the numbers calculated and presented in this example are indicative. The Previous Price ultimately used for determining Eir's liberalisation fee will be calculated after completion of the Assignment Round of the Award using the most recent CPI data available at the time, as set out above.

A 14.15 Based on the assumptions above, the Previous Price for a 2 × 5 MHz block based on the fees paid by Eir for its current licence is EUR 11,549,865, calculated as follows in accordance with to the steps described above:

- Adjust the payments set out in Table A14.1 for inflation to put them into 1 January 2022 terms. These adjustments are shown in Table A14.2 below (as noted above, the CPI terms are hypothetical, put into January 2022 terms based on February 2021 CPI data and an assumed annual inflation rate of 1.5% over the 9 month period between the end of March 2021 and the start of January 2022).
- Summing the discounted payments using a real discount rate of 4.35% per annum then gives a NPV of EUR 120,152,525.
- Divide the NPV for the 2 × 15 MHz licence fees by three, to give a 20-year 2 × 5 MHz licence price of EUR 40,050,842.
- Adjusting to account for the fact that the term for new licences over Time Slice 1 is 4 years and 147 days gives $0.298 * \text{EUR } 40,050,842 = \text{EUR } 11,944,507$ as the price paid for 2 × 5 MHz for the duration of Time Slice 1, expressed in January 2022 terms and assuming that this hypothetical licence started immediately.
- Finally, discount this price (using a real discount rate of 4.35% per annum applied for 288 days) to take account of the difference between 1 January 2022 and 16 October 2022 (the start of the liberalisation period covered by any liberalisation fee). This gives EUR 11,549,865 (again in January 2022 terms).

- This is the Previous Price that would be compared against the Award Price.

Table A14.2 Calculation of 20-year licence price in 2021 terms

Date of payment	Amount for 2 × 15 MHz (EUR, SAF+SUF)	CPI (Mar 2022 = 100)	Inflation adjusted payment for 2 × 15 MHz (EUR, Mar 2022 terms)	Annual inflation (based on CPI)
30 June 2007	46,304,610.00	94.13	49,193,693.35	NA
30 June 2008	1,904,610.00	98.80	1,927,804.23	4.96%
30 June 2009	1,904,610.00	93.49	2,037,317.11	-5.38%
30 June 2010	1,904,610.00	92.66	2,055,435.54	-0.88%
30 June 2011	5,704,610.00	95.13	5,996,374.17	2.67%
30 June 2012	5,704,610.00	96.78	5,894,259.95	1.73%
30 June 2013	5,704,610.00	97.42	5,855,481.92	0.66%
30 June 2014	5,704,610.00	97.79	5,833,551.28	0.38%
30 June 2015	5,704,610.00	97.61	5,844,496.03	-0.19%
30 June 2016	5,704,610.00	98.06	5,817,210.80	0.47%
30 June 2017	9,504,610.00	97.70	9,728,551.80	-0.37%
30 June 2018	9,504,610.00	98.06	9,692,217.33	0.37%
30 June 2019	9,504,610.00	99.16	9,584,824.34	1.12%
30 June 2020	9,504,610.00	98.80	9,620,356.59	-0.37%
30 June 2021	9,504,610.00	100.28	9,478,183.84	1.50%
30 June 2022	11,004,610.00	101.78	10,811,835.77	1.50%
30 June 2023	1,904,610.00	103.31	1,843,591.95	1.50%
30 June 2024	1,904,610.00	104.86	1,816,346.75	1.50%
30 June 2025	1,904,610.00	106.43	1,789,504.18	1.50%
30 June 2026	1,904,610.00	108.03	1,763,058.31	1.50%
Total (2 × 15 MHz)	152,392,200.00		156,584,095.24	
Total (2 × 5 MHz)	50,797,400.00		52,194,698.41	

Calculation of any required liberalisation fee due

- A 14.16 Based on the outcome of the award, if the estimated price of a newly awarded 2 × 5 MHz 2.1 GHz licence (the Award Price) were to exceed the duration adjusted price paid by Eir for a 2 × 5 MHz licence based on its current licence fees (i.e. the Previous Price), a liberalisation fee would be applicable should Eir choose to liberalise its licence at any point before expiry.
- A 14.17 For the simplest case in which Eir chooses to liberalise before or on the LF Notification Date, if the Award Price exceeded the Previous Price, Eir would be due to pay the difference. This difference for a 2 × 5 MHz block is the Calculated Liberalisation Fee, and is equal to the larger of zero and the Award Price less the Previous Price. Eir would be due to pay the Calculated Liberalisation Fee (if any) for each 2 × 5 MHz block of currently licensed 2.1 GHz spectrum Eir liberalised. This liberalisation fee would be due at the same time as the Spectrum Access Fees to be paid by winning Bidders.
- A 14.18 In the event that Eir had not exercised its option to liberalise by the LF Notification Date, ComReg would nevertheless determine the Calculated Liberalisation Fee (which might be zero), using the method above and notify this to Eir.

Eir exercises its option after the LF Notification Date

- A 14.19 There are three cases according to when Eir might choose to exercise its liberalisation option after being notified of the Calculated Liberalisation Fee, set out in turn below.
- A 14.20 Eir would be able to exercise its option (which includes making the relevant payment if appropriate) to liberalise at the Calculated Liberalisation Fee for each 2 × 5 MHz block liberalised for a period of 90 days from the date on which ComReg notified Eir of the Calculated Liberalisation Fee (i.e. the LF Notification Date).
- A 14.21 Alternatively, if Eir exercises its option to liberalise later than 90 days after the LF Notification Date, then the Calculated Liberalisation Fee will be updated to reflect the time value of money on a daily basis from the LF Notification Date until the date that Eir notifies ComReg that it wishes to exercise its liberalisation option. To ensure consistency with the payment terms of other Bidders who may also acquire 2.1 GHz rights of in Time Slice 1 and would pay for those rights of use in their upfront SAF the update to the Calculated Liberalisation Fee will be at a rate of 5.85% per annum. This accounts for the time value of money and is also consistent with ComReg's approach to setting minimum prices and the refund of fees to account for any delayed commencement (see Section 2.5 of this document).

A 14.22 Finally, if Eir exercises its option to liberalise on or after 16 October 2022, then a reduction will be made in the Calculated Liberalisation Fee to reflect that the period over which Eir's existing licence would be liberalised would be shorter than the 4-year 147-day period assumed by the Calculated Liberalisation Fee.

A 14.23 The reduction in the Calculated Liberalisation Fee is calculated as follows:

- amortise the Calculated Liberalisation Fee across the full 4-year 147-day licence term (based on a real discount rate of 4.35% per annum) to give a daily price difference;
- take the net present value (at the time of liberalising) of the stream of daily price differences over the number of days for which a liberalisation fee would be due (calculated based on a real discount rate of 4.35% per annum), running from the first day of liberalisation until (and including) 11 March 2027.