



Commission for
Communications Regulation

3.6 GHz Band Spectrum Award

Information Memorandum

Reference: ComReg 16/71

Date: 24 August 2016

An Coimisiún um Rialáil Cumarsáide
Commission for Communications Regulation

Abbey Court, Irish Life Centre, Lower Abbey Street, Dublin 1, Ireland

Telephone +353 1 804 9600 Fax +353 1 804 9680 Email info@comreg.ie Web www.comreg.ie

Additional Information

Document No:

16/71

Date:

24 August 2016

Contents

Section	Page
1 Introduction.....	8
1.1 Legal Framework and Agreement.....	8
1.2 The 3.6 GHz Band	9
1.3 Structure of Information Memorandum.....	10
2 Licences, Regions and Award Spectrum	12
2.1 Introduction	12
2.2 The Regions in the Award Process	14
2.3 The Spectrum in the Award Process.....	16
2.4 The 3.6 GHz Band Liberalised Use Licence – Terms and Conditions.....	19
2.5 The 3.6 GHz Band Preparatory Licence – Terms and Conditions.....	36
2.6 The Transition Protected Licence (TPL) – Terms and Conditions.....	39
2.7 The Transition Unprotected Licence (TUL)– Terms and Conditions	42
2.8 The 3.6 GHz Band Spectrum Lease Licence	46
3 The Award Process.....	49
3.1 Lots Available.....	49
3.2 Process Overview and Timeline.....	53
3.3 Application Stage	58
3.4 Qualification Stage	76
3.5 Main Stage.....	79
3.6 Assignment Stage.....	86
3.7 Notification and Grant Stage	92
3.8 Transition Rules	94
4 The Auction Rules	98
4.1 General	98
4.2 The Main Stage.....	102
4.3 The Assignment Stage.....	122
5 Legal Terms and Conditions	136
5.1 Important Notice.....	136
5.2 Additional Conditions	139

Annexes

Section	Page
Annex 1: Glossary	144
Annex 2: Draft Regulations	162
Annex 3: Application Form	163
Annex 4: Alliance Notification Form	176
Annex 5: Worked Example of Activity Rules for the Primary Bid Rounds and Caps on Supplementary Bids.....	179
Annex 6: Example of Winner and Price Determination	200
Annex 7: Implications of the Final Price Cap	204
Annex 8: Relationships, resolution of Bidder connections, exemptions and changes	212
Annex 9: Methodology for generating Assignment Options.....	217
Annex 10: Determination of Winning Bids and Base Prices in the Main Stage	228

Table of Figures

Section	Page
Figure 1: Illustration of the interaction between the different Licences in the 3.6 GHz Band in relation to the Transition Rules	14
Figure 2. Graphical representation of the nine (9) Regions for award	16
Figure 3. The band plan for the 3.6 GHz Band.....	18
Figure 4: Overview of the Award Process	55

Table of Tables

Section	Page
Table 1: The spectrum rights available in the Award Process.....	10
Table 2: The spectrum and Lots available in the Award Process.....	17
Table 3: Rollout base station obligation by Region	22
Table 4: Reserve Prices per Lot per Region	30
Table 5: Annual SUF before CPI adjustment per Lot per Region.....	31
Table 6: Annual fee per FWALA Service Area in a TPL.....	41
Table 7: Annual fee per FWALA Service Area in a TUL.....	45
Table 8: Lots available in the Award Process	52
Table 9: Indicative Timeline for Application and Qualification Stages of the Award Process	57

Chapter 1

1 Introduction

- 1.1 In Document 16/22¹, ComReg published, for consultation, a draft Information Memorandum and draft Regulations setting out the processes and procedures for the proposed 3.6 GHz Band spectrum award (“Award Process”) which it had developed following extensive consultation as detailed in Document 15/140².
- 1.2 In Document 16/57³, ComReg then set out its response to consultation and final Decision on the Award Process, (as reflected in Decision D04/16 contained in Chapter 8 of that document). Interested Parties are also referred to previous documents in the consultation process for a description of ComReg’s proposals and how it reached its final position on the Award Process.⁴
- 1.3 In light of its Decision as set out in Document 16/57 and its consideration of all submissions received in response to Document 16/22 (see Response to Consultation Document 16/70 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, which details the processes and procedures ComReg will employ to implement Decision D04/16.

1.1 Legal Framework and Agreement

- 1.4 In preparing this Information Memorandum, ComReg has been guided by the statutory functions, objectives and duties relevant to its management of Ireland’s radio frequency spectrum (which are outlined in Annex 2 of Document 16/57) and the findings of its regulatory impact assessments (which are set out in Chapter 3 and Annex 5 of ComReg Document 16/57).
- 1.5 Further, in addition to providing for the licensing of spectrum rights of use in the 3.6 GHz Band following the Award Process, it is proposed that the draft Statutory Instrument contained in this document - subject to obtaining the

¹ ComReg Document 16/22 – Proposed 3.6 GHz Band Spectrum Award, Draft Information Memorandum – published 16 March 2016.

² ComReg Document 15/140 Response to Consultation and Draft Decision on Proposed 3.6 GHz Band Award – published 22 December 2015.

³ ComReg Document 16/57 – Response to Consultation and Decision on Proposed 3.6 GHz Band Spectrum Award D04/16 – published 11 July 2016

⁴ See, in particular, ComReg Documents 15/140, 15/70 and 14/101.

necessary, prior consent of the Minister for Communications Climate Action and Environment will prescribe relevant matters⁵ in relation to those Licences.

- 1.6 In addition, Interested Parties should note the requirement to be authorised to provide an electronic communications network or service in Ireland.⁶ Interested Parties can consult ComReg's website⁷ for further details and, in particular, the General Authorisation contained in Document 03/81R5⁸ which sets out the general conditions of authorisation.
- 1.7 Chapters 2, 3, 4 and 5 of this Information Memorandum contain the terms of the agreement which Interested Parties must agree to in participating in the Award Process and attention is specifically drawn to these chapters given the important and binding provisions contained therein.⁹
- 1.8 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.

1.2 The 3.6 GHz Band

- 1.9 A total of 350 MHz of spectrum rights of use in the 3.6 GHz Band are being included in the Award Process. These spectrum rights are to be awarded on a regional basis¹⁰. The band plan for the Award Spectrum will consist of a Time Division Duplex (TDD) configuration.

⁵ See Section 6 of the Wireless Telegraphy Act, 1926, as amended by Section 182 of the Broadcasting Act 2009.

⁶ 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.

⁷ See http://www.comreg.ie/licensing_and_services/general_authorisation.551.html for further details.

⁸ ComReg document 03/81R5 - General Authorisation, Pursuant to Regulation 8 of the European Communities (Electronic Communications Networks and Services) (Authorisation) Regulations, 2003 (S.I. No. 306 of 2003), Conditions for the provision of Electronic Communications Networks and Services - published 25 December 2015.

⁹ 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 Electronic Auction System (EAS) operate in the manner intended by ComReg, as set out in the Information Memorandum. 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.

¹⁰ As detailed in Chapter 2.

1.10 The spectrum rights available in each Region is set out in the following Table:

Frequency Band	Frequency range (MHz)	Spectrum rights available
3.6 GHz	3 410 – 3 435	25 MHz
	3 475 – 3 800	325 MHz

Table 1: The spectrum rights available in the Award Process

1.3 Structure of Information Memorandum

1.11 The remainder of this Information Memorandum is structured as follows:

- **Chapter 2** details the Regions, the spectrum rights of use being made available, the Auction Lots and the terms and conditions associated with the various Licence types that may be granted in connection with this process;
- **Chapter 3** provides an overview of the Award Process describing, in general terms, the various Award stages and associated timelines;
- **Chapter 4** details the Auction Rules and provides substantial information on the Auction component of the Award Process; and
- **Chapter 5** provides additional details on the legal terms and conditions that apply to this Award Process.
- **Annexes:**
 1. Glossary
 2. Draft Regulations¹¹
 3. Application Form
 4. Alliance Notification Form
 5. Worked example of Activity Rules for the Primary Bid Rounds and Caps on Supplementary Bids
 6. Example of Winner and price determination
 7. Implications of Final Price Cap
 8. Relationships, resolution of Bidder connections, exemptions and changes

¹¹ These draft Regulations are indicative only and are subject to the Minister's consent being given pursuant to Section 37 of the Communications Regulation Act 2002.

9. Methodology for generating Assignment Options

10. Determination of Winning Bids and Base Prices

- 1.12 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 ComReg's guidelines on the treatment of confidential information.¹²

¹² See Document 05/24.

Chapter 2

2 Licences, Regions and Award Spectrum

2.1 Introduction

- 2.1 In this Award Process, ComReg intends to grant, under section 5 of the Wireless Telegraphy Act 1926 (as amended) (“Act of 1926”), licences which will:
- permit the keeping, possession and use of 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 3.6 GHz Band, in one or more Regions (being those identified in Section 2.2 below) (“3.6 GHz Band Liberalised Use Licences”).
- 2.2 The terms and conditions attached to 3.6 GHz Band Liberalised Use Licences are described in Section 2.4 below and are set out in the Draft Regulations and in the indicative 3.6 GHz Band Liberalised Use Licence in Annex 2 of this document. Among other things, 3.6 GHz Band Liberalised Use Licences are being made available with a commencement date of 1 August 2017 (or such other date as may be specified by ComReg¹³) and shall expire on 31 July 2032¹⁴.
- 2.3 Winning Bidders in the Award Process will also be entitled to apply for a 3.6 GHz Band Preparatory Licence which will allow the holders of such licences to install networks and associated equipment in advance of the commencement date of its 3.6 GHz Band Liberalised Use Licence, but will not allow any wireless telegraphy transmissions¹⁵. The terms and conditions attached to a 3.6 GHz Band Preparatory Licence are described in Section 2.5 below and are set out in the Draft Regulations and the indicative 3.6 GHz Band Preparatory Licence.

¹³ The commencement date of a 3.6 GHz Band Liberalised Use Licence or specific Lots in a 3.6 GHz Band Liberalised Use Licence may be delayed due to circumstances outside ComReg’s control, notably the Transitional Activities provided for in Section 3.8 of this Information Memorandum.

¹⁴ Any delay to the commencement of 3.6 GHz Band Liberalised Use Licences due to the Transitional Activities provided for in Section 3.8 of this Information Memorandum, or otherwise, shall not affect this expiry date.

¹⁵ If a licensee wishes to test equipment then they must apply separately to ComReg for a test licence.

- 2.4 Where an Existing Licensee is a Winning Bidder in a Region that contains the service area of its Existing Licence, and the Transition Activities¹⁶ associated with this Existing Licence are likely to occur after 31 July 2017, such Existing Licensees will be able to apply to ComReg for a 3.6 GHz Band Transition Protected Licence (“TPL”) in order to facilitate the timely and orderly completion of its Transition Activities provided for under Section 3.8 below. The terms and conditions attached to a TPL are described in Section 2.6 below and are set out in the Draft Regulations and the indicative TPL.
- 2.5 Under certain pre-conditions, an Existing Licensee will also be allowed to apply for a Transition Unprotected Licence (“TUL”). The purpose of the TUL is to:
- facilitate the timely and orderly completion of an Existing Licensee’s Transition Activities; and
 - maximise the benefits to users and ensure the efficient use of spectrum during the Transition period.
- 2.6 The terms and conditions attached to a TUL are described in Section 2.7 below and are set out in the Draft Regulations and indicative TUL.
- 2.7 The terms and conditions attached to a 3.6 GHz Band Spectrum Lease Licence are described in Section 2.8 below and are set out in the Draft Regulations and indicative 3.6 GHz Band Spectrum Lease Licence. The purpose of the 3.6 GHz Band Spectrum Lease Licence is to facilitate the leasing of spectrum rights in the 3.6 GHz Band in accordance with such procedures as may be specified by ComReg under Regulation 19 of the Framework Regulations¹⁷.
- 2.8 The figure below provides an illustration of the interaction between the different Licences in the 3.6 GHz Band in relation to the Transition Rules set out in Section 3.8 below.

¹⁶ The Transition Activities refer to the activities required by the Existing Licensee to make adjustments 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 (see section 3.8 below for further information).

¹⁷ As noted in Document 16/50 (ComReg’s Spectrum Management Strategy 2016 to 2018), ComReg intends to set out a regulatory framework for the leasing of spectrum rights in the radio spectrum policy programme (RSPP) bands (this includes the 3.6 GHz Band) in advance of 31 July 2017.

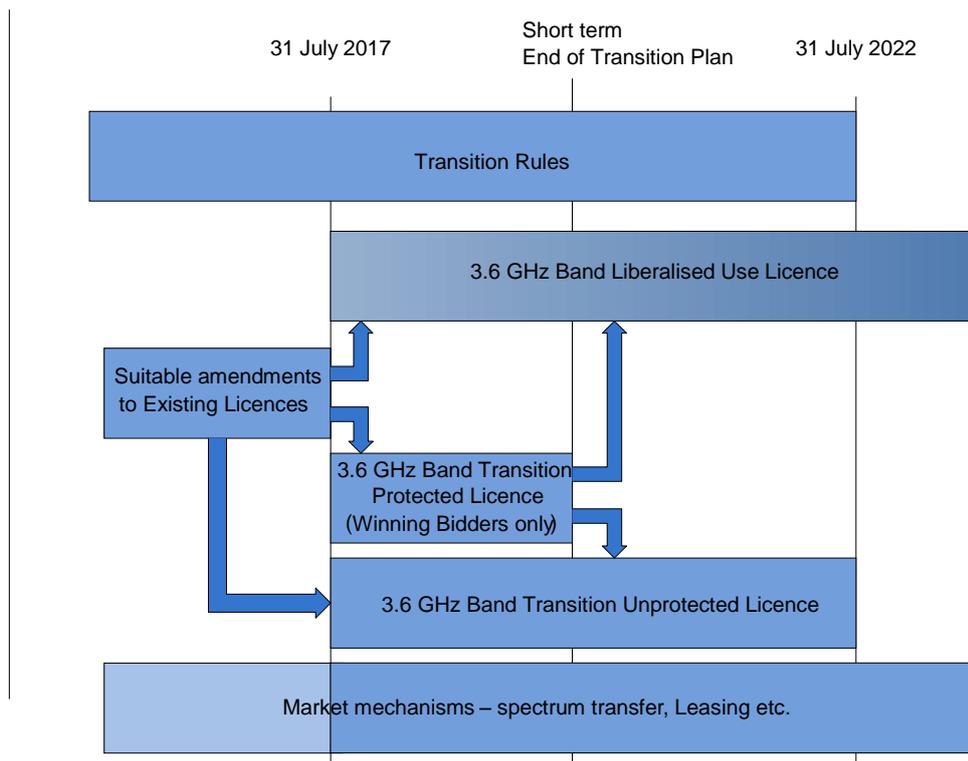


Figure 1: Illustration of the interaction between the different Licences in the 3.6 GHz Band in relation to the Transition Rules

2.2 The Regions in the Award Process

2.9 In this Award Process liberalised spectrum rights of use in the Award Spectrum are being made available in distinct non-overlapping regional areas of the State. There are nine such Regions, being:

- **Borders, Midlands and West:** That area of the State comprising counties Donegal, Leitrim, Sligo, Mayo, Roscommon, Cavan, Monaghan, Louth, Longford, Westmeath, Offaly, Laois and Galway, but excluding the respective parts of these counties contained in the CSO Boundary for Galway City and Suburbs Region.
- **South West:** That area of the State comprising counties Clare, Limerick, Kerry, Cork and the former local authority area of North Tipperary (as originally referred to as Tipperary North Riding in the Local Government Act 1898) but excluding the respective parts of these counties contained in the CSO Boundary for Cork City and Suburbs region and the CSO Boundary for Limerick City and Suburbs Region.

- **East:** That area of the State comprising counties Meath, Kildare, Wicklow and Dublin, but excluding the respective parts of these counties contained in the CSO Boundary for Dublin City and Suburbs Region.
- **South East:** That area of the State comprising counties Carlow, Wexford, the former local authority area of South Tipperary (as originally referred to as Tipperary South Riding in the Local Government Act 1898), Kilkenny and Waterford, but excluding the respective parts of these counties contained in the CSO Boundary of Waterford City and Suburbs Region.
- **CSO Boundary for Dublin City and Suburbs:** That area of the State as defined by the CSO in the Census 2011 Boundary Files for Dublin City and Suburbs.
- **CSO Boundary for Cork City and Suburbs:** That area of the State as defined by the CSO in the Census 2011 Boundary Files for Cork City and Suburbs.
- **CSO Boundary for Limerick City and Suburbs:** That area of the State as defined by the CSO in the Census 2011 Boundary Files for Limerick City and Suburbs.
- **CSO Boundary for Galway City and Suburbs:** That area of the State as defined by the CSO in the Census 2011 Boundary Files for Galway City and Suburbs.
- **CSO Boundary for Waterford City and Suburbs:** That area of the State as defined by the CSO in the Census 2011 Boundary Files for Waterford City and Suburbs.

2.10 ComReg represents the above Regions using boundary files and has made available ten ESRI shape files that set out the boundaries of the Regions¹⁸. One file set is the master which sets out the boundaries of all nine Regions. The other nine file sets describe the boundaries of each individual Region and is provided to assist potential Bidders for individual Regions. In the event of any discrepancy between the boundary in the master file set and the individual Region file sets, the master file set will be definitive.¹⁹

¹⁸ These files may also be useful for Interested Parties that wish to view the boundaries of the Regions using their own mapping software.

¹⁹ © Ordnance Survey Ireland/Government of Ireland - Copyright Permit No. MP 001316

2.11 These file sets are made available on the ComReg website at the following link for download by Interested Parties: <http://www.comreg.ie/industry/radio-spectrum/spectrum-awards/3-6ghz-spectrum-award/>

2.12 A graphical representation of the Regions is shown in Figure 2 below.

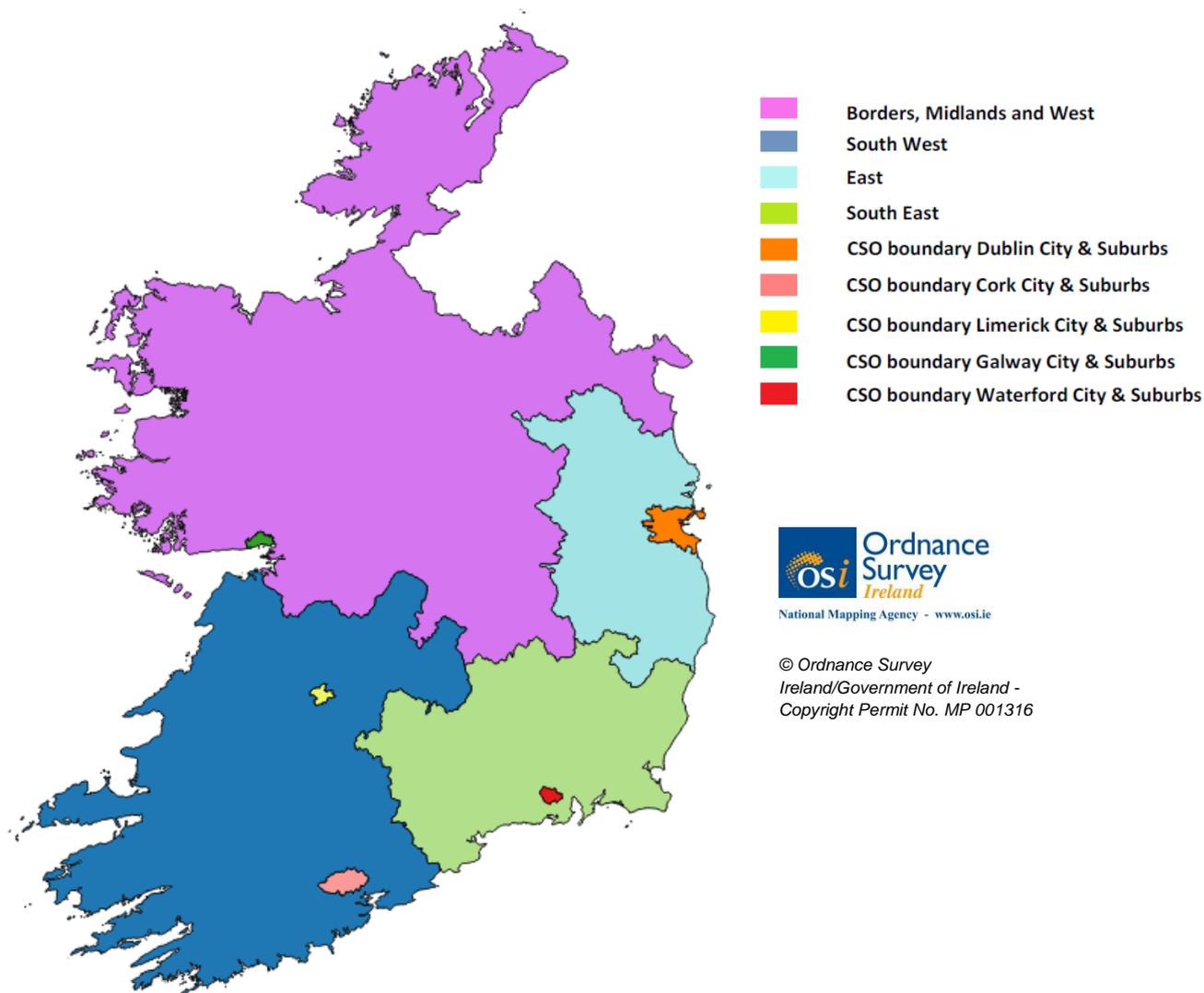


Figure 2. Graphical representation of the nine (9) Regions for award

2.3 The Spectrum in the Award Process

2.13 In each Region, 350 MHz of unpaired spectrum in the 3.6 GHz Band is being made available for award as set out in Table 2 below.

Frequency Band	Frequency range (MHz)	Spectrum available	Lots available for award
3.6 GHz	3 410 – 3 435	25 MHz	1 x 25 MHz
	3 475 – 3 800	325 MHz	65 x 5 MHz

Table 2: The spectrum and Lots available in the Award Process

- 2.14 In each Region a total of 66 Lots are being made available. There are two types of Lots:
- **A-Lots:** a single, frequency-specific 25 MHz Lot in the frequency range 3 410 MHz – 3 435 MHz; and
 - **B-Lots:** sixty five (65), 5 MHz frequency-generic Lots in the frequency range 3 475 MHz – 3 800 MHz.
- 2.15 Overall, this results in 18 Lot Categories in the Award Process: A1-A9 and B1-B9 (two Lot Categories for each of the nine Regions).
- 2.16 Figure 3 below illustrates the band plan for the 3.6 GHz Band in this Award Process.

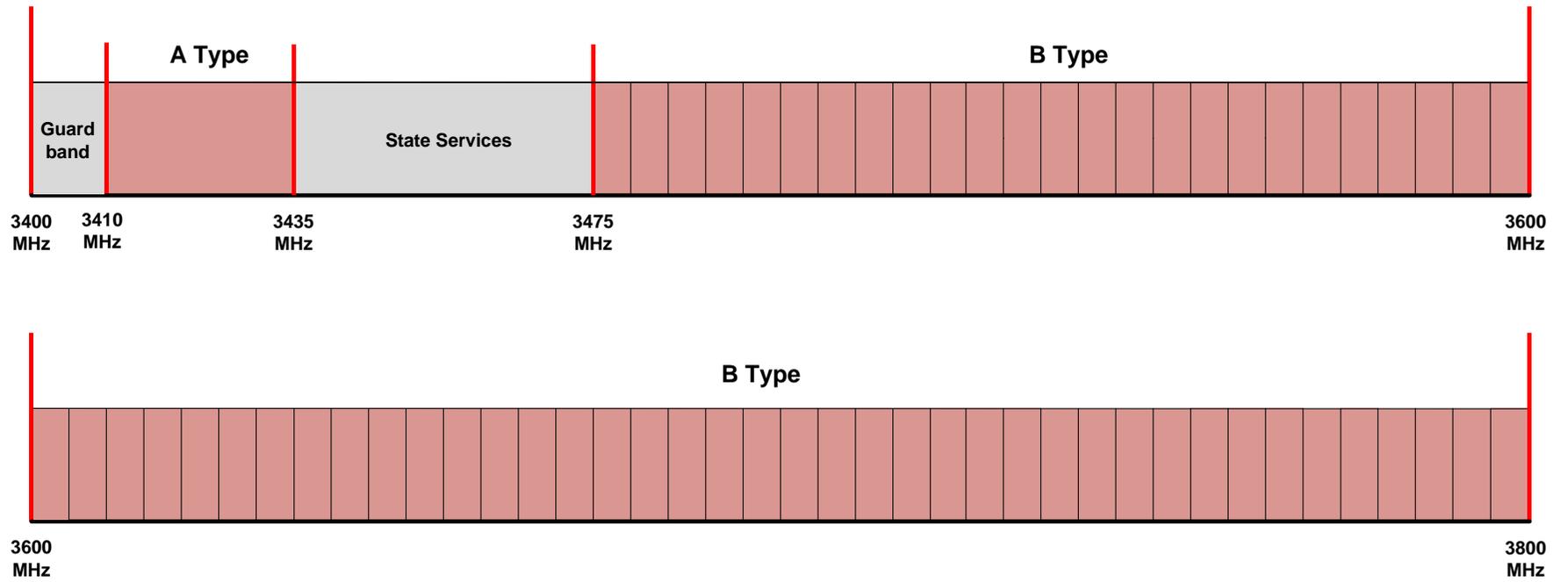


Figure 3. The band plan for the 3.6 GHz Band

2.4 The 3.6 GHz Band Liberalised Use Licence – Terms and Conditions

2.17 The following describes the principal terms and conditions associated with a 3.6 GHz Band Liberalised Use Licence. These terms and conditions are set out in the Draft Regulations and the indicative 3.6 GHz Band Liberalised Use Licence.

2.4.1 Entitlement to apply for a 3.6 GHz Band Liberalised Use Licence

2.18 In accordance with the rules for the Notification and Grant Stage (as discussed in Section 3.7 of this Information Memorandum), Winning Bidders will be entitled to apply for a 3.6 GHz Band Liberalised Use Licence.

2.4.2 Scope of the 3.6 GHz Band Liberalised Use Licence

2.19 A 3.6 GHz Band Liberalised Use Licence will allow the Licensee to keep and have possession of, install, maintain, work and use Apparatus for terrestrial systems capable of providing ECS in the part of the 3.6 GHz Band to which the Licence relates.

2.20 It is a "Non-exclusive" Licence for specific Regions of the State as specified in the Licence and all Apparatus licensed under a 3.6 GHz Band Liberalised Use Licence is required to comply with, among other things, the conditions of the Licence and the relevant European Commission ("EC") decisions for the 3.6 GHz Band, including EC Decision 2008/411/EC²⁰ as amended by EC Decision 2014/276/EC²¹ ("3.6 GHz EC Decision").

2.21 As set out in the Draft 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 on the radio frequency spectrum specified in the Licence,²² and

²⁰ The 2008 3.6 GHz EC Decision of 21 May 2008 on the harmonisation of the 3 400 - 3 800 MHz frequency and for terrestrial systems capable of providing electronic communications services in the Community. <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:144:0077:0081:EN:PDF>.

²¹ The 2014 3.6 GHz EC Decision of 2 May 2014 on amending the 2008 3.6 GHz EC Decision 2008/411/EC on the harmonisation of the 3 400 – 3 800 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Community <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014D0276&from=EN>

²² As discussed in Section 6.3 of Document 16/57, Article 2(1) of the 3.6 GHz EC Decision obliges member States to make available the 3.6 GHz Band on a non-exclusive basis and this decision is binding on Member

- “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 the protection of Apparatus used on this basis against Harmful Interference originating from radiocommunication services.

2.4.3 3.6 GHz Band Liberalised Use Licence Duration

- 2.22 Spectrum rights of use in this Award Process are being made available from 1 August 2017 (or some other date as may be specified by ComReg) to 31 July 2032.
- 2.23 There is no implied or express right of renewal, extension or any other form of prolongation of a 3.6 GHz Band Liberalised Use Licence (and the spectrum rights of use granted by same) beyond the expiry date of 31 July 2032.
- 2.24 Significantly prior to the expiry of 3.6 GHz Band Liberalised Use Licences, ComReg intends to consider the future use of the 3.6 GHz Band, including identifying the appropriate process for dealing with the spectrum released due to the expiration of 3.6 GHz Band Liberalised Use Licences.

Potential for delayed commencement of 3.6 GHz Band Liberalised Use Licences

- 2.25 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 3.6 GHz Band available for inclusion in a 3.6 GHz Band Liberalised Use Licence of a Winning Bidder by the commencement date of 1 August 2017.²³
- 2.26 Interested Parties are hereby expressly put on notice of the potential for delayed access to any and all Lots in the 3.6 GHz Band and, in submitting an Application, Applicants acknowledge and accept same.
- 2.27 Section 2.4.7 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 date of 1 August 2017.

States. Further it is standard practice in Ireland that spectrum bands licensed to particular licensees are also made available to other Wireless Telegraphy apparatus on a non-interference and non-protected basis. ComReg does not presently foresee any material change in its policy on non-exclusivity over and above that already applied in other licensing regimes in Ireland.

²³ Such circumstances include, for example, delayed access to certain Lot(s) caused by the Transition Activities of Existing Licensees.

2.28 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 date of 1 August 2017 is expressly limited to the refunds or adjustments of Licence fees as set out in Section 2.4.7 of this Information Memorandum and, by submitting an Application, Interested Parties agree to same.

2.4.4 Licence Conditions Applicable to all 3.6 GHz Band Liberalised Use Licences

2.29 This section describes the conditions which are applicable to all 3.6 GHz Band Liberalised Use Licences.

Rollout and associated compliance reporting conditions

2.30 It is a condition of a 3.6 GHz Band Liberalised Use Licence that the Licensee shall achieve and maintain the rollout base station obligation detailed in Table 3 below within 3 years of the licence commencement date for each of the Regions specified in its Licence. For this purpose:

- a "rollout base station" means network-controlled Apparatus in the 3.6 GHz Band with a minimum spectrum efficiency capability of 4 bits/Hz; and
- "network-controlled Apparatus" means Apparatus which has backhaul capability²⁴ 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.

²⁴ If the 3.6 GHz Band is 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.

Reference number of region	Name of Region	Number of rollout base stations to be worked and used	
		Licensee holding up to and including 100 MHz in the 3.6 GHz Band in that Region	Licensee holding over 100 MHz in the 3.6 GHz Band in that Region
1	Borders, Midlands and West	15	25
2	South West	15	25
3	East	15	25
4	South East	15	25
5	CSO boundary for Dublin City and Suburbs	10	15
6	CSO boundary for Cork City and Suburbs	2	4
7	CSO boundary for Limerick City and Suburbs	2	4
8	CSO boundary for Galway City and Suburbs	2	4
9	CSO boundary for Waterford City and Suburbs	2	4

Table 3: Rollout base station obligation by Region

- 2.31 For Regions 1, 2, 3 and 4 in Table 3 above, the Licensee is required to work and use rollout base stations in at least 4 counties for each licensed Region.
- 2.32 Where a Licensee has a rollout base station in one county and this rollout base station is worked and used to provide service to another county, the rollout base station will be counted as being worked and used in the county it serves (and not the county in which it is located).
- 2.33 Where a Licensee has a rollout base station in one county and this rollout base station is worked and used to provide services to more than one county (i.e. the county in which it is located in and also neighbouring counties), the rollout base station will only be counted as a single rollout base station for the purposes of meeting the rollout base station obligation and the Licensee may choose the county in which such a rollout base station is to be counted for this purpose.

- 2.34 Rollout base stations worked and used pursuant to a spectrum leasing arrangement count towards the rollout base station obligation of the lessor's Licence.
- 2.35 Where a Licensee has a spectrum leasing arrangement for a rollout base station in a Region not contained in its licensed Regions and this rollout base Station is being worked and used to serve a Region contained in its licensed Regions, such a rollout base station will be counted as being worked and used in the county and Region which it serves.
- 2.36 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 in their respective licensed Regions, provided that at least one licensed spectrum blocks of each Licensee is worked and used by the rollout base station.
- 2.37 Additionally, it is a condition of a 3.6 GHz Band Liberalised Use Licence that the Licensee submits an annual report to ComReg regarding its compliance with its rollout obligation ("Rollout Compliance Report"). Details of this compliance reporting condition are set out in Part 4, Section 4(3) of the indicative 3.6 GHz Band Liberalised Use Licence and include that:
- the Licensee shall identify in the Rollout Compliance Report whether it has either (a) met the relevant rollout obligation specified in its Licence, or (b) failed to meet the said obligation and reasons for same;
 - the information required for the Rollout Compliance Report shall be agreed with ComReg in advance and the Rollout Compliance Report shall have sufficient detail and granularity to allow ComReg to verify the results of the Licensee's Rollout Compliance Report; and
 - the Licensee shall submit its Rollout Compliance Report each calendar year within 31 calendar days following the anniversary of the commencement date of its 3.6 GHz Band Liberalised Use Licence.

Quality of Service and associated compliance reporting conditions

- 2.38 It is a condition of a 3.6 GHz Band Liberalised Use Licence that the minimum Quality of Service ("QoS") obligations²⁵ as set out in Part 4, Section 5 of the indicative 3.6 GHz Band Liberalised Use Licence are met. These QoS obligations comprise both a:

²⁵ The QoS obligations attached to a 3.6 GHz Band Liberalised Use Licence apply to all relevant services provided using the spectrum blocks licensed 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 via contractual or other arrangements with the Licensee that use those spectrum blocks.

- Minimum “Availability of the Network” Standard; and
- Minimum “Voice Call” Standard.

2.39 It is a further condition of a 3.6 GHz Band Liberalised Use Licence that the Licensee shall, every twelve months, measure and submit an annual report to ComReg regarding its compliance with (a) the Availability of the Network QoS standard and (b) the Voice Call QoS standard (“QoS Compliance Report”). Details of this compliance reporting condition are set out in Part 4, Section 5(4) of the indicative 3.6 GHz Band Liberalised Use Licence and include that:

- the Licensee shall identify in the QoS Compliance Report whether it has either (a) met the relevant QoS obligations specified in its Licence, or (b) failed to meet the said obligations and reasons for same;
- the information required for the QoS Compliance Report shall be agreed with ComReg in advance and the QoS Compliance Report shall have sufficient detail and granularity to allow ComReg to verify the results of the Licensee’s QoS Compliance Report;
- upon request by ComReg, the Licensee shall carry out Drive Test Measurements and submit these results to ComReg.²⁶ These Drive Test Measurements are to be carried out at the Licensee’s own expense and to a standard as agreed with ComReg; and
- the Licensee shall submit its QoS Compliance Report each calendar year within the 31 calendar days following the anniversary of the commencement date of its 3.6 GHz Band Liberalised Use Licence.

Cessation of use of a terrestrial system

2.40 It is a condition of a 3.6 GHz Band Liberalised Use Licence that, in Part 2 of its Licence, the Licensee specifies the terrestrial system applicable to each Apparatus specified on its Licence.

2.41 It is also a condition of a 3.6 GHz Band Liberalised Use Licence that, where a Licensee intends to cease the use of a terrestrial system that is used to

²⁶ 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 a QoS Compliance Report for the first time; or
- ComReg’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.

provide services under its 3.6 GHz Band Liberalised Use Licence,²⁷ the Licensee is obliged to:

- notify ComReg of this intention at least 6 months²⁸ 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.

Compliance with rules to prevent spectrum hoarding

2.42 It is a condition of the 3.6 GHz Band Liberalised Use Licence that the Licensee complies with any rules to prevent spectrum hoarding as laid down by ComReg under Regulation 17(10) of the Framework Regulations. While no such rules have yet been laid down by ComReg, ComReg reserves the right to specify such rules in the future and such rules may apply to rights of use for radio frequencies associated with 3.6 GHz Band Liberalised Use Licences.

Assignment of rights and obligations of a 3.6 GHz Band Liberalised Use Licence

2.43 Assignment of rights and obligations of a 3.6 GHz Band Liberalised Use Licence (including trading of rights of use for radio frequencies attaching to a 3.6 GHz Band Liberalised Use Licence) will be permitted.

2.44 In relation to any such assignment of rights and obligations, among other things, it is a condition of the 3.6 GHz Band 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 3.6 GHz Band Liberalised Use Licence;
- only transfer the rights of use for radio frequencies attached to its 3.6 GHz Band Liberalised Use Licence in accordance with the Transfer Regulations²⁹;

²⁷ 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.

²⁸ Should a Licensee notify ComReg that it could cease using one technology in favour of another in a time period of less than 6 months, then 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.

²⁹ S.I. No. 34 of 2014. See also ComReg Document 14/11.

- notify ComReg of its intention to lease any rights of use for radio frequencies attached to its 3.6 GHz Band Liberalised Use Licence;
 - only lease the rights of use for radio frequencies attached to its 3.6 GHz Band Liberalised Use Licence in accordance with such procedures as may be specified by ComReg under Regulation 19 of the Framework Regulations³⁰;
 - not, without the prior consent of ComReg (which shall not be unreasonably withheld), lease any rights of use for radio frequencies attached to its 3.6 GHz Band Liberalised Use Licence; and
 - 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.
- 2.45 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 Acts 2002 (as amended) or to the EC in accordance with Council Regulation (EC) No 139/2004.

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

- 2.46 Part 2 and Part 3 of the 3.6 GHz Band Liberalised Use Licence details the Apparatus to which the Licence relates and the location of each Apparatus.
- 2.47 It is a condition of the 3.6 GHz Band Liberalised Use Licence that the Licensee submit up to date information to ComReg in respect of Parts 2 and 3 of its 3.6 GHz Band Liberalised Use Licence in advance of its licence commencement date and on or before 1 August of each year that the Licence is in force.
- 2.48 It is ComReg's intention to publish details of 3.6 GHz Band 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

- 2.49 It is a condition of a 3.6 GHz Band Liberalised Use Licence that the Licensee shall make payment of fees as detailed in the Draft Regulations.

³⁰ As noted in Document 16/50, ComReg intends to set out a regulatory framework for the leasing of spectrum rights in the radio spectrum policy programme (RSPP) bands (which includes the 3.6 GHz Band) in advance of 31 July 2017.

2.4.5 3.6 GHz Band Liberalised Use Licence Technical Conditions

2.50 The technical conditions for a 3.6 GHz Band Liberalised Use Licence are detailed in Part 4, Sections 2 and 3 of the indicative 3.6 GHz Band Liberalised Use Licence. These conditions are in accordance with the parameters set out in the Annex to the 3.6 GHz EC Decision and, among other things, require a 3.6 GHz Band Liberalised Use Licensee to:

- ensure that only terrestrial systems compatible with the 3.6 GHz EC Decision are worked and used in the 3.6 GHz Band;
- be bound by the Inter-Licensee Synchronisation Procedure as set out in Part 4, Section 3 of the Licence;
- comply with all memoranda of understanding (“MoU”) agreed from time to time between ComReg and Ofcom³¹ (or its successor) in relation to the 3.6 GHz Band³²; and
- comply with the co-ordination threshold limit of 32 dBµV/m/5 MHz for 90% of the time and 90% of the locations at a height of 10 m at the borders of each Region³³. This co-ordination threshold limit may be relaxed when an Inter-Licensee Co-ordination Agreement is in place between all potentially affected Licensees.³⁴

Compliance with the R&TTE Regulations

2.51 All radio and telecommunications terminal equipment must comply with the essential requirements and other relevant provisions of the Radio and Telecommunications Terminal Equipment (R&TTE) Directive before being placed on the market or put into service in Ireland.

2.52 Under the R&TTE Regulations³⁵, which transpose the R&TTE Directive into law in Ireland, and the 2002 Act³⁶, it is a function of ComReg to ensure compliance, as appropriate, by persons with the relevant provisions of that legislation in relation to the placing of communications equipment on the

³¹ The national regulatory authority responsible for electronic communications matters in the UK.

³² See Annex 3 of ComReg Document 06/17R7. This MoU may be updated and amended by ComReg from time to time.

³³ The field prediction method shall be according to the current version of Recommendation ITU-R P.452, unless otherwise specified by ComReg.

³⁴ Inter-Licensee Co-ordination Agreements may be guided by ECC Recommendation (15) 01 or subsequent relevant guidance documents.

³⁵ The European Communities (Radio Equipment and Telecommunications Terminal Equipment) Regulations, 2001 (S.I. No. 240 of 2001).

³⁶ The Communications Regulation Act 2002 (No. 20 of 2002), as amended.

market, and the placing on the market and putting into service of radio equipment.

- 2.53 Among other things, ComReg defines the regulated interface requirements for radio services in Ireland and these interfaces are currently set out in ComReg Document 06/47R.³⁷ This document includes radio interface specifications for the 3.6 GHz Band and it is ComReg's intention to update ComReg Document 06/47R in due course to account for any 3.6 GHz Band Liberalised Use Licences issued as a result of this Award Process.
- 2.54 It is a condition of a 3.6 GHz Band Liberalised Use Licence that the Licensee ensures that all radio equipment worked and used under the Licence operates in accordance with the relevant interface requirements as set out in ComReg Document 06/47R (as may be amended from time to time).
- 2.55 The Radio Equipment Directive³⁸ ("RE Directive") came into force on 13 June 2016 and will replace the R&TTE Directive. There is a one year transition period during which equipment may be placed on the market or put into service under the R&TTE Directive or the RE Directive. However, radio equipment placed on the market or put into service after 13 June 2017 must comply with the requirements of the RE Directive. All references to the R&TTE Directive and Regulations herein and in the final Regulations, as appropriate, should be understood as referring to the RE Directive and any associated national implementing provisions.
- 2.56 It is a condition of a 3.6 GHz Band Liberalised Use Licence that the Licensee ensure that the Apparatus, or any part thereof, complies with the R&TTE Regulations. In this regard, a Licensee has a duty to ensure that the electromagnetic disturbance generated by its licensed Apparatus does not exceed the level above which radio and telecommunications equipment or other equipment cannot operate as intended, and that equipment sold, or installations constructed, by them are appropriately immune to electromagnetic interference.

2.4.6 Fees for a 3.6 GHz Band Liberalised Use Licence

- 2.57 The fee for a 3.6 GHz Band Liberalised Use Licence consists of an Upfront Fee which is paid at the end of the Award Process and Spectrum Usage Fees

³⁷ Interface Requirements for Radio Services in Ireland (see http://www.comreg.ie/fileupload/publications/ComReg_0647R.pdf).

³⁸ Directive 2014/53/EU of the European Parliament and of the Council, 16th April 2014, on harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC.

(“SUFs”) which are paid prior to the first grant of a 3.6 GHz Band Liberalised Use Licence and then over its duration.³⁹

2.58 For the avoidance of doubt, it should be noted that the grant of any Licence arising out of this Award Process is not an activity that is currently subject to Value Added Tax (“VAT”) and so all Licence fees to be paid by Licensees in connection with the Award Process do not include VAT. If the VAT rules change over the duration of the Licences, requiring the application of VAT, this would be applied as appropriate.

The Upfront Fee

2.59 The Upfront Fee payable by a Winning Bidder for a 3.6 GHz Band Liberalised Use Licence at the end of the Auction is a spectrum access 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 Additional Price for that Winning Bidder, if any, payable for the assignment of B-Lots as a result of the Assignment Stage of the Award Process.

2.60 The **Base Price** is determined as follows:

- where the Main Stage of the Award Process is not required, the Base Price for a 3.6 GHz Band Liberalised Use Licence is the sum of the Reserve Prices for all Lots in all Regions to be included in a 3.6 GHz Band Liberalised Use Licence. Table 4 below sets out the Reserve Price per Lot per Region.

³⁹ As discussed further in Section 3.7 of this document, the net fees to be paid at the end of the Auction will be appropriately reduced by the Deposit submitted and any applicable refunds or fee adjustments to reflect any delayed commencement.

Region	Reserve Price per A-Lot, €	Reserve Price per B-Lot €
Border, Midlands & West	114,000	22,800
South-West	72,000	14,400
East	64,000	12,800
South-East	44,000	8,800
Dublin City & Suburbs	178,000	35,600
Cork City & Suburbs	34,000	6,800
Limerick City & Suburbs	16,000	3,200
Galway City & Suburbs	14,000	2,800
Waterford City and Suburbs	8,000	1,600

Table 4: Reserve Prices per Lot per Region

- where the Main Stage of the Award Process is required, the Base Price for a 3.6 GHz Band Liberalised Use Licence is determined by the Main Stage of the Auction as detailed in Chapter 4 of this document. The Base Price for a 3.6 GHz Band Liberalised Use Licence will be no less than the sum of the Reserve Prices for all Lots won in all Regions to be included in a 3.6 GHz Band Liberalised Use Licence.
- 2.61 The **Additional Price** for a Winning Bidder, if any, is the price associated with the assignment of specific Lots 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 and will be no greater than the amount bid by the Assignment Bidder for these specific Lots in the Assignment Stage.

The Spectrum Usage Fee

- 2.62 The SUF is an index-linked fee that is paid at defined intervals over the duration of the 3.6 GHz Band Liberalised Use Licence. The first SUF is due prior to the initial grant of the 3.6 GHz Band Liberalised Use Licence. SUFs are due each subsequent calendar year during the term of the 3.6 GHz Band Liberalised Use licence prior to 1 August of that calendar year. SUFs are index-linked to the overall Consumer Price Index⁴⁰ (“CPI”) as published by the Central Statistics Office⁴¹ 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 3.6 GHz Band Liberalised Use Licence (“CPI Adjustment”).

⁴⁰ 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.

⁴¹ See <http://www.cso.ie>.

- 2.63 For a 3.6 GHz Band Liberalised Use Licence, the SUFs are the sum of the SUFs associated with each Lot per Region included in the 3.6 GHz Band Liberalised Use Licence. For each Lot per Region included in a 3.6 GHz Band Liberalised Use Licence, the annual SUF before CPI Adjustment is set out in Table 5 below.

Region	Annual SUF before CPI Adjustment per A-Lot (€)	Annual SUF before CPI Adjustment per B-Lot (€)
Border, Midlands & West	17,670	3,534
South-West	14,400	2,232
East	12,800	1,984
South-East	8,800	1,364
Dublin City & Suburbs	35,600	5,518
Cork City & Suburbs	6,800	1,054
Limerick City & Suburbs	3,200	496
Galway City & Suburbs	2,800	434
Waterford City and Suburbs	1,600	248

Table 5: Annual SUF before CPI adjustment per Lot per Region

- 2.64 The CPI Adjustment is to be calculated using 1 August 2017 as the common base date for the CPI (i.e. CPI = 100). When calculating the CPI Adjustment to the SUF associated with a Licence, ComReg will use the most current CPI data available to it at that time. For example, for 1 August, ComReg envisages that the most up to date CPI data available to it is likely to be CPI data from May of that year.⁴²
- 2.65 Where a 3.6 GHz Band Liberalised Use Licence is granted for a period of less than one year, the SUF shall be calculated using the above methodology and adjusted on a pro-rata daily basis.

Payment Arrangements for Licence Fees

- 2.66 The Licence fees for a 3.6 GHz Band Liberalised Use Licence are to be paid into ComReg's Bank Account, the details of which are specified in the Application Form contained in Annex 3 of this document.
- 2.67 Where the due date for payment of Licence fees falls on a day which is not 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.

⁴² This would take into consideration the time required for the publication of CPI data by the CSO and the administrative requirements such as invoicing the SUF to the Licensee thirty (30) calendar days in advance of the anniversary of the commencement date of the 3.6 GHz Band Liberalised Use Licence.

- 2.68 As set out in Section 3.7 of this document, where a Winning Bidder does not comply with the conditions relating to the payment of the Upfront Fee or the conditions attached to the payment of the SUF due on the first grant of a Licence, it may forfeit its Deposit and its entitlements to a 3.6 GHz Band Liberalised Use Licence and a 3.6 GHz Band Preparatory Licence, without prejudice to ComReg's entitlement to recover the full amount due in respect of all Lots per Region as a simple contract debt.
- 2.69 Where a Licensee has already been issued a 3.6 GHz Band 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, including taking compliance actions in accordance with the Authorisation Regulations.
- 2.70 In addition, where payment of any fee is not made in due time, then the Licensee shall pay to ComReg interest on the fees or part thereof that is outstanding at the 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. 580/2012), between the date when such fee or part fell due and the date of payment of such fee or part thereof.⁴³
- 2.71 An amount payable by a person in respect of an outstanding Licence fee may be recovered by ComReg from the person as a simple contract debt in any court of competent jurisdiction.

2.4.7 Refund or adjustment of Licence Fees

- 2.72 As noted in Section 2.4.3 of this Document, in limited circumstances ComReg may refund or adjust Licence fees payable by Winning Bidders due to the delayed commencement of Lots.
- 2.73 The refund or adjustment of fees payable to a Winning Bidder for each Lot so delayed shall be calculated as follows:
- a pro-rata portion of the Upfront Fees already paid by the Winning Bidder on a daily basis for each whole day following the commencement date of 1 August 2017 (or other commencement date as indicated by

⁴³ For the avoidance of doubt, any fees paid in respect of late payment are not subject to refunds or adjustments as discussed in Section 2.4.7.

ComReg in relation to the Award Process) that ComReg does not make the Lot available for use;⁴⁴ and

- a pro-rata portion of SUFs⁴⁵ already paid by the Winning Bidder on a daily basis for each whole day following the commencement date of 1 August 2017 (or other commencement date as indicated by ComReg in relation to the Award Process) that ComReg does not make the Lot available for use.

2.74 For each Winning Bidder, ComReg currently intends to purchase NTMA⁴⁶ Exchequer Notes in respect of the pro-rata portion of the Upfront Fees already paid for delayed Lot(s).⁴⁷ Interest, if earned⁴⁸, less any financial fees, if applicable, will be paid by ComReg to the Winning Bidder on these funds.

2.75 For each month following 1 August 2017, 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 Upfront Fees 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;
- in submitting an Application, Applicants agree that if they become Winning Bidders, 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

⁴⁴ To calculate the Upfront Fee associated with a Lot in a 3.6 GHz Band Liberalised Use Licence, ComReg will use the Round Prices in the Final Primary Bid Round and other relevant information.

⁴⁵ ComReg does not envisage a requirement to refund SUF payments for delayed Lot(s), as no SUF payments will be requested by ComReg for delayed Lot(s) until such time as ComReg notifies the Winning Bidder of the commencement date of these Lots.

⁴⁶ National Treasury Management Agency.

⁴⁷ However, ComReg reserves the right to manage all monies held in accordance with good treasury management.

⁴⁸ The current rate of interest on NTMA Exchequer Notes is zero per cent. However, the rate of interest associated with the NTMA Exchequer Notes may be negative. For the avoidance of doubt, in such circumstances, the refund paid to the Winning Bidder will be less the amount of negative interest accrued over the period a Deposit has been held by ComReg. See also Section 3.3.3 below.

the refunds or adjustments identified above and, in submitting an Application, Applicants agree to same.

- 2.76 Noting the local area nature of the Existing Licences, and any subsequent service areas in a TPL or TUL⁴⁹ issued in respect of same, ComReg observes that the Transition Activities of these Licensees in the 3.6 GHz Band may only cover a small proportion of a Region in which new spectrum rights have been won by a Winning Bidder.
- 2.77 Where this proportion is greater than 25% of the geographic area of the Region, ComReg will delay the commencement date of each Lot affected, unless otherwise requested by the Winning Bidder, and the refund or adjustment of fees payable to a Winning Bidder for each Lot so delayed shall be calculated as set out above.
- 2.78 Where this proportion is less than or equal to 25% of the geographic area of the Region, ComReg would not expect to delay the commencement of any such Lot(s) affected⁵⁰ thereby facilitating the deployment of services by the Winning Bidder in the remaining part of this Region. To compensate the Winning Bidder for the issue of spectrum rights for less than the entire Region, the fees associated with the service areas of the TPLs or TULs affecting the geographic availability of Lots in this Region will be paid by ComReg to the Winning Bidder. Where the service area of a TPL or TUL affects two or more Winning Bidders, the fees will be apportioned on an equal basis between these Winning Bidders irrespective of the parameters associated with each Winning Bidder's affected area (i.e. the number of Lots affected and the geographic proportion of the Region affected).⁵¹

Other refunds of Licence Fees

- 2.79 Where a Licensee requests an amendment to its 3.6 GHz Band Liberalised Use Licence which is accepted by ComReg and which results in:
- a reduction of the quantum of spectrum assigned to a 3.6 GHz Band Liberalised Use Licence, the Licensee shall not be entitled to any refund of its Upfront Fee⁵², but shall be entitled to any excess SUFs paid in

⁴⁹ This provision only applies to TUL's which are undergoing Transition Activities in accordance with the 3.6 GHz Band Transition Plan.

⁵⁰ ComReg may delay the commencement date of such Lots where justification for such a delay is provided by the Winning Bidder to ComReg's satisfaction.

⁵¹ This compensation mechanism is designed, in part, noting the complexities and various parameters associated with calculating refunds on alternative basis and noting that the quantum of any such refunds should be small.

⁵² For the avoidance of doubt, ComReg reserves the right to offer such refunds as part of any future reassignment/re-organisation of spectrum.

relation to this quantum of spectrum (which is the subject of the reduction) after the date this amendment takes effect and the Licensee no longer has a right of use over that spectrum pursuant to a Licence; or

- a reduction of the duration of one or more Lots in a 3.6 GHz Band Liberalised Use Licence, the Licensee shall not be entitled to any refund of its Upfront Fee, but shall be entitled to any excess SUFs paid in relation to the unused part of the Licence term where SUFs have already been paid. Additionally, the 3.6 GHz Band Liberalised Use Licensee will not be liable for any future SUFs on these surrendered Lots beyond the new expiry date of these Lots in its amended 3.6 GHz Band Liberalised Use Licence.

2.80 Where an amendment, surrender or withdrawal of a 3.6 GHz Band Liberalised Use Licence results from an enforcement action taken by ComReg, no 3.6 GHz Band Liberalised Use Licence fees paid will be refunded to the Licensee.

2.4.8 Enforcement Actions – Compliance with Licence Conditions, Licence Suspension, Licence Withdrawal

2.81 Enforcement of conditions of a 3.6 GHz Band Liberalised Use Licences shall be carried out by ComReg in accordance with its statutory powers, including those set out in the Authorisation Regulations.

2.82 A 3.6 GHz Band Liberalised Use Licence may be suspended or withdrawn in accordance with the Authorisation Regulations.

2.83 In the event that enforcement action by ComReg results in the suspension, withdrawal (or foreshortening) of a 3.6 GHz Band Liberalised Use Licence or part thereof, no Licence fees paid in connection with that 3.6 GHz Band Liberalised Use Licence will be refunded to the Licensee.

2.4.9 Amendment of a 3.6 GHz Band Liberalised Use Licence

2.84 ComReg may amend the rights, obligations and procedures relating to a 3.6 GHz Band Liberalised Use Licence from time to time in accordance with the Authorisation Regulations.

2.4.10 The Draft Regulations and an Indicative 3.6 GHz Band Liberalised Use Licence

2.85 Annex 2 of this document sets out the Draft Regulations which would provide for the issuing of 3.6 GHz Band Liberalised Use Licences, 3.6 GHz Band

Preparatory Licences, TPLs and TULs. Among other things, these Draft Regulations specify the:

- duration of a Licence;
- conditions of a Licence; and
- Licence fees.

2.86 An indicative 3.6 GHz Band Liberalised Use Licence is set out in Schedule 1 to the Draft Regulations, where:

- Part 1 of Schedule 1 sets out commencement and expiry dates for each Spectrum Block in the 3.6 GHz Band Liberalised Use Licence;
- Parts 2 and 3 of Schedule 1 set out the Apparatus to which the 3.6 GHz Band Liberalised Use Licence applies and the location and details of same; and
- Part 4 of Schedule 1 sets out further licence conditions associated with the 3.6 GHz Band Liberalised Use Licence.

2.87 The Draft Regulations and the indicative 3.6 GHz Band Liberalised Use Licence should be considered in conjunction with the text in this document and Document 16/57.

2.4.11 Other Considerations

Potential collaboration agreements between wireless operators

2.88 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).

2.5 The 3.6 GHz Band Preparatory Licence – Terms and Conditions

2.89 As outlined above, Winning Bidders in the Award Process will be entitled to apply for a 3.6 GHz Band Preparatory Licence, which will allow the holders of such licences to install networks and associated equipment in advance of the

commencement date of their 3.6 GHz Band Liberalised Use Licence, but will not allow any wireless telegraphy transmissions⁵³.

- 2.90 The following describes the principal terms and conditions associated with a 3.6 GHz Band Preparatory Licence. These terms and conditions are reflected in the Draft Regulations.

2.5.1 Entitlement to apply for a 3.6 GHz Band Preparatory Licence

- 2.91 In accordance with the rules for the Notification and Grant Stage as discussed in Section 3.7 of this Information Memorandum, Winning Bidders will be entitled to apply for a 3.6 GHz Band Preparatory Licence.

2.5.2 Scope of a 3.6 GHz Band Preparatory Licence

- 2.92 A 3.6 GHz Band 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 3.6 GHz Band. It is a condition of a 3.6 GHz Band Preparatory Licence that the Licensee shall not work or use said Apparatus.
- 2.93 It is a “non-exclusive” Licence for specific Regions of the State as set out in the schedule to the Licence and all Apparatus licensed under the 3.6 GHz Band Preparatory Licence is required to comply, among other things, with the 3.6 GHz EC Decision.

2.5.3 3.6 GHz Band Preparatory Licence - Duration and Renewal

- 2.94 The duration of a 3.6 GHz Band Preparatory Licence is set by reference to its commencement and expiry dates.
- 2.95 Before a 3.6 GHz Band Preparatory Licence will be granted to a Winning Bidder, it must pay the Upfront Fee associated with its 3.6 GHz Band Liberalised Use Licence (see also Section 2.5.5 below in respect of the administrative fee). Consequently, the commencement date of a 3.6 GHz Band 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.
- 2.96 The expiry date of a 3.6 GHz Band Preparatory Licence will be set by reference to the latest commencement date of a Lot in the Licensee’s 3.6 GHz Band Liberalised Use Licence.

⁵³ If a licensee wishes to test or trial equipment then they must apply for a separate test or trial licence as applicable.

- 2.97 A 3.6 GHz Band Preparatory Licence granted to a Licensee will be for the duration of the Licence as defined by reference to the above commencement and expiry dates of each Lot.
- 2.98 Once issued, the duration of the 3.6 GHz Band Preparatory Licence may be amended by ComReg in accordance with the provisions of the Authorisation Regulations.

2.5.4 Licence Conditions Applicable to all 3.6 GHz Band Preparatory Licences

- 2.99 The conditions associated with a 3.6 GHz Band Preparatory Licence are set out in Regulation 6 of the Draft Regulations and in the Licence.

2.5.5 Fees for a 3.6 GHz Band Preparatory Licence

- 2.100 An administrative fee of €100.00 will be payable to ComReg prior to the issue of a 3.6 GHz Band Preparatory Licence.
- 2.101 In addition, before a 3.6 GHz Band Preparatory Licence will be issued, Winning Bidders must pay the Upfront Fee associated with its 3.6 GHz Band Liberalised Use Licence.

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

- 2.102 Enforcement of conditions of 3.6 GHz Band Preparatory Licences shall be carried out by ComReg in accordance with its statutory powers including those set out in the Authorisation Regulations.
- 2.103 A 3.6 GHz Band Preparatory Licence may be suspended or withdrawn in accordance with the Authorisation Regulations.

2.5.7 Amendment of a 3.6 GHz Band Preparatory Licence

- 2.104 ComReg may amend the rights, obligations and procedures relating to a 3.6 GHz Band Preparatory Licence from time to time in accordance with the Authorisation Regulations.

2.5.8 The Draft Regulations and indicative 3.6 GHz Band Preparatory Licence

- 2.105 The Draft Regulations provide for the issuing of a 3.6 GHz Band Preparatory Licence on foot of this Award Process. Among other things, the Draft Regulations specify the:

- duration of a 3.6 GHz Band Preparatory Licence;
- conditions of a 3.6 GHz Band Preparatory Licence; and
- 3.6 GHz Band Preparatory Licence fees.

2.106 An indicative 3.6 GHz Band Preparatory Licence is set out in Schedule 3 of the Draft Regulations.

- Part 1 of Schedule 3 sets out further licence conditions associated with the 3.6 GHz Band Preparatory Licence; and
- Part 2 of Schedule 3 sets out the Statement of Authorised Apparatus associated with the 3.6 GHz Band Preparatory Licence.

2.107 The Draft Regulations and indicative 3.6 GHz Band Preparatory Licence should be considered in conjunction with the text in this document and Document 16/57.

2.6 The Transition Protected Licence (TPL) – Terms and Conditions

2.108 As noted above, following the Award Process, Existing Licensees may be required to make adjustments to their existing networks (referred to as “Transition Activities”) in order to comply with the outcome of the Award Process if they wish to continue to provide services following the cessation of the FWALA licensing scheme on 31 July 2017.

2.109 Subject to certain conditions, a Winning Bidder that is also an Existing Licensee will be able to apply for a TPL in order to facilitate the timely and orderly completion of its Transition Activities in line with the 3.6 GHz Transition Plan as provided for in Section 3.8 of this document.

2.110 The following describes the principal terms and conditions associated with the TPL. These terms and conditions are set out in the Draft Regulations.

2.6.1 Entitlement to apply for a 3.6 GHz Band TPL

2.6.2 Where an Existing Licensee is a Winning Bidder in a Region that contains some or all of the FWALA Service Area (as defined in the Draft Regulations) of its Existing Licence, and the Transition Activities associated with this Existing Licence are likely to occur after 31 July 2017, that Existing Licensee will be entitled to apply for a TPL in order to facilitate the timely and orderly completion of its Transition Activities in line with the 3.6 GHz Band Transition Plan.

2.111 An Applicant will only be entitled to apply for a TPL with the same FWALA Service Area of its Existing Licence.

2.6.3 Scope of the TPL

2.112 A TPL allows the Licensee to keep and have possession of, install, maintain, work and use Wireless Telegraphy Apparatus for terrestrial systems capable of providing electronic communications services in the 3.6 GHz Band for the duration of the TPL.

2.113 It 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 3.6 GHz Band TPL is required to comply with, among other things, the 3.6 GHz EC Decision.

2.6.4 TPL Licence Duration and Renewal

2.114 The duration of the TPL is set by reference to its commencement and expiry dates.

2.115 The commencement date of a TPL will be 1 August 2017, or such other date as determined by ComReg.

2.116 The expiry date of a TPL will be determined by ComReg by reference to the completion of the Licensee’s Transition Activities.

2.117 Once issued, the duration of the TPL may be amended by ComReg in accordance with the provisions of the Authorisation Regulations.

2.6.5 Licence Conditions Applicable to all TPLs

2.118 The terms and conditions of the TPL will be the same as those in the Existing Licence with the exceptions of the duration, the frequency assignment and

the FWALA Service Area⁵⁴ which will be determined by ComReg in order to facilitate the completion of the 3.6 GHz Transition Plan.

- 2.119 The conditions associated with a TPL are set out in Regulation 6 of the Draft Regulations. Among other things, Regulation 6 of the Draft Regulations sets out conditions in relation to ensuring that the Apparatus or any part thereof, complies with the provisions of the R&TTE Regulations or the Radio Equipment Directive (RED), as appropriate⁵⁵.
- 2.120 It is also a condition of the TPL that the Licensee submit up to date information to ComReg in respect of Parts 2 and Part 5 of its TUL in advance of its licence commencement date and on or before 1 August of each year that the Licence is in force.
- 2.121 It is ComReg's intention to publish details of TPLs, including information contained in Part 2 and Part 5, on its website subject to the assessment of confidential information in line with ComReg Document 05/24.

2.6.6 Fees for a TPL

- 2.122 The annual fee per FWALA Service Area in a TPL is detailed in Table 6 below.

Radio frequency spectrum bandwidth (paired channel)	<i>TPL Annual Fee (€)</i>
Up to 7 MHz	1500
Over 7 MHz and up to 14 MHz	2000
Over 14 MHz and up to 28 MHz	2800

Table 6: Annual fee per FWALA Service Area in a TPL

- 2.123 The fee for an unpaired channel is calculated by reference to its "equivalent" paired channel bandwidth.
- 2.124 Where spectrum rights for a FWALA Service Area in a TPL are granted for a portion of a year, the fee to be paid by the Licensee shall be calculated using $A \times (B/12) = C$, where:
- A is the relevant annual fee set out in Table 6 above;
 - B is the number of whole months for which the spectrum rights for a FWALA Service Area in the TPL 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
 - C is the appropriate fee to be paid.

⁵⁴ Geographic areas may be excluded from the FWALA Service Area.

⁵⁵ As previously outlined in paragraphs 2.51 to 2.56 above.

2.125 Additionally, before a TPL will be issued, a Winning Bidder must pay the Upfront Fee associated with its 3.6 GHz Band Liberalised Use Licence.

2.6.7 Enforcement Actions – Compliance with Licence Conditions, Licence Suspension, Licence Withdrawal

2.126 Enforcement of conditions of TPLs shall be carried out by ComReg in accordance with its statutory powers including those set out in the Authorisation Regulations.

2.127 A TPL may be suspended or withdrawn in accordance with the Authorisation Regulations.

2.128 In the event that enforcement action by ComReg results in the suspension, withdrawal (or foreshortening) of a TPL, no Licence fees paid in connection with the TPL will be refundable.

2.6.8 Amendment of a TPL

2.129 ComReg may amend the rights, obligations and procedures relating to a TPL from time to time in accordance with the Authorisation Regulations.

2.6.9 The Draft Regulations and an Indicative TPL

2.130 The Draft Regulations provide for the issuing of a TPL on foot of this Award Process. Among other things, the Draft Regulations specify the:

- duration of a TPL;
- conditions of a TPL; and
- TPL Fees.

2.131 An indicative TPL is set out in Schedule 4 of the Draft Regulations.

2.132 The Draft Regulations and the indicative TPL should be considered in conjunction with the text in this document and Document 16/57.

2.7 The Transition Unprotected Licence (TUL)– Terms and Conditions

2.133 As outlined above, the purpose of the TUL is to:

- facilitate the timely and orderly completion of Existing Licensees' Transition Activities provided for under Section 3.8 of this document; and

- maximise the benefits to users and ensure the efficient use of spectrum during the Transitional period.

2.134 The following describes the principal terms and conditions associated with the TUL. These terms and conditions are set out in the Draft Regulations.

2.7.1 Entitlement to apply for a 3.6 GHz Band TUL

2.135 To be entitled to apply for a TUL, the following preconditions apply, namely that the Applicant:

- is an Existing Licensee or a TPL licensee in the FWALA Service Area for which it is making an Application;
- has agreed to be bound by the Transition Rules including the 3.6 GHz Transition Plan; and
- must hold a General Authorisation.

2.136 The Applicant will only be able to apply for a TUL for the same FWALA Service Area(s), for the same amount or a lower amount of spectrum rights in those FWALA Service Area(s), and for the equipment with the same functionality as currently licensed under its Existing Licence(s).

2.137 Where the Applicant is also a holder of new 3.6 GHz spectrum rights or a TPL, the Applicant will also be entitled to apply for a TUL provided the combined spectrum holdings under its 3.6 GHz Band Liberalised Use Licence, TPL and TUL do not exceed the total amount of spectrum in its Existing Licence in each FWALA Service Area applied for.

2.7.2 Scope of the TUL

2.138 A TUL allows the Licensee to keep and have possession of, install, maintain, work and use Apparatus for terrestrial systems capable of providing electronic communications services in the 3.6 GHz Band.

2.139 A TUL will be issued on a Non-Interference and Non-Protected basis.⁵⁶

2.140 A TUL is also a “non-exclusive” Licence for one or more specific areas of the State and all Apparatus licensed under the TUL is required to comply with, among other things, the 3.6 GHz EC Decision.

⁵⁶ As set out in the Draft Regulations, this 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 the protection of Apparatus used on this basis against Harmful Interference originating from radiocommunication services.

2.7.3 TUL Licence Duration and Renewal

- 2.141 The duration of the TUL is set by reference to its commencement and expiry dates.
- 2.142 The commencement date of a TUL will be 1 August 2017, or such other date as determined by ComReg.
- 2.143 The expiry date of a TUL will be 31 July 2022 or such earlier date as determined by ComReg depending upon, among other things, the availability of suitable spectrum.
- 2.144 Once issued, the duration of the TUL may be amended by ComReg in accordance with the provisions of the Authorisation Regulations.

2.7.4 Licence Conditions Applicable to all TUL

- 2.145 The terms and conditions of the TUL will be the same as those in the Existing Licence with the exception that it will:
- be issued on a non-protected non-interference basis;
 - have its frequency assignment determined and amended by ComReg as appropriate;
 - expire on or before 31 July 2022 depending upon, among other things, the availability of suitable spectrum and notifications from the 3.6 GHz Band Liberalised Use Licensee(s) who obtain spectrum rights of use for the frequency assigned to the TUL;
 - have a FWALA Service Area as determined and amended by ComReg noting that geographic areas may be excluded from the FWALA Service Area;
 - have licence fees as specified below.
- 2.146 The conditions associated with a TUL are set out in Regulation 6 of the Draft Regulations and in the TUL. Among other things, Regulation 6 of the Draft Regulations sets out conditions in relation to ensuring that the Apparatus or any part thereof, complies with the provisions of the R&TTE Regulations or the Radio Equipment Directive (RED), as appropriate.⁵⁷
- 2.147 It is also a condition of the TUL that the Licensee submit up to date information to ComReg in respect of Parts 2 and Part 5 of its TUL in advance of its licence

⁵⁷ As previously outlined in paragraphs 2.51 to 2.56 above.

commencement date and on or before 1 August of each year that the Licence is in force.

2.148 It is ComReg’s intention to publish details of TULs, including information contained in Part 2 and Part 5, on its website subject to the assessment of confidential information in line with ComReg Document 05/24.

2.7.5 Fees for a TUL

2.149 The annual fee per FWALA Service Area in a TUL is set out in Table 7 below.

Radio frequency spectrum bandwidth (paired channel)	TUL Annual Fee (€)
Up to 7 MHz	1,783
Over 7 MHz and up to 14 MHz	2,378
Over 14 MHz and up to 28 MHz	3,329

Table 7: Annual fee per FWALA Service Area in a TUL

2.150 The fee for an unpaired channel is calculated by reference to its “equivalent” paired channel bandwidth.

2.151 Where spectrum rights for a FWALA Service Area in a TUL is granted for a portion of a year, the fee to be paid by the Licensee shall be calculated using $A \times (B/12) = C$, where

- A is the relevant annual fee set out in Table 7 above;
- B is the number of whole months for which the spectrum rights for a FWALA Service Area in the TUL is granted (if granted for a period of less than one month then, for the purpose of these calculations only, it shall be considered as a being granted for a period of one month); and
- C is the appropriate fee to be paid.

2.152 Additionally, before a TUL will be issued, the Applicant must pay the Upfront Fee associated with its 3.6 GHz Band Liberalised Use Licence (if applicable).

2.7.6 Enforcement Actions – Compliance with Licence Conditions, Licence Suspension, Licence Withdrawal

2.153 Enforcement of conditions of TULs shall be carried out by ComReg in accordance with its statutory powers including those set out in the Authorisation Regulations.

2.154 A TUL may be suspended or withdrawn in accordance with the Authorisation Regulations.

2.155 In the event that enforcement action by ComReg results in the suspension, withdrawal (or foreshortening) of a TUL, no Licence fees paid in connection with that TUL will be refundable.

2.7.7 Amendment of a Licence

2.156 ComReg may amend the rights, obligations and procedures relating to a TUL from time to time in accordance with the Authorisation Regulations.

2.7.8 The Draft Regulations and an Indicative TUL

2.157 The Draft Regulations provide for the issuing of a TUL on foot of this Award Process. Among other things, the Draft Regulations specify the:

- duration of a TUL;
- conditions of a TUL; and
- TUL Fees.

2.158 An indicative TUL is set out in Schedule 5 of the Draft Regulations.

2.159 The Draft Regulations and the indicative TUL should be considered in conjunction with the text in this document, and Document 16/57.

2.8 The 3.6 GHz Band Spectrum Lease Licence

2.160 As outlined above, the purpose of the 3.6 GHz Band Spectrum Lease Licence is to facilitate the leasing of spectrum rights in accordance with such procedures as may be specified by ComReg under Regulation 19 of the Framework Regulations.

2.161 The following describes the principal terms and conditions associated with the 3.6 GHz Band Spectrum Lease Licence. These terms and conditions are set out in the Draft Regulations.

2.8.1 Entitlement to apply for a 3.6 GHz Band Spectrum Lease Licence

2.162 A 3.6 GHz Band 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.

2.8.2 Scope of the 3.6 GHz Band Spectrum Lease Licence

2.163 A 3.6 GHz Band Spectrum Lease Licence allows the Licensee to keep and have possession of, install, maintain, work and use Apparatus for terrestrial

systems capable of providing electronic communications services in the 3.6 GHz Band.

2.164 A 3.6 GHz Band Spectrum Lease Licence is a “non-exclusive” Licence for one or more specific areas of the State and as set out in the schedule to same, and all Apparatus licensed under the 3.6 GHz Band Spectrum Lease Licence is required to comply with, among other things, the relevant EC decisions, including the 3.6 GHz EC Decision.

2.8.3 Licence Duration and Renewal

2.165 The duration of the 3.6 GHz Band 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.

2.8.4 Licence Conditions Applicable to all 3.6 GHz Spectrum Lease Licences

2.166 The conditions associated with a 3.6 GHz Spectrum Lease Licence are set out in Regulation 6 of the Draft Regulations and in the Licence. Among other things, Regulation 6 of the Draft Regulations sets out conditions in relation to ensuring that the Apparatus or any part thereof, complies with R&TTE Regulations.

2.167 It is also a condition of the 3.6 GHz Band Spectrum Lease Licence that the Licensee submit up to date information to ComReg in respect of Parts 2 and 3 of its 3.6 GHz Band Spectrum Lease Licence in advance of its licence commencement date and on or before 1 August of each year that the Licence is in force. Part 2 and Part 3 of the 3.6 GHz Band Spectrum Lease Licence details the Apparatus to which the Licence relates and the location of each Apparatus.

2.168 It is ComReg’s intention to publish details of 3.6 GHz Band 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.

2.8.5 Fees for a 3.6 GHz Band Spectrum Lease Licence

2.169 The fee for a 3.6 GHz Spectrum Lease Licence will be determined in accordance with such procedures as may be specified by ComReg under Regulation 19 of the Framework Regulations.

2.170 Additionally, before a 3.6 GHz Band Spectrum Lease Licence will be issued, Winning Bidders must pay the Upfront Fee associated with its 3.6 GHz Band Liberalised Use Licence.

2.8.6 Enforcement Actions – Compliance with Licence Conditions, Licence Suspension, Licence Withdrawal

2.171 Enforcement of conditions of 3.6 GHz Band Spectrum Lease Licence shall be carried out by ComReg in accordance with its statutory powers including those set out in the Authorisation Regulations.

2.172 A 3.6 GHz Band Spectrum Lease Licence may be suspended or withdrawn in accordance with the Authorisation Regulations.

2.173 In the event that enforcement action by ComReg results in the suspension, withdrawal (or foreshortening) of a 3.6 GHz Band Spectrum Lease Licence, no Licence fees paid in connection with the 3.6 GHz Band Spectrum Lease Licence will be refundable.

2.8.7 Amendment of a Licence

2.174 ComReg may amend the rights, obligations and procedures relating to a 3.6 GHz Band Spectrum Lease Licence from time to time in accordance with the Authorisation Regulations.

2.8.8 The Draft Regulations and an Indicative 3.6 GHz Band Spectrum Lease Licence

2.175 The Draft Regulations provide for the issuing of a 3.6 GHz Band Spectrum Lease Licence. Among other things, the Draft Regulations specify that the duration, conditions, and fees of a 3.6 GHz Band Spectrum Lease Licence will be determined in accordance with such procedures as may be specified by ComReg under Regulation 19 of the Framework Regulations.

2.176 An indicative 3.6 GHz Band Spectrum Lease Licence is set out in Schedule 2 of the Draft Regulations.

2.177 The Draft Regulations and the indicative 3.6 GHz Band Spectrum Lease Licence should be considered in conjunction with the text in this document and Document 16/57.

Chapter 3

3 The Award Process

- 3.1 This chapter provides an overview of the various stages of the Award Process. The detailed rules that apply to the Auction stages within the Award Process are described in Chapter 4.
- 3.2 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

- 3.3 The available spectrum rights of use will be awarded on a regional basis, using a TDD band plan in a total of nine Regions (see Section 2.2 of Chapter 2 for a definition of the Regions).
- 3.4 In each Region, a total of 66 Lots will be available. There are two types of Lots:
- **A-Lots** - a single 25 MHz frequency-specific Lot using frequencies 3 410 MHz – 3 435 MHz; and
 - **B-Lots** - 65 frequency-generic Lots of 5 MHz each in the frequency range 3 475 MHz – 3 800 MHz.
- 3.5 B-Lots will first be assigned on a frequency-generic basis. That is, demand for B-Lots expressed by Applicants in their Initial Bids⁵⁸ and any Bids submitted by Bidders in the Main Stage will be for blocks of spectrum within the frequency range 3 475 MHz – 3 800 MHz but which do not have specific frequencies assigned to them. The specific frequency assignments for the B-Lots will subsequently be decided in a separate Assignment Stage.
- 3.6 All A-Lots have a specific frequency range assigned to them and therefore will not be included in the Assignment Stage.
- 3.7 For the Main Stage of the Auction, Lots will be divided into 18 **Lot Categories**, A1-A9 and B1-B9 (two Lot Categories for each Region, splitting the A-Lots and B-Lots available, i.e. A1 and B1, A2 and B2, and so on).

⁵⁸ 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.

- 3.8 Lots in this Award Process are being made available from 1 August 2017 (or some later date as may be specified by ComReg in accordance with the provisions set out in Chapter 2) to 31 July 2032.
- 3.9 Table 8 provides an overview of the Lots available, showing for each Lot Category:
- the Region associated with that Lot Category;
 - the associated frequency band for the Lot(s) in that Lot Category;
 - the number of Lots available in that Lot Category;
 - the size of each Lot (in MHz) in that Lot Category;
 - the Reserve Price⁵⁹ per Lot for Lots in that Lot Category and the associated annual Spectrum Usage Fees (SUFs) before Indexation; 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 Auction.⁶⁰

⁵⁹ Licences are awarded subject to payment of the Upfront Fee determined by the Award Process and the first SUF payment. The Reserve Price indicates the minimum SAF for each Lot included in the Licence and does not include any subsequent payment of SUFs.

⁶⁰ The Eligibility Points are used to rank different combinations of Lots (or Packages) in order to assess demand and implement the Activity Rules. The Eligibility of a Package is equal to the sum of Eligibility Points of all the Lots included in the Package. The Activity Rules constrain the amount that Bidders can offer when bidding for Packages with greater Eligibility than their earlier Bids. However, Bidders can still bid for such Packages subject to these constraints being met. Further details are provided in Section 3.5 and Section 4.2

Lot Category	Region	Frequency band	Number of Lots available	Lot size	Reserve Price per Lot (€)	Annual SUF per Lot (€)	Eligibility Points per Lot
A1	Border, Midlands & West	3 410 - 3 435 MHz	1	25 MHz	114,000	17,670	50
B1	Border, Midlands & West	3 475 - 3 800 MHz	65	5 MHz	22,800	3,534	10
A2	South West	3 410 - 3 435 MHz	1	25 MHz	72,000	11,160	25
B2	South West	3 475 - 3 800 MHz	65	5 MHz	14,400	2,232	5
A3	East	3 410 - 3 435 MHz	1	25 MHz	64,000	9,920	25
B3	East	3 475 - 3 800 MHz	65	5 MHz	12,800	1,984	5
A4	South East	3 410 - 3 435 MHz	1	25 MHz	44,000	6,820	25
B4	South East	3 475 - 3 800 MHz	65	5 MHz	8,800	1,364	5
A5	CSO Boundary for Dublin City and Suburbs	3 410 - 3 435 MHz	1	25 MHz	178,000	27,590	75
B5	CSO Boundary for Dublin City and Suburbs	3 475 - 3 800 MHz	65	5 MHz	35,600	5,518	15
A6	CSO Boundary for Cork City and Suburbs	3 410 - 3 435 MHz	1	25 MHz	34,000	5,270	10
B6	CSO Boundary for Cork City and Suburbs	3 475 - 3 800 MHz	65	5 MHz	6,800	1,054	2
A7	CSO Boundary for Limerick City and Suburbs	3 410 - 3 435 MHz	1	25 MHz	16,000	2,480	5
B7	CSO Boundary for Limerick City and Suburbs	3 475 - 3 800 MHz	65	5 MHz	3,200	496	1

Lot Category	Region	Frequency band	Number of Lots available	Lot size	Reserve Price per Lot (€)	Annual SUF per Lot (€)	Eligibility Points per Lot
A8	CSO Boundary for Galway City and Suburbs	3 410 - 3 435 MHz	1	25 MHz	14,000	2,170	5
B8	CSO Boundary for Galway City and Suburbs	3 475 - 3 800 MHz	65	5 MHz	2,800	434	1
A9	CSO Boundary for Waterford City and Suburbs	3 410 - 3 435 MHz	1	25 MHz	8,000	1,240	5
B9	CSO Boundary for Waterford City and Suburbs	3 475 - 3 800 MHz	65	5 MHz	1,600	248	1

Table 8: Lots available in the Award Process

3.2 Process Overview and Timeline

3.10 This section describes the overall structure of the Award Process.

3.11 The Award Process comprises the following stages:

- an **Application Stage** (see section 3.3 below), during which Applicants can submit Applications to ComReg for participation in the Award Process in accordance with the procedures described in section 3.3. The Application must include an **Initial Bid** nominating a selection of Lots at Reserve Prices;
- a **Qualification Stage** (see section 3.4 below), during which ComReg will examine Applications received to determine which Applicants are qualified to participate in the Award Process as Bidders. ComReg will also determine whether an Auction is necessary on the basis of the demand expressed by Bidders in their Initial Bids;
- if required, an **Auction**, consisting of a Main Stage and/or an Assignment Stage, where:
 - 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 3.5.2); and
 - an announcement to 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 Price;
 - the **Assignment Stage** (see section 3.6 below) which determines the specific frequencies in each Region that are to be assigned to those Winning Bidders of the frequency-generic B-Lots (in accordance with the outcome of the Main Stage) and the Additional Prices to be paid by each Assignment Bidder. The Assignment Stage consists of:

- a period during which groups of Winning Bidders that are to be awarded B-Lots may form Alliances to participate in the Assignment Stage as a single Assignment Bidder;⁶¹
 - if required⁶², an Assignment Round, in which Assignment Bidders may bid for alternative frequency assignments corresponding to the Lots won in the Main Stage. This provisionally 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 Price that it must pay for its frequency assignment; and
 - a Negotiation Phase, in which Assignment Bidders can negotiate a re-organisation of the frequency assignments (in the frequency range 3 475 – 3 800 MHz) in the Assignment Round which resulted from the Assignment Round in one or more Regions (subject to restrictions and approval from ComReg), and in which Alliances must notify ComReg of the specific frequencies to be awarded to each Alliance member; and
- a **Notification and Grant Stage**, (see Section 3.7 below) during which ComReg will notify the Winning Bidders of their entitlement to apply⁶³ for and be granted a Licence in accordance with the outcome of the Award Process, subject to certain conditions including the payment of fees.

3.12 This process is illustrated in Figure 4 below.

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

⁶¹ For the Assignment Stage (and under certain conditions), Winning Bidders of B-Lots are permitted to form an 'Alliance' with other Winning Bidders of B-Lots to participate in the Assignment Stage as a single Assignment Bidder. The ability to form Alliances in certain circumstances has been introduced to take account of the regional licence structure of the Award Process and in recognition that there may be significant efficiency in two or more Winning Bidders being assigned similar frequencies across Regions and/or adjacent frequencies in Regions. Each Winning Bidder of B-Lots in the Main Stage can participate in at most one Alliance. Further details on forming an Alliance for the Assignment Stage are provided in section 3.6.1 and section 4.3.2.

⁶² 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.

⁶³ For the avoidance of doubt, the payment of each Winning Bidder's Upfront Fee and the first SUF is a pre-requisite condition to that Winning Bidder being entitled to apply for a 3.6 GHz Band Preparatory Licence and a 3.6 GHz Band Liberalised Use Licence.

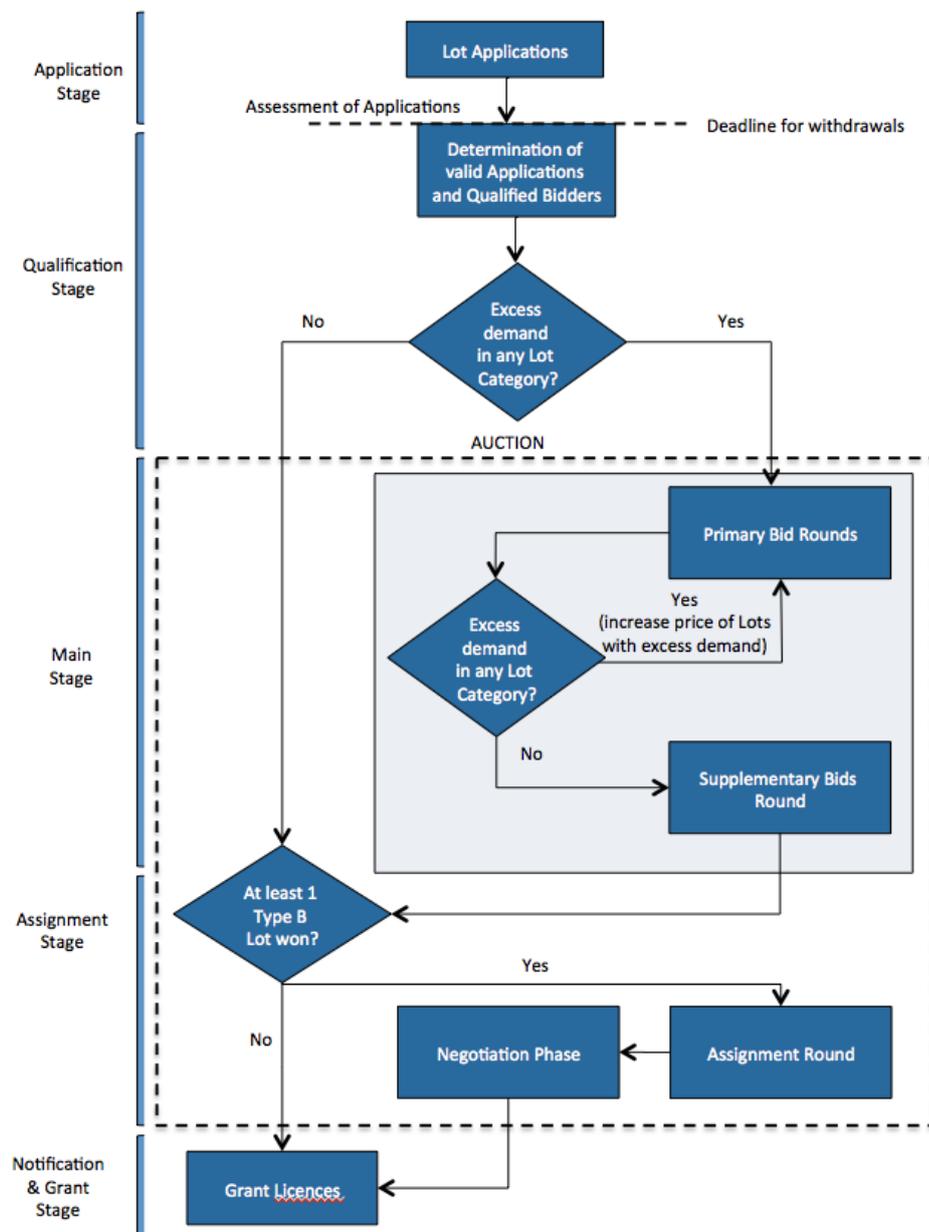


Figure 4: Overview of the Award Process

- 3.14 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 9 below.
- 3.15 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).

Stage of process	Milestone	Timeline ⁶⁴
Application Stage	Publication of Information Memorandum on ComReg's website	24 August 2016
	Presentation to Interested Parties on the Award Process and the Auction Rules	14 September 2016
	Deadline for submission of questions regarding the Award Process	16:00 hours on Wednesday 28 September 2016
	Final date for the responses to questions on the Award Process to be published on ComReg's website	Wednesday 12 October 2016
	Application Date - Deadline for receipt of Application Forms	16:00 hours on Wednesday 26 October 2016
	Deadline for receipt of Deposits	23.59 hours on Wednesday 26 October 2016
	Restriction on Auction-related communications comes into effect	On submission of first Application to ComReg
Qualification Stage	Deadline for withdrawal of Application	16:00 hours on Wednesday 16 November 2016
	Each Applicant to be informed by ComReg about whether or not it has become a Bidder. Confirmation of the requirement for a Main Stage of the Auction and notification to Bidders of scheduled start date of the mock auctions; <u>or</u> Confirmation that there is no requirement for a Main Stage and notification to Winning Bidders of Winning Bids and scheduled start	Wednesday 7 December 2016

⁶⁴ All times are local, Irish time

Stage of process	Milestone	Timeline ⁶⁴
	date of the mock auctions; <u>or</u> Confirmation that there is no requirement for a Main Stage or an Assignment Stage and notification to Winning Bidders of Winning Bids and progression to Notification and Grant Stage	
	Return of Deposits to Applicants that have not become Bidders	14 December 2016
	Circulation of Bidder Materials for accessing and using the EAS to Bidders and proceed to the start of Mock Auctions for Bidders	Week beginning 12 December 2016

Table 9: Indicative Timeline for Application and Qualification Stages of the Award Process

3.16 ComReg is currently not in a position to announce with certainty the timing of the later stages of the Award Process (i.e. the Main Stage, the Assignment Stage, the Notification and Grant Stage and the 3.6 GHz Band Transition Process), as these will depend on the outcome of previous stages in the Award Process and/or circumstances outside ComReg’s control.⁶⁵

3.17 ComReg will provide further information on the timing of these stages to the appropriate parties (e.g. Bidders, Winning Bidders, etc.) during the course of the Award Process. The timelines for these stages will be in accordance with the terms set out in this document which, among other things, states 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);
- 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);
- following the outcome of the Main Stage (or Qualification Stage if a Main Stage was not required), a period of ten clear Working Days will be

⁶⁵ 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 determines the start date of the Assignment Stage etc.

provided to Winning Bidders to establish any Alliances for participating in the Assignment Stage;

- 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 frequency band 3 475 – 3 800 MHz in the Assignment Round, subject to a number of restrictions and approval from 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).

3.3 Application Stage

3.18 The Award Process begins on the day on which ComReg publishes this Information Memorandum.

3.19 The deadline⁶⁶ by which point all Interested Parties wishing to participate in the Award Process must have submitted an Application and associated Deposit is set out below and allows approximately 8 weeks to submit a complete and valid Application.

3.20 ComReg is mindful of the complexities involved in the Award Process. With this in mind, during the time between publication of this document and the deadline to submit an Application, ComReg will provide a presentation on the Award Process and of the Auction Rules. This presentation will seek to provide as much clarity and explanation around the Award Process and the Auction Rules as possible, taking into account the fact that some Interested Parties may not have previously participated in any similar process. Further details will be published on ComReg's website regarding this presentation and ComReg would welcome feedback from Interested Parties in advance of this presentation as to what would be useful to address. ComReg will also facilitate the submission of questions regarding the Award Process and Auction Rules and will respond publicly to these questions on an anonymous basis.⁶⁷

3.21 For logistics purposes, interested parties that wish to attend the presentation or view the presentation via the live webinar format must e-mail

⁶⁶ See paragraph 3.22. If the deadline for application in this Information Memorandum and that published on ComReg's website differ, the deadline for applications published on ComReg's website takes precedence.

ComReg is under no obligation to consider applications that have not been submitted in full by this deadline.

⁶⁷ See Section 3.3.1 in this regard.

joseph.coughlan@comreg.ie by **16:00 hours on Friday 9 September 2016**, providing the name(s), and e-mail address(es) of those that wish to attend and indicate if attendance will be via webinar or in person.

- 3.22** The deadline for all Interested Parties to submit their Applications to participate in the Award Process, together with the required monetary Deposit (the “Application Date”)⁶⁸ is 16:00 hours (local time) on **Wednesday 26 October 2016**.
- 3.23 For the purpose of this document, and for the Award Process, the term “**Auction Rules**” shall refer to the rules and procedures relating to the Auction, as presented in Chapters 3 and 4 of this Information Memorandum, and to any other material to which the rules in Chapters 3 and 4 directly refer. To the extent that there is any inconsistency between the description of the Auction Rules set out in this chapter and the detailed Auction Rules set out in Chapter 4, the description set out in Chapter 4 shall prevail.
- 3.24 As part of their Applications and in order to be eligible to participate in this Award Process, all Interested Parties must submit:
- a completed Application Form;⁶⁹
 - a cleared monetary Deposit; and
 - any other documentation required to be annexed to the Application Form.
- 3.25 An Interested Party that submits an Application is herein referred to as an “Applicant”.

Joint Bidding

- 3.26 Joint bidding can occur at two points in the Award Process.
- 3.27 The first instance is prior to the Application Date for the submission of Applications, where Interested Parties can decide, if they wish, to bid jointly in the award as a consortium. This consortium will be 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, a 3.6 GHz Band Liberalised Use Licence would be issued to this consortia as a single entity.
- 3.28 ComReg envisages that this could be a useful option for potential Bidders in the present award due to the interest expressed by smaller operators in the band. By way of example, it may be a useful option for smaller operators that currently operate in a localised area under the existing FWALA scheme to bid

⁶⁸ ComReg is under no obligation to consider Applications that have not been submitted in full by the Application Date.

⁶⁹ See Annex 3.

as part of a consortium in order to better compete for one or more of the Regions proposed. Equally, some of the larger regional operators could form a consortium to acquire a multi-regional / national licence.

- 3.29 The second form of joint bidding provided for in this Award Process is the formation of Alliances for the Assignment Stage. This is an innovation on the process for the MBSA which has been developed to take account of the fact that, in the 3.6 GHz Band award, ComReg will release spectrum rights of use on a regional basis. Winning Bidders will be able to decide, prior to the Assignment Stage, to bid in the Assignment Round as an Alliance. This possibility is explained further in Section 3.6 and Section 4.3.

3.3.1 Questions

- 3.30 ComReg will facilitate the submission of questions by Interested Parties in order to promote clarity and understanding of the Award Process and Auction Rules (see also Section 5.2.5 on errors).
- 3.31 All questions received in due time will be replied to on an ongoing basis and as far as possible within 10 Working Days. The deadline date for the submission of questions is 16:00 hours (local time) on **28 September 2016**. ComReg anticipates publishing all questions and associated answers no later than **12 October 2016**.
- 3.32 For this process, 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 and addressed as follows:

Mr Joseph Coughlan

3.6 GHz Band Spectrum Award

Commission for Communications Regulation

Abbey Court, Irish Life Centre

Lower Abbey Street

Dublin 1

D01 W2H4

Ireland

- 3.33 Questions should be submitted in a sealed envelope. Interested Parties submitting questions control delivery of any submission and, for example, anonymity is in the control of the Interested Party. 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.

- 3.34 Receipt of questions will be acknowledged by ComReg.
- 3.35 ComReg will publish all questions together with their associated responses on an anonymous basis on its website.
- 3.36 ComReg reserves its right to, where appropriate, amend previous responses up until **12 October 2016**, such that answers provided before this date are for general guidance only and should not be considered final or relied upon until **12 October 2016**.

3.3.2 Application Form and Supporting Documents

- 3.37 The Application Form can be found in Annex 3 and must be completed by each Applicant.
- 3.38 Part 1 of the Application Form concerns Administrative Information and requires the 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 Applicant must also submit appropriate evidence that the persons signing the Application Forms and the persons bidding on behalf of the Applicant (“**Authorised Agents**”) are duly authorised by the Applicant to do so. If Applicants wish to have the ability to participate in the Assignment Stage as part of an Alliance, this should include evidence that Authorised Agents are further authorised to make binding Assignment Stage Bids on behalf of such an Alliance. Appropriate evidence would include:
 - where the 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 2014 in Ireland);
 - a board resolution from an Applicant which is a company registered in Ireland;
 - an irrevocable power of attorney; or
 - equivalent evidence in respect of an Applicant from outside Ireland, supported by a legal opinion from a law firm in their 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 Applicant contractually.

- 3.39 Part 2 of the Application Form, the Applicant Declaration which must be signed by the Applicant, requires the Applicant to agree to be bound by the Auction Rules as set out in this document including:
- the provisions regarding agreements with third parties;
 - the Auction Rules relating to confidentiality;
 - the rules around Bidder behaviour applying for the duration of the Award Process;⁷⁰ and
 - the Transition Rules which form part of the Auction Rules.
- 3.40 Part 3 of the Application Form, the Initial Bid Form, lists all of the Lot Categories, the number of Lots available within each Lot Category, the Reserve Price per Lot in each Lot Category, and the number of Eligibility Points per Lot in each Lot Category. These Lot Categories are set out in Table 8 above. 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 an Auction is not required, each Bidder will be awarded the Lots in its Initial Bid. In the event that an 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.
- 3.41 In order for an Application to be valid, it must include information regarding the ownership structure of the Applicant ("**Ownership Structure Document**"). In the Ownership Structure Document the Applicant must (a) certify to the best of its knowledge that the document is a detailed, complete and clear overview of its ownership structure; (b) certify that the Applicant's ownership structure complies with the rules set out in Section 3.3.4; and (c) list the Applicant's Insiders (as the term is defined at paragraph 3.65 below).
- 3.42 If at any point during the Award Process a Bidder is found by ComReg to have submitted information on its ownership structure which is materially incomplete or incorrect, ComReg has the discretion to take whatever measures that it deems appropriate, including requiring one or more Bidders to verify information already provided, and to provide additional information and supporting evidence. If ComReg is unable to determine to its reasonable satisfaction that two or more Bidders are not connected or associated (in the terms as set out in Section 3.3.4) on the basis of information provided to it, it reserves the right to treat those Bidders as being connected or Associated.

⁷⁰ Which apply in addition to but without prejudice to Irish and EU competition law.

- 3.43 Applications are subject to Competition Caps (see Section 4.1.3). If an Application Form includes Lots that, if awarded, would exceed the relevant Competition Caps, 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.
- 3.44 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.
- 3.45 In addition, in submitting its Application Form, an Applicant agrees to be bound by terms and conditions associated with the Award Process as set out in this Information Memorandum which, among other things, include:
- 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 2.4.7 of this Information Memorandum;
 - 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, then its failure to obtain consents, approvals, Apparatus or funding necessary to deploy a network or complete Transitional Activities shall be deemed to be a breach of the Auction Rules by that Winning Bidder;
 - its agreement that if it becomes a Winning Bidder, to participate in the Assignment Stage and to be bound by its outcome; and
 - its agreement to participate in the development of the Transition Plan and to be bound by the Transitional Rules of the Award Process.

3.3.3 Deposits

- 3.46 An Applicant must submit a monetary Deposit with its Application. 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.

- 3.47 The Applicant's Deposit must be transferred to the bank account nominated by ComReg as specified in Annex 3, and is to be received as cleared funds in ComReg's account⁷¹ before 23:59 hours Irish time on the Application Date, namely **26 October 2016**
- 3.48 ComReg currently intends to use all monies received from each Applicant to purchase NTMA Exchequer Notes.⁷² Interest, if earned⁷³, 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 if applicable.
- 3.49 Where any section or part of this Information Memorandum indicates that:
- an Applicant or Bidder may in part or whole forfeit its Deposit; and/or
 - ComReg may impose a sanction on the Applicant or Bidder that includes the forfeiture of part or all of the Deposit which was paid on Application,

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

3.3.4 Ownership Rules

- 3.50 Each Interested Party applying to take part in the Award Process and all Bidders are subject to the ownership rules.
- 3.51 The ownership rules apply from the submission of Applications until the public announcement on the outcome of the Award Process by ComReg.
- 3.52 Bidders are subject to the ownership rules to help ensure that 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

⁷¹ Bidders are cautioned to ensure that the cleared funds received by ComReg are required to be the amount of the Deposit specified in euro. Bidders should ensure that the amount of funds received by ComReg is not diminished by bank charges, exchange rate fluctuations or similar matters.

⁷² However, as noted previously, ComReg reserves the right to manage all monies held in accordance with good treasury management.

⁷³ The current rate of interest on NTMA Exchequer Notes is zero per cent. However, the rate of interest associated with the NTMA Exchequer Notes may be negative. For the avoidance of doubt, the monetary cost of a negative interest rate, where it arises, shall fall on Applicants/Bidders such that:

- an Applicant who has not been approved by ComReg or any Bidder who is not a Winning Bidder will have their Deposit returned less the amount of negative interest accrued over the period a Deposit has been held by ComReg; and
- a Winning Bidders Deposit used to settle the payment of the Upfront Fee will be reduced by the amount of negative interest accrued over the period a Deposit has been held by ComReg.

Caps cannot be circumvented and prevent a Bidder from having any unfair advantage or distorting competition within the Award Process by being able to coordinate with another Bidder.

3.53 In essence, the ownership rules require that no entity in a “Bidding Group” (that is, a Bidder and its Connected Persons) is connected to or associated with any entity in another Bidding Group.

3.54 ComReg considers that Bidders are:

- “connected” if they have common or overlapping Bidding Groups; and
- “Associated” if their Bidding Groups do not overlap but there is nonetheless a degree of common ownership between the Bidders.

3.55 The following relations must not exist between Bidders:

- a Bidder or Connected Person within one Bidding Group must not also be a Bidder or Connected Person in another Bidding Group;
- two or more Bidders must not be Associated Bidders.

3.56 Before submitting its Application, a potential Bidder must take all reasonable measures to identify its Connected Persons, Associated Bidders and Insiders.

3.57 Annex 8 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 8 will apply. Annex 8 also describes when ComReg may grant exemptions from the ownership rules, and the rules relating to joint bidding, restructuring and changes to ownership structure.

3.58 The rules set out above and in Annex 8 do not imply that ComReg has taken a position in this Information Memorandum 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. Such assessment falls outside the scope of this Information Memorandum.

Joint bidding

3.59 A Bidding Group may be under the joint control of two or more persons. Persons wishing to Bid in consortium as a Bidding Group will be viewed as a single entity for the purposes of applying ownership rules (as detailed in this Section), rules on confidentiality and Bidder behaviour (see Section 3.3.5) and the Auction Rules within the Award Process. Note, in particular, that such an entity would be subject to the same Competition Caps as other Bidders (see Section 4.1.3 below).

3.3.5 Confidential Information and Bidder behaviour

- 3.60 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 from the time of submission of their Applications until the public announcement on the outcome of the Award Process by ComReg.⁷⁴ The Auction Rules require that any Applicant shall refrain from any action that could undermine the running of the Award Process. The Auction Rules also set out a number of specific rules in relation to Confidential Information and Bidder behaviour, other restrictive practices capable of distorting the outcome of the Award Process, and the behaviour of employees and legal entities that are related or connected to the Bidder.
- 3.61 As part of its Application to be awarded spectrum rights of use being made available in the Award Process, each Applicant is required to confirm that it has and will continue to comply with the Auction Rules and that it has taken all reasonable measures to ensure that its Connected Persons, employees and Insiders⁷⁵ have and will continue to at all times comply with these rules. If at any point it becomes apparent that an Applicant or Bidder, its Connected Persons or its Insiders (as defined below) have failed to comply with the Auction Rules, the Applicant or 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 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 emerges that the Bidder, its Connected Persons or its Insiders breached the Auction Rules.
- 3.62 Applicants should note that, even if they are unsuccessful in becoming Bidders, they remain bound by the Auction Rules on release of Confidential Information until the public announcement on the outcome of the Award Process by ComReg.

Confidential Information and Insiders

- 3.63 “**Confidential Information**” means any information which is not in the public domain and which, if it became known to another Bidder, may influence the amount that the 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 a Bidder’s business case, its

⁷⁴ Note that, in the case where a Bidder were to submit multiple Applications (in which case the last Application only would be considered by ComReg), the period from which the rules on Confidential Information would apply is from the submission of the first Application.

⁷⁵ See paragraph 3.65 for a definition of an Insider.

pre-Auction activities, its Auction strategy, information as to the identity of a Bidder's Authorised Agents, or the prices it is willing to bid for spectrum in the Award Process. Confidential Information relating to individual Bidders shall also include:

- a) the Bidder's actual participation in the Award Process including the Auction itself;
- b) the Bidder's Eligibility to make future Bids within the Auction; and
- c) the composition and value of all Bids made so far by the Bidder within the Auction.

3.64 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 Bidder). The rules regarding Confidential Information set out in this section shall apply from the date of first Application or the 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 are relaxed to the extent necessary to achieve specified purposes including, for example, the formation of Alliances after the Main Stage⁷⁶, and Assignment Bidders may wish to negotiate with other Assignment Bidders during the Negotiation Phase of the Assignment Stage⁷⁷, confidentiality regarding the outcome of the Award Process must be maintained until ComReg makes a public announcement at the end of the Award Process.

3.65 An "**Insider**" includes an entity that has:

- received Confidential Information about a Bidder but is not a Connected Person;
- undertaken, wholly or partly, to finance or assist a member of a Bidding Group in connection with the Award Process; or
- has provided advice to the Bidder in formulating its Bid strategy and/or business case in connection with the Award Process.

3.66 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 a 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 Bidder must submit a list of its Insiders to ComReg, at the time of its

⁷⁶ See Sections 3.6.1 and 4.3.2 below for more information.

⁷⁷ See Sections 3.6.3 and 4.3.11 below for more information.

- Application, and it shall inform ComReg thereafter of every change to its list of Insiders.
- 3.67 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 public such information, or by communicating such information directly to another Bidding Group or its Insiders or indirectly through an intermediate source.
- 3.68 It is possible that, at the Application Date, a Bidder is unaware that it has a common Insider with another Bidder. If ComReg finds that two or more Bidders have a common Insider, it shall:
- notify the Bidders concerned, indicating a deadline for them to apply for exemption from the rules on common Insiders; or
 - require the relationship of one or more of the Bidders with the common Insider to terminate insofar as the Award Process is concerned.
- 3.69 If the Bidders concerned are not granted an exemption by ComReg and/or they do not alter the common Insider situation to ComReg's satisfaction, then ComReg shall exclude the Bidders from further participation in the Award Process. If the relationship comes to light later in the Award Process, for example after the Auction has commenced, then ComReg may exclude the Bidder from further participation in the Award Process (see paragraph 3.88 below in that regard) and this may result in partial or whole Deposit forfeiture for the affected Bidders. In certain circumstances, ComReg may also suspend or withdraw a Winning Bidder's Licence(s) if, after grant of the Licence(s), it emerges that the Bidder, its Connected Persons or its Insiders breached the Auction Rules set out in Chapters 3 and 4 or the agreement with ComReg described in Chapter 5. ComReg may also declare the result of the Award Process as not binding, wholly or partly, on it.
- 3.70 If two or more Bidders have a common Insider, and it is not possible to bring the situation 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 all affected Bidders.

Exemption from Insider rules

- 3.71 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.
- 3.72 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 Bidder with individuals acting for or connected with another Bidder.
- 3.73 In considering whether or not to grant an exemption, ComReg will require certain information from the Bidder, including (but not necessarily limited to) the following:
- details of all individuals acting for each 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 Bidder data;
 - 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 Bidders that it is acting for and not to use any common personnel in relation to the different Bidders.
- 3.74 If a 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

- 3.75 Circumstances may arise where Bidding Groups and their respective Insiders have common directors and/or employees. If this occurs, the 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 Bidder or their Connected Persons, 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 Bidder or their respective Connected Persons or Insiders.

3.76 A Bidder shall ensure that its Connected Persons take all reasonable measures to identify and inform the Bidder if they have any board members or employees who are Insiders in relation to another Bidder, such that the Bidder can take appropriate precautions to ensure that the rules on confidentiality and Bidder behaviour are not breached.

Disruption to the Award Process

3.77 All Bidders and Bidding Groups shall refrain from undertaking any action that is intended to, or is likely to, distort the outcome of the Award Process.⁷⁸

3.78 Save, and only to the extent necessary, for the formation of Alliances after the Main Stage or the participation of Assignment Bidders in the Negotiation Phase, all Bidders and Bidding Groups shall refrain from doing any of the following:

- disclose any Confidential Information beyond the Bidder and its Connected Persons and Insiders;
- disclose any Confidential Information in breach of undertakings made by a Bidder pursuant to any exemption to the rules on ownership and Insiders granted by ComReg;
- knowingly obtain Confidential Information in relation to any other Bidder;
- communicate with other Bidders and their Connected Persons with the intention or effect of coordinating Bidding within the Auction;
- enter into agreements with other 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 Bidders and their Connected Persons regarding the Bidder's strategy for use of the Licence.

3.79 The above requirements shall be binding upon all Applicants until ComReg has received all Upfront Fees payable and has publicly announced the final outcome of the Award Process.

⁷⁸ For the avoidance of doubt, this prohibition applies also in respect of the formation of Alliances prior to the Assignment Stage or the participation of Winning Bidders in the Negotiation Phase.

- 3.80 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.
- 3.81 Notwithstanding the provisions of the paragraphs above, any member of a Bidding Group or an Insider may disclose Confidential Information to its employees, agents or other representatives, and vice versa, where this is necessary for the purposes of:
- determining the Bidder's participation and preparing for its participation in the Award Process, including its Bid strategy;
 - assisting the 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 Auction, including for example liaison with ComReg prior to the grant of Licences.
- 3.82 However, such disclosure shall not include disclosure to any members of another Bidding Group except with ComReg's prior written consent.

Restrictive agreements

- 3.83 A Bidding Group or its Insiders may neither prior to the submission of an Application, nor after the submission of an Application and not until ComReg publicly announces the outcome of the Award Process, 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 Bidder or another Bidder's 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 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.
- 3.84 A 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 this third party not to

participate in the Award Process, or restricts the ability of this third party to participate in the Award Process.

Sanctions

- 3.85 As part of their Applications, Applicants agree to be bound by a series of possible administrative sanctions for infringement of the Auction Rules.
- 3.86 Interested Parties should note that certain breaches of the Auction Rules and other behaviours that Applicants and/or Bidders could engage in may entitle other Applicants and/or 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 individuals engaging in the behaviour as well as on the organisation. In the event that such behaviour comes to the attention of Bidders during the Auction they are obliged under the Auction Rules to notify ComReg immediately to enable appropriate action to be taken.
- 3.87 In the event that an Applicant or Bidder breaches any of these rules, it 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:
- exclusion from the Award Process; and/or
 - forfeiture of part or all of the Deposit which was paid on Application.
- 3.88 If a Bidder is excluded from the Award Process, then ComReg, at its discretion, may void some or all 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 been made known to all Bidders, ComReg would typically expect to re-calculate the outcome of the Main Stage excluding the Bids of the excluded Bidder.⁷⁹

3.89 A breach by an individual Bidder, its Connected Persons or Insiders of any of the rules mentioned in this section may lead to the forfeiture of part or all of the Deposits paid by that Bidder during the Award Process.

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

- submitting materially⁸⁰ false or misleading information to ComReg;
- failing to update ComReg, in a timely manner, in relation to any change to material information submitted within its Application or during the Award Process;
- a Bidder or any member of its Bidding Group colluding or attempting to collude with any other person to distort the outcome of the Award Process, or is acting in a way which is likely to distort the outcome of the Award Process;
- a Bidder or any member of its Bidding Group, or any Insider, disclosing Confidential Information to others during the period of restrictions on communications, other than in accordance with an Exemption from Insider Rules as discussed above or as required for the formation of Alliances after the Main Stage or as required for the Negotiation Phase;
- a Bidder or any member of its Bidding Group knowingly obtaining or attempting to obtain Confidential Information in relation to any other Bidder;
- any member, director or employee of a member of a Bidder's Bidding Group, who is also a director or employee of a member of another Bidding Group, taking part in the preparation of both Bidding Groups for

⁷⁹ The issue of exclusion of a Bidder at the end of the Main Stage is addressed in Section 4.3.8.

⁸⁰ 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.

participation in the Award Process or receiving Confidential Information relating to both Bidding Groups or participating in the Award Process in relation to more than one Bidding Group;

- a Bidder, 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 Auction Rules contained in Chapters 3 and 4 or the agreement with ComReg described in Chapter 5 that is not a trivial or inconsequential breach.

3.91 In certain circumstances, ComReg may also suspend or withdraw a Winning Bidder's Licence(s) if, after grant of the Licence(s), it emerges that the Bidder, its Connected Persons or its Insiders breached the Auction Rules set out in Chapters 3 and 4 or the agreement with ComReg described in Chapter 5.

3.92 In cases where breaches are caused not by the Bidder, but by its Connected Persons and 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 Bidder's knowledge, that the Bidder has taken all reasonable steps to avoid the breach and that the breach has not caused material detriment to the Award Process.

3.93 Nothing in this Information Memorandum shall preclude ComReg from seeking alternative remedies for breach of the Auction Rules set out herein, including, but not limited to, a claim for damages, or the bringing of proceedings under the Competition Act 2002, the Communications Regulation Act 2002 or the Specific Regulations.

3.3.6 Application procedure

3.94 In order to take part in the Award Process, Applicants must submit four completed and identical Application Forms on paper including four identical copies of an Ownership Structure Document and an electronic copy of same in an editable format on CD-ROM. The container(s) in which the Application Form and Ownership Structure Documents and CD-ROM are submitted must not in any way disclose the identity of the Applicant.

3.95 ComReg will only accept applications on Working Days from **20 October 2016** to **26 October 2016** between **10.00 and 16.00 hours (Irish time)**. Applicants are required to make an appointment with ComReg to submit an Application. To make an appointment to submit an Application, Applicants are required to contact **Mr Joseph Coughlan** on Working Days between **18 October 2016**

and **25 October 2016**, and between 10.00 to 13:00 and 14:00 to 16.00 hours (Irish time) at:

Phone: 00 353 (0)1 804 9767

- 3.96 All Applications will be date and time stamped. Applicants will be given a receipt acknowledging the submission of their Application.
- 3.97 An Application can be replaced at any time up to 16.00 hours (Irish time) on the Application Date, **26 October 2016**. In the event that an Applicant submits more than one Application prior to 16.00 on the Application Date, only the latest Application received from that Applicant will be taken into consideration.
- 3.98 On the submission of a second or subsequent Application prior to the Application Date, the Applicant must return the receipt for the prior Application to ComReg. This receipt will be endorsed to indicate that the earlier Application has been superseded and will not be evaluated. However, any superseded Applications will not be returned until after the Qualification Stage of the Award Process.
- 3.99 No Applications will be opened by ComReg until after 16:00 hours (Irish time) on the Application Date **26 October 2016**. Applications will be opened in the presence of an independent auditor.
- 3.100 The deadline for receipt of Deposits, as set out in Section 3.3.3, will be 23:59 hours (Irish time) on the Application Date **26 October 2016**.
- 3.101 As noted at Section 3.3.1 above, ComReg will facilitate the submission of questions regarding the Award Process up until **28 September 2016**. Following that 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 (Communications with ComReg) and save for those communications and responses which are specifically requested by ComReg or its agents in accordance with the Information Memorandum.
- 3.102 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 **16 November 2016** without forfeiture or partial forfeiture of Deposits.
- 3.103 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

3.104 Once the Application Date has passed, ComReg will evaluate all Applications received within the specified time window on or before the Application Date, evaluate which Applications are valid⁸¹ and assess the level of Aggregate Demand associated with valid Applications. Applicants that submitted valid Applications at the Application Stage that are approved by ComReg become Bidders.

3.105 Upon completion of its assessment of Applications, 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.

3.106 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.

3.107 Applicants are reminded that, even if they are unsuccessful in becoming Bidders, they remain bound by the Auction 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

3.108 If an Applicant fails to ensure that ComReg receives sufficient Deposit to cover its Initial Bid by the deadline specified by ComReg, ComReg may, at its discretion, decide that the corresponding Application is not valid and that the Applicant will not become a Bidder and will thus not be eligible to participate in the Award Process. Alternatively, and at its sole discretion, ComReg may provide a short additional period of time for the Deposit to be topped up appropriately.

3.109 In the event that the Applicant does not become a Bidder by virtue of failing to make a sufficient Deposit, any Deposit which has been paid to ComReg will be returned in accordance with the timeline for the return of Deposits to

⁸¹ Details of what constitutes a valid Application is set out in Section 3.3

unsuccessful Applicants as provided in Table 9 subject to potential extension not exceeding the length of any grace period permitted by ComReg for rectification of an insufficient Deposit.

- 3.110 If any aspect of an Application (other than the partial payment of a Deposit) 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.
- 3.111 In the event that an Application is in any material way incomplete, inaccurate, invalid or untrue, ComReg reserves the right to exclude the Applicant from becoming a Bidder directly without providing opportunity for the Applicant to clarify or correct the information already provided. If, having determined that Applicant to be a Bidder, ComReg becomes subsequently aware that the Bidder's original Application was incomplete, inaccurate, invalid or untrue, ComReg may, at its discretion, allow the Bidder the opportunity to clarify or correct the information already provided.
- 3.112 If the Bidder cannot provide correction or clarification to ComReg's satisfaction within a time limit specified by ComReg, that Bidder may be excluded from the Award Process with return of all, part or none of the Bidder's Deposit in accordance with the timeline as set out in Table 9. In the event of any material inaccuracy or untruth in an Application being identified, ComReg reserves the right to exclude the Bidder directly without providing opportunity for the Bidder to clarify or correct the information already provided.
- 3.113 In the case where an Applicant is declared unsuccessful in its Application on account of such deficiencies in its Application, its Deposit will be returned in accordance with the timeline for the return of Deposits to unsuccessful Applicants provided in Table 9 subject to any additional grace period permitted by ComReg when in seeking to address such deficiencies.
- 3.114 In the case where a Bidder's Application is considered incomplete, inaccurate, invalid or untrue retrospectively, its Deposit may or may not be returned, in whole or in part, depending on the nature and seriousness of the deficiency of its Application. In the case where at least a partial Deposit is to be returned, these funds will be returned within one week of the Bidder being informed that it is not eligible to take further part in the Award Process.
- 3.115 Applicants are subject to an on-going obligation to inform ComReg of material changes in all circumstances affecting any of the information provided in their Applications. If an Applicant becomes aware of a material error, omission or inaccuracy in its Application, the Applicant must inform ComReg as soon as

reasonably possible. This obligation extends for the full duration of the rights of use the Applicant may be awarded on foot of the Award Process.

3.4.3 Progress of the Award Process

3.116 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;
- an Assignment Stage will be held, followed by a Notification and Grant Stage; or
- only a Notification and Grant Stage will be held.

3.117 A Main Stage of an 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.

3.118 If a Main Stage of an 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 at the Qualification Stage⁸²;
- ComReg will inform each Bidder of its Initial Eligibility (i.e. the sum of the Eligibility Points associated with all the Lots in its Initial Bid); 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.

3.119 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.

3.120 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. An Assignment Stage is required whenever at least one frequency-generic B-Lot is won by a Bidder in any Region during the Main Stage or the Qualification Stage if a Main Stage is not required.

⁸² This is because Lots in different Lot Categories may be substitutes for at least some Bidders. Therefore, even if there is no excess demand for a Lot Category on the basis of Initial Bids, some Bidders may increase their demand for Lots in such a category if the price for other Lot Categories (which they preferred at Reserve Prices) increases.

- 3.121 The purpose of the Assignment Stage is to determine the specific frequencies to be assigned to Winners of (frequency-generic) B-Lots and any Additional Prices they will have to pay. In the case that 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 a conflict in 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).
- 3.122 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.
- 3.123 Following completion of the Assignment Stage (if required), the Award Process will progress to the Notification and Grant Stage.

3.5 Main Stage

- 3.124 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 automatically determine whether a Bid is in compliance with the Auction Rules as set out in detail in Chapter 4.
- 3.125 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 a price to be paid by each Winning Bidder (its Base Price). Specific frequency assignments for Winners of the frequency-generic B-Lots will be determined subsequently in the Assignment Stage.
- 3.126 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**.

- 3.127 The open, multiple round, structure of the Auction is intended to allow Bidders to learn about Aggregate Demand for Lots in the various Regions and to provide an opportunity for Bidders to revise their assessment of the value of Lots in light of this information.
- 3.128 All Bids in the Main Stage are for Packages of 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.

3.5.1 Primary Bid Rounds

- 3.129 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).
- 3.130 Before the start of each Primary Bid Round, ComReg will announce a price per Lot for each Lot Category applicable in that round (the 'Round Prices').
- 3.131 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 by the sum total of the prevailing Round Prices for the Lots included.

Round Prices

- 3.132 For the first Primary Bid Round, the Round Price per Lot in each Lot Category for which there was no excess demand⁸³ 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.
- 3.133 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

⁸³ 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.

in a Lot Category at previous Round Prices, no Price Increment shall be applied to Lots in that Lot Category.

Activity Rules

- 3.134 Primary Bids are subject to Activity Rules that may limit the composition of Packages 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.
- 3.135 Activity in the Auction is measured in Eligibility Points. Each Lot has been assigned a number of Eligibility Points (set out in Table 8). The Eligibility associated with a Package of Lots is the sum of Eligibility Points of all the Lots included in the Package. This will be referred to as the “Eligibility of the Package of Lots”.
- 3.136 Each Bidder will start the Primary Bid Rounds with a given Eligibility level (also measured in terms of a number of Eligibility Points) equal to the Eligibility of the Package that is made up of its Initial Bid. This will be referred to as the Bidder’s Initial Eligibility. In subsequent rounds, the Eligibility of each Bidder will be equal to the smallest of:
- (i) the Bidder’s Eligibility in the preceding round; and
 - (ii) the Eligibility of the Package subject to its Primary Bid in the preceding round.

Therefore, a Bidder’s Eligibility can never increase during the Main Stage.

- 3.137 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. 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 (either within the same Region or in a different Region).
- 3.138 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. 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 behaviour.⁸⁴

⁸⁴ 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.

- 3.139 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 Lots.⁸⁵ 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.
- 3.140 For instance, suppose that a Bidder starts by bidding for Package A, but at some point this Package 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 became again relatively cheap when compared with Package B. The facility to make Relaxed Primary Bids allows the Bidder to bid again for Package A if (and only if) it has not become relatively more expensive (in relation to B) than in the round in which the Bidder switched from A to B. See Annex 5 for an example of how to submit a Relaxed Primary Bid.
- 3.141 In some cases, to submit a Bid for Package A that is consistent with the preferences implied by the Bidder's previous Primary Bids, it might be necessary to raise a Bidder's previous Bid for some 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 Bidder.⁸⁶ 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.
- 3.142 The EAS will alert a Bidder during a Primary Bid Round where it might be possible to bid for a Package of Lots of interest via a Relaxed Primary Bid. 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 Bid⁸⁷. Therefore, making a Relaxed Primary Bid simply requires the 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.

⁸⁵ A worked example of the Activity Rules for the Primary Bid Rounds and caps on Supplementary Bids is set out in Annex 5 of this document.

⁸⁶ 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

⁸⁷ In practice, there would typically be only a small number of such Chain Bids needed.

End of the Primary Bid Rounds

3.143 The Primary Bid Rounds end following the first Primary Bid Round in which there is no excess demand for any Lot Category at the prevailing Round Prices.⁸⁸

3.5.2 Supplementary Bids Round

3.144 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).

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

- submit Bids for Packages of Lots for which they are willing and eligible to bid, 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.

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

3.147 A Supplementary Bid may be submitted for any Package of Lots satisfying the Competition Cap.

3.148 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 maximum amounts allowed. 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. 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 on⁸⁹.

⁸⁸ Subject to certain provisions for exceptional circumstances (see Section 4.1.5).

⁸⁹ 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.

Floors on Supplementary Bids

- 3.149 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, 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.
- 3.150 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).
- 3.151 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.

Caps on Supplementary Bids

- 3.152 Supplementary Bid Amounts may be subject to two caps:
- a Relative Cap; and
 - a Final Price Cap.⁹⁰
- 3.153 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 Prices.⁹¹ 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.
- 3.154 **Relative Caps** arise whenever the Bidder submits a Bid that affects its Eligibility. Relative Caps arise from a Bidder's Initial Bid (which sets the Bidder's Initial Eligibility) and from Primary Bids submitted in Primary Bid Rounds where the Bidder reduced Eligibility (i.e. where the Eligibility of the

⁹⁰ 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.

⁹¹ 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.

Package of Lots it bid for was strictly less than the Bidder's Eligibility at the start of that round).

- 3.155 The Relative Cap arising from a Bidder's Initial Bid will apply to the Bid Amounts for any Packages of Lots with Eligibility greater than the Bidder's Initial Eligibility. Relative Caps arising from a Primary Bid submitted in a Primary Bid Round in which the Bidder reduced its Eligibility will apply to the Bid Amounts for Packages of Lots with Eligibility no greater than the Bidder's Eligibility at the start of that round, but greater than the Eligibility of the Package of Lots subject to the Primary Bid.
- 3.156 The Relative Cap will limit the maximum Bid Amount for the Package of Lots to which it applies (the Constrained Package) in relation to the highest Bid Amount that the Bidder makes for the Package of Lots subject to the Bid that originated the Relative Cap⁹² (the Constraining Package) and the difference in the price of the two Packages of Lots at the time in which the Bidder chose to make that Bid for the Constraining Package⁹³ (the Constraining Price Differential). The Relative Cap will limit the Bid Amount on the Constrained Package so that it cannot exceed the highest Bid Amount on the Constraining Package by more than the Constraining Price Differential.⁹⁴
- 3.157 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 Packages 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 the Final Package plus the difference in the price of the two Packages of Lots in the final Primary Bid Round.⁹⁵
- 3.158 A detailed description of the caps is provided in Section 4.2.3. Annex 5 provides examples of how the caps are calculated and Annex 7 discusses the practical implications of the Final Price Cap.

⁹² The Package of the Bidders Initial Bid or the Package of the Primary Bid that led to the Bidder losing Eligibility

⁹³ Reserve Prices in the case of a Relative Cap originating from the Bidder's Initial Bid, or the corresponding Round Prices in the case of a Relative Cap originating from a Primary Bid that led to a loss in Eligibility.

⁹⁴ So if the Relative Cap on the Bid Amount for Package X originated from a Bid on Package Y when the difference in price between X and Y was D, then the Bid Amount for X cannot be greater than the Bid Amount for Y plus D.

⁹⁵ 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.

3.5.3 Winner and Base Price determination

3.159 Following the Supplementary Bids Round, all valid Initial Bids, Primary 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 4.2.4).

3.160 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.

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

3.162 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 4.2.4). In particular, each Winning Bidder will be required to pay a sufficient amount so 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.

3.163 Annex 10 sets out the more formal mathematical description of the process of winner and price determination that will be used. Annex 6 provides a very simple example of the winner and price determination process.

3.164 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

3.165 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 was not required) across all

relevant Regions. As the location of the frequencies associated with A-Lots is fixed, the A-Lots do not need to be taken into account in an Assignment Stage.

3.166 Winning Bidders will be able to participate in the Assignment Stage individually or as part of an Alliance of Winning Bidders⁹⁶. Participants in the Assignment Stage are referred to as 'Assignment Bidders'⁹⁷. Note that Winning Bidders will be provided with the relevant information for forming any Alliances at the end of the Main Stage, including the identity of the Winners of B-Lots and the number of Lots won by each Winning Bidder in each Lot Category.

3.167 At the start of the Assignment Stage, ComReg will determine the set of feasible frequency assignments for each Assignment Bidder who is to be awarded B-Lots in accordance with the outcome of the Main Stage (or Qualification Stage if a Main Stage was not required), such that:

- for each Region in which an Assignment Bidder won B-Lots in the Main Stage (or Qualification Stage if the Main stage is not required), the Assignment Bidder is awarded a contiguous block of spectrum within the Region, in accordance with the number of B-Lots it won in that Region;
- any option for assigning frequencies to a particular Assignment Bidder is consistent with all other Assignment Bidders each receiving contiguous spectrum in every Region;
- any Assignment Bidder that has been awarded exactly the same number of B-Lots in every Region is assigned the same frequencies in each Region;
- subject to the previous requirements being satisfied, for Assignment Bidders that have been awarded B-Lots in multiple Regions, the options presented will be those which maximise the extent to which the same frequencies are assigned in each Region⁹⁸; and

⁹⁶ As noted above, the formation of Alliances may be permitted in certain circumstances to take account of the regional structure of the Award Process and in recognition that there may be significant efficiency in two or more Winning Bidders being assigned adjacent frequencies within a Region or similar frequencies across Regions, in particular where coordination at regional borders is important. Where an Alliance is formed, it will need to designate a Leading Member that will be responsible for submitting any Bids on behalf of the Alliance, and who will be primarily liable for making any deposits and payments applicable to the Alliance.

⁹⁷ i.e. an Assignment Bidder is either an individual Winning Bidder, or a group of Winning Bidders participating in the Assignment Stage as an Alliance.

⁹⁸ This is implemented through the procedure presented in Annex 9. In summary, this procedure eliminates Assignment Options with poor alignment of frequencies assigned to each Bidder across different Regions and, for the remaining options, uses unassigned Lots to pad the frequency boundaries between Bidders in specific Regions to improve frequency alignment across Regions.

- subject to the previous requirements being satisfied, the extent to which unassigned spectrum rights of use can be combined into the fewest number of contiguous blocks is maximised.
- 3.168 If there is more than one feasible frequency assignment for at least one Assignment Bidder, the Assignment Stage will include an Assignment Round to determine the frequency assignment for each Assignment Bidder. This will require a bidding process if there is potential conflict between the frequency assignments that could be awarded to two or more Assignment Bidders. In this case, Assignment Bidders will be able to make Assignment Bids for their options (feasible frequency assignments), each option detailing the specific frequencies that Assignment Bidder would be assigned in the Regions where it has won B-Lots.
- 3.169 The outcome of the Assignment Round, if required, will form the Provisional Frequency Plan, setting out frequency assignments within the frequency range 3 475 MHz – 3 800 MHz for each Assignment Bidder in all nine Regions. If there is only one possible frequency assignment for every Assignment Bidder, an Assignment Round is not required and the Provisional Frequency Plan will consist of each Assignment Bidder's unique frequency assignment.
- 3.170 Following the determination of the Provisional Frequency Plan, there will be a Negotiation Phase during which Assignment Bidders will be given a period of ten clear Working Days to negotiate and submit a request to ComReg for a reassignment of the frequencies they were assigned in the Provisional Frequency Plan in the frequency range 3 475 MHz – 3 800 MHz for one or more Regions. In addition, Alliances should inform ComReg of the specific frequencies to be assigned to each Alliance member by the end of this period.

3.6.1 Participating as an Alliance in the Assignment Round

- 3.171 As noted above, subsets of Winning Bidders may choose to participate jointly in the Assignment Round by forming an Alliance in advance in accordance with the conditions set out in Section 4.3.2. This will allow a subset of Winning Bidders to align their frequency assignments (within the frequency range 3 475 – 3 800 MHz) in the event that it would be beneficial for the efficient use of the spectrum.
- 3.172 In this case, the feasible frequency assignments will be generated as if the Lots won by each Winning Bidder included in the Alliance were won by a single entity in the Main Stage (or the Qualification Stage if a Main Stage was not required), and the Alliance of Bidders will submit Assignment Stage Bids jointly.
- 3.173 Winning Bidders will be given a period of ten clear Working Days between the end of the Main Stage and the start of the Assignment Stage to establish any

such Alliances and notify ComReg⁹⁹. For the avoidance of doubt, note that Alliances in the Assignment Stage are not the same as consortia formed prior to the Auction (see Section 3.3.4).

3.174 The formation of an Alliance for the Assignment Stage is subject to a number of restrictions, as set out in Chapter 4.

3.175 No Winning Bidder can be part of more than one Alliance in the Assignment Stage.

3.6.2 Assignment Round

3.176 Following the period allowed for the formation of Alliances, ComReg will establish the set of feasible frequency assignments that could be assigned to each Assignment Bidder.¹⁰⁰ Each frequency assignment for an Assignment Bidder sets out a specific set of frequencies that would be assigned to that Assignment Bidder in each of the nine Regions, in accordance with the B-Lots won by the Assignment Bidder in the Main Stage.

3.177 If there is more than one feasible frequency assignment identified for any given Assignment Bidder, it will be necessary to determine which options will form the Provisional Frequency Plan. In this case, an Assignment Round will be run to determine a frequency assignment for each Assignment Bidder that is compatible with the frequency assignments for all other Assignment Bidders.

3.178 The Assignment Round consists of a single round in which:

- Assignment Bidders whose preferred frequency assignment might conflict with the preferred assignment of at least one other Assignment Bidder¹⁰¹ 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

⁹⁹ See Annex 4 for the Alliance Notification Form to be submitted to ComReg

¹⁰⁰ Each frequency assignment is a unique set of specific frequencies across all Regions in which the Assignment Bidder has won B-Lots.

¹⁰¹ This will be the case for any Assignment Bidder awarded B-Lots in at least one Region in which another Assignment Bidder has been awarded B-Lots.

Assignment Bidder¹⁰² in any Region will be able to choose their preferred option from amongst the set of frequency assignments presented to them.

Winner and Additional Price determination

- 3.179 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 one of the feasible frequency plans.
- 3.180 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. The key features of this rule are similar to those set out in relation to determination of the Base Prices to be paid by Winning Bidders in the Main Stage.
- 3.181 As per Section 4.3.8, 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.

3.6.3 Negotiation Phase

- 3.182 Following the determination of a Provisional Frequency Plan, Winning Bidders will be provided with a period of ten clear Working Days in which:
- Assignment Bidders may communicate with each other to negotiate a re-organisation of the frequency assignments in the frequency range 3 475 – 3 800 MHz in each Region; and
 - Winning Bidders that chose to participate in the Assignment Round as part of an Alliance should inform ComReg of the specific frequencies to be assigned to each Alliance member.
- 3.183 Any such re-organisation is subject to all Winning Bidders receiving contiguous blocks of spectrum (above and below State Services Spectrum), in accordance with the amount of spectrum awarded to them in each Region in the Main Stage

¹⁰² This will be the case if there is no other Winner of B-Lots in any Region 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.

(or Qualification Stage). The rules relating to the negotiation of alternative frequency assignments are further set out in Chapter 4

- 3.184 To provide a starting point for the Negotiation Phase, ComReg will inform Winning Bidders of the Provisional Frequency Plan (i.e. the frequencies to be assigned to each Assignment Bidder) and any Additional Prices to be paid.
- 3.185 Following receipt of notification of frequency assignments from Alliance members and any requests for alternative frequency assignments, ComReg will determine the Final Frequency Plan, setting out the specific frequencies to be assigned to all Winning Bidders in each Region.
- 3.186 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 Frequency Plan.

Post-Auction frequency reassignment

- 3.187 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 unassigned frequencies.
- 3.188 In this case, one or more Licence holders may submit an Application to ComReg following the completion of the Award Process to request a reassignment of the frequencies assigned in some or all Regions. For example, this could involve:
- a swap of frequencies between two Licence holders; and/or
 - a swap of frequencies assigned to a Licence holder for currently unassigned spectrum.
- 3.189 Frequency reassignment requests are strictly subject to the approval of ComReg.
- 3.190 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.
- 3.191 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

- 3.192 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.
- 3.193 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 them (less any Deposit forfeiture imposed in accordance with the Auction Rules) within approximately two weeks of this notification.
- 3.194 In the case of Winning Bids, ComReg will notify the Winning Bidders of their entitlement to apply for a 3.6 GHz Band Preparatory Licence and a 3.6 GHz Band Liberalised Use Licence, subject to compliance with certain upfront obligations, as set out in paragraphs 3.199 and 3.200 below, including their obligation to pay the Upfront Fee (see below).
- 3.195 The Upfront Fee to be paid by each Winning Bidder prior to a receipt of a 3.6 GHz Band Preparatory or 3.6 GHz Band Liberalised Use Licence will be the sum of its Base Price plus its Additional Price. In the case of an Alliance, the Additional Price for the Alliance will be payable by the Leading Member designated by the Alliance and added to the Leading Member's Base Price to determine its Upfront Fee. Members of an Alliance should then make their own internal arrangements for any apportionment of the Alliance's Additional Price amongst the members of the Alliance. Members of an Alliance shall be jointly and severally liable for the Additional Price for the Alliance in the event of non-payment of the Additional Price by the Leading Member.
- 3.196 The notification to the Winning Bidder will specify the date for the payment of the Upfront Fee (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 Upfront Fee and first SUF is a prerequisite condition to that Winning Bidder being entitled to apply for a 3.6 GHz Band Preparatory Licence and a 3.6 GHz Band Liberalised Use Licence. For an Alliance, the members must have between them paid the relevant Additional Price for the Alliance in order for any member to be entitled to apply for a 3.6 GHz Band Preparatory Licence and a 3.6 GHz Band Liberalised Use Licence.
- 3.197 If the amount of a Winning Bidder's Upfront Fee 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 amount of a Winning Bidder's Upfront Fee, less any applicable Rebates, is less than the amount of its Deposit, the relevant amount of its Deposit 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).

- 3.198 In respect of a 3.6 GHz Band 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 3.6 GHz Band Preparatory Licence (as detailed in draft form in Annex 2 and as described in Section 2.5 of this Information Memorandum) and will among other things specify the due date by which the Winning Bidder shall pay the Licence fee associated with the 3.6 GHz Band Preparatory Licence.
- 3.199 Where the Winning Bidder has submitted the Upfront Fee and the Licence fee associated with the 3.6 GHz Band Preparatory Licence, ComReg will issue a 3.6 GHz Band Preparatory Licence to the Winning Bidder.
- 3.200 In respect of a 3.6 GHz Band Liberalised Use Licence, the notification¹⁰³ will state that, upon grant of such a Licence, the Winning Bidder is obliged to comply with the terms and conditions associated with the Liberalised Use Licence (as detailed in draft form in Annex 2 and as described in Section 2.4 of this Information Memorandum) and will among other things:
- specify the Lots to be included in the 3.6 GHz Band Liberalised Use Licence in accordance with the Lots awarded to the Winning Bidder in the Award Process;
 - specify the expected commencement date of each Lot in the 3.6 GHz Band Liberalised Use Licence notwithstanding the possibility for the commencement date of a 3.6 GHz Band Liberalised Use Licence to be delayed beyond the expected start date;
 - specify the expiry date of each Lot in the 3.6 GHz Band Liberalised Use Licence and the expiry date of the 3.6 GHz Band Liberalised Use Licence;
 - note that the Winning Bidder is required to pay the SUF associated with the 3.6 GHz Band Liberalised Use Licence in advance of the issue of its 3.6 GHz Band 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 3.6 GHz Band Liberalised Use Licence, noting the possibility for the commencement date of a 3.6 GHz Band Liberalised Use licence to be delayed beyond the expected start date;

¹⁰³ This notification will be sent to all Winning Bidders.

- specify the information required by ComReg to populate Part 2 and Part 3 of the 3.6 GHz Band 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 3.6 GHz Band 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 3.6 GHz Band Liberalised Use Licence.

3.201 Where the Winning Bidder has submitted the Upfront Fee by the Payment Deadline and complies with the conditions set out in paragraph 3.200 above, ComReg will issue a 3.6 GHz Band Liberalised Use Licence to the Winning Bidder.

3.202 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 3.6 GHz Band Preparatory Licence or the 3.6 GHz Band Liberalised Use Licence as set out in this Section, including relating to the payment of the Upfront Fee, it may forfeit its Deposit and entitlements to a 3.6 GHz Band Liberalised Use Licence and a 3.6 GHz Band 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.

3.203 Once a 3.6 GHz Band Liberalised Use Licence has been issued to a Winning Bidder, ComReg will publish on its website the text of the 3.6 GHz Band Liberalised Use Licence and subsequent amendments to same.

3.8 Transition Rules

3.204 As explained in Chapter 7 of ComReg Document 15/70, Existing Licensees may be required to make adjustments to their existing networks ('Transition Activities') in order to comply with the outcome of the Award Process if they wish to continue to provide services following the cessation of the FWALA licensing scheme on 31 July 2017. In line with ComReg's Decision¹⁰⁴, the following parties are obliged to abide by the Transition Rules as set out in this Information Memorandum:

- all Bidders; and
- all Existing Licensees applying for a TUL.

3.205 If an Existing Licensee is not a Bidder and, further, chooses not to apply for a TUL, then this Existing Licensee is not obliged to comply with the Transition

¹⁰⁴ See paragraph 3.11.10 of the Decision in Chapter 8 of ComReg Document 16/57.

Rules. For the avoidance of doubt, such an Existing Licensee would remain entitled to make full use of its existing 3.6 GHz rights of use until the expiry date of its licence(s) noting that all existing 3.6 GHz rights of use expire on or before 31 July 2017.

- 3.206 Upon completion of the Assignment Stage, ComReg will issue a notification to Winning Bidders and Existing Licensees informing them of the specific frequency assignments resulting from the Assignment Stage. In addition, this notification will require Winning Bidders and Existing Licensees who have agreed to abide by the Transition Rules 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.
- 3.207 The Transition Plan Proposals, and the Transition Plan as subsequently adopted by ComReg, should identify and consider all the Transition Activities¹⁰⁵ required by the Existing Licensees.
- 3.208 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. 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 Licensees in these bands.
- 3.209 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 Licensees and the order of each activity in the 3.6 GHz Band;
 - the setting of milestone dates for each Transition Activity identified;
 - where the Transition Activities of one Existing Licensee is 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 Licensees, Winning Bidders and other Interested Parties to monitor compliance with the Transition Activity

¹⁰⁵ The Transition Activities refer to the activities required by the Existing Licensee to make adjustments 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.

milestones and deliverable dates (subject to non-disclosure of Confidential Information); and

- attribution and acceptance of liability for liquidated damages that may be payable by the Existing Licensee(s), TPL Licensee and/or TUL Licensee in the event of non-compliance with the Transition Activity milestones identified in the Transition Plan, where such Existing Licensee(s)', TPL Licensee's or TUL Licensee's actions or omissions caused the non-compliance with the relevant milestone.

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

3.211 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 Licensees. In any case, ComReg will take appropriate and effective measures to ensure that there is no undue delay in the availability of liberalised 3.6 GHz Band spectrum rights of use.

3.212 ComReg reserves the right to make a final and binding decision on any and all matters pertaining to Transition Rules following appropriate consultation. In line with ComReg's Decision in Chapter 8 of ComReg Document 16/57 (paragraph 3.11.10), all Bidders and all Existing Licensees applying for a TUL are required to abide by the Transition Rules including the Transition Plan.

3.213 Once the Transition Plan is finalised, it will 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.

3.8.1 Liquidated Damages

3.214 An essential part of ensuring that the Winning Bidders and Existing Licensees who abide by the Transition Rules 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 Licensee or Winning Bidder fails to discharge its obligations in accordance with the milestones and deadlines set out in the Transition Plan.

3.215 The total amount of liquidated damages payable by these Existing Licensees 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 Winning Bidders in the event that ComReg may be unable to make Lots available for use due to the delays caused to the completion of Transitional Activities in the Transition Plan.

3.216 Section 2.4.7 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 automatically work out the complex rules applicable to the Auction for Bidders.
- 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 reviews 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 must contact ComReg immediately. ComReg may, at its discretion, suspend or continue the Auction while investigating any such concerns.

4.1.2 Bid submission

- 4.8 As noted above, all Bids must be submitted through the EAS unless exceptional circumstances prevents a Bidder from doing so and ComReg gives its consent to that Bidder using an alternative channel.
- 4.9 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 of these cases, 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 can 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).

A submission 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 Extensions, 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, 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 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 fax, email or telephone; otherwise ComReg will consider that no submission has been made.

4.1.3 Competition Caps

4.12 All Bids for the Main Stage of the Auction are subject to a Competition Cap of 150 MHz in each Region.

4.1.4 Communication with ComReg

4.13 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.

4.14 Bidders may contact ComReg by telephone, using designated telephone numbers, only to report technical problems. In certain exceptional circumstances, Bidders may be given permission to submit Bid(s) through alternative means, such as fax, 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.

4.15 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

4.16 If exceptional circumstances arise during any stage of the Auction, ComReg has the discretion to:

- postpone the scheduled start of a round;
- 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 one or more rounds and the Bids made therein, and resume the Auction from an earlier 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.

4.17 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.

4.18 In the event that a Bidder is excluded from the Auction and some, or all, of its Bids so far deemed invalid, ComReg would typically expect not to exercise 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

4.19 Applicants and Bidders are reminded that, with the exception of the specific rules for bidding in Alliances which are relevant only in the Assignment Stage, the Award Process and Auction Rules prohibits Applicants and Bidders from:

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

4.20 Such behaviours may also be illegal under EU and Irish competition law. These prohibitions apply throughout the Award Process. In the Main Stage, the prohibitions apply to each Bidder; in the Assignment Stage, the prohibitions apply to each Assignment Bidder. See Section 3.3.5 of this Information Memorandum for the Auction Rules relating to Bidder behaviour.

4.2 The Main Stage

4.21 This section provides a detailed description of the rules applying to the Main Stage of the Auction.¹⁰⁶

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

4.22 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).

4.23 ComReg will also inform each Bidder of its own Initial Eligibility (as determined by its Initial Bid).

4.2.2 Primary Bid Rounds

Schedule for Primary Bid Rounds

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

4.25 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-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

¹⁰⁶ 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, as set out in the Information Memorandum. 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.

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.

- 4.26 All Primary Bid Rounds will be scheduled to run between 10.00 and 16.00 Irish time on Working Days¹⁰⁷, 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.
- 4.27 There will be a minimum of 30 minutes between Primary Bid Rounds.
- 4.28 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.
- 4.29 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.
- 4.30 If no Extension rights are used, a Primary Bid Round will end at the scheduled round 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

- 4.31 For each Primary Bid Round, ComReg will specify a Round Price per Lot for each Lot Category.
- 4.32 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 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.
- 4.33 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.
- 4.34 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.

¹⁰⁷ Public holidays and bank holidays will be treated as non-Working Days

- 4.35 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.
- 4.36 For the avoidance of doubt, it is not possible for the Round Price for any Lot Category to fall during the Primary Bid Rounds.
- 4.37 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.
- 4.38 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.
- 4.39 Round Prices will be in units of EUR 100.

Primary Bid submission

- 4.40 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 Competition Caps and the Activity Rules (described subsequently in this Section 4.2.2).
- 4.41 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 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.
- 4.42 It is not possible for a Bidder to subsequently amend the Bid Amount for a Primary Bid.
- 4.43 Bid submission follows the two-step check and confirm process described in Section 4.1.2.
- 4.44 A Primary Bid is a binding offer to buy the selected Package of Lots for a price not exceeding the Bid Amount. Each Primary Bid will be considered in its entirety and will not be sub-divided.
- 4.45 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 caps detailed in Section 4.2.3

- 4.46 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.
- 4.47 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 in 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.
- 4.48 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 Extensions remaining), the EAS will automatically enter a Zero Bid on the Bidder's behalf.

Activity and Bidder Eligibility

- 4.49 Each Lot available in the Auction is assigned a number of Eligibility Points, as set out in Table 8. The differences in the Eligibility Points assigned to Lots in different Lot Categories approximate relative differences in their Reserve Prices. However, Lot Categories in different Regions have been grouped into a limited number of tiers for the purpose of setting Eligibility Points, with a view to facilitate switching across Regions and simplifying the bidding process.
- 4.50 The Eligibility of a Package of Lots is the sum of the Eligibility Points of the Lots included in the Package of Lots.
- 4.51 A Bidder starts each Primary Bid Round with a number of Eligibility Points; this is the Bidder's Eligibility for the round.
- 4.52 The Activity of a Bid is equal to the Eligibility of the Package of Lots subject to the Bid.
- 4.53 In any Primary Bid Round, each Bidder may submit a Primary Bid with Activity less than or equal to its Eligibility at the start of the round, provided that the Bid satisfies the Competition Cap.
- 4.54 Under certain conditions, a Bidder may submit a Primary Bid with Activity strictly greater than its Eligibility at the start of the round. 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.

- 4.55 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 or Supplementary Bids) for Packages of Lots with Eligibility exceeding its Initial Eligibility, providing 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 (discussed below).
- 4.56 For each subsequent Primary Bid Round, a Bidder's Eligibility is set to the lesser of:
- the Bidder's Eligibility at the start of the preceding Primary Bid Round; and
 - the Activity of the Bid submitted by the Bidder in the preceding Primary Bid Round.
- 4.57 This rule implies that a Bidder's Eligibility can never increase. Specifically, if a Bidder submits a Relaxed Primary Bid (which has an Activity that strictly exceeds the Bidder's Eligibility at the start of the round), its Eligibility will be maintained for the next Primary Bid Round.
- 4.58 The EAS will not allow any Bidder to submit a Bid that violates the Competition Cap. 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 in the following section). If a Bidder checks a Bid that is invalid, the EAS will require the Bidder to return to the Bid form to revise the Bid and resubmit this for checking. The EAS will only allow confirmation of Bids that have satisfied the checking step.

Consequences of reductions in Eligibility

- 4.59 The consequence of the above rules is that from one Primary Bid Round to the next, a Bidder's Eligibility could stay the same (if it Bids for a Package of Lots with Eligibility equal to its current Eligibility, or makes a Relaxed Primary Bid for a Package of Lots with Eligibility exceeding its current Eligibility) or fall (if it bids for a Package of Lots with Eligibility strictly less than its current Eligibility).
- 4.60 The EAS will warn a Bidder if the Bidder selects a Primary Bid that would result in a reduction of Eligibility for the next Primary Bid Round.
- 4.61 Both the Initial Bid and Primary Bids submitted in rounds in which a Bidder reduces Eligibility are significant in terms of the Activity Rules. Such Eligibility-setting Bids have consequences for the Bidder's ability to submit subsequent

Primary Bids (as described further below) and also cap the maximum amount that the Bidder can bid as Supplementary Bids for some Packages of Lots (as described in Section 4.2.3 below).

- 4.62 Where a Bidder makes an Eligibility-setting Bid, it loses its ability to Bid unconditionally for some Packages of Lots with greater Eligibility in subsequent Primary Bid Rounds. The Bidder may still in some cases be able to make a subsequent Relaxed Primary Bid for such a Package of Lots, but the Activity Rules will only allow this where such a Bid would be consistent with the preferences that the Bidder has implicitly expressed when submitting previous Eligibility-setting Bids.
- 4.63 When a Bidder makes an Eligibility-setting Primary Bid, this sets a constraint on all Packages of Lots with Eligibility no greater than the Bidder's Eligibility at the start of the round, but strictly greater than the Activity of the Eligibility-setting Bid (i.e. the Eligibility of the Bidder going forward into the next round). Where a Bidder subsequently bids for any of these Packages of Lots – whether by a Relaxed Primary Bid or a Supplementary Bid – this needs to be consistent with the preference it has expressed by choosing the Package of Lots subject to the Eligibility-setting Primary Bid.
- 4.64 For example, suppose that a Bidder currently has Eligibility to make a Primary Bid for Package X, but chooses to bid for a Package Y with strictly smaller Eligibility; the Bidder's Eligibility in the subsequent round will be set equal to the Eligibility of Package Y. In the current round, there is a price difference¹⁰⁸ of D between Package X and Package Y at the prevailing Round Prices. The Bidder's choice to bid for Package Y implies that the Bidder is not willing to offer more than D to obtain Package X rather than Package Y. It will only be possible for the Bidder to bid for Package X subsequently provided that this respects the preference that the Bidder has already expressed in the current round through its Eligibility-setting bid for Package Y. In particular, this means that the Bidder cannot offer more than D to obtain Package X rather than Package Y, either in any subsequent Primary Bid Round (through a Relaxed Primary Bid) or in the Supplementary Bids Round. Therefore, the Activity Rules require that any subsequent Bid for Package X does not exceed the highest Bid made for Package Y plus the amount D.
- 4.65 Where a Bidder has reduced Eligibility in a number of rounds, these consistency requirements can chain together. For example:
- in some Primary Bid Round, the Bidder had sufficient Eligibility to make a Primary Bid for Package X, but instead submitted a Primary Bid for a Package Y with strictly smaller Eligibility, at a price difference of D;

¹⁰⁸ Here D is the price of Package X less that of Package Y. It could be positive, negative or zero.

- in a subsequent Primary Bid Round, the Bidder had sufficient Eligibility to make a Primary Bid for Package Y, but instead submitted a Primary Bid for a Package Z with strictly smaller Eligibility at a price difference of E.

4.66 In this case, the Activity Rules (detailed below) have the effect of:

- limiting the amount that can subsequently be bid for Package Y to the highest Bid for Package Z plus the amount E; and
- limiting the amount that can subsequently be bid for Package X to the highest Bid for Package Y plus the amount D.

4.67 The amount that can subsequently be Bid for Package X is, therefore, indirectly limited relative to the highest Bid for Package Z plus the sum of D and E through two steps.

Relaxed Primary Bids

4.68 Under certain conditions, a Bidder will be permitted to make a Primary Bid with Activity greater than the Bidder's Eligibility at the start of the round. This is called a Relaxed Primary Bid. See Annex 5 for a worked example of Relaxed Primary Bids.

4.69 In practice, the EAS will automatically check if the conditions for being able to submit a Relaxed Primary Bid on a certain Package of Lots are met. The EAS will provide the functionality for Bidders to maintain a list of Packages of Lots of interest; the EAS will notify Bidders if a Relaxed Primary Bid is possible for any of the Packages of Lots in this list.

4.70 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.

4.71 A Bidder cannot submit a Relaxed Primary Bid if its Eligibility at the start of the round is zero.

4.72 A pre-requisite for a Bidder to be able to submit a Relaxed Primary Bid for a Package X is that the Bidder's Eligibility at the start of the Primary Bid Round must be strictly less than the Eligibility of Package X.

4.73 A Bidder may only submit a Relaxed Primary Bid for a Package X if the following conditions are satisfied:

- (i) If Y is the Package subject to the *first* Bid that the Bidder made with Activity less than the Eligibility of X, the difference in price between X and Y at current Round Prices is not greater than the price difference between X and Y which existed when the Bidder submitted its *first* Bid for Y.

- (ii) All of the Bids submitted by the Bidder (which during the Primary Bid Rounds may only include the Initial Bid, Primary Bids and Chain Bids) must at all times satisfy the requirement that, for any Package W subject to a Bid by the Bidder:
- if the Bidder has submitted a Bid for a Package W and the Activity of this Bid exceeds the Bidder's Eligibility at the start of the current round; and
 - Z is the Package for which the Bidder made the *first* Bid with Activity below the Eligibility of W; then
 - the difference between the highest Bid that the Bidder submitted for W and the highest Bid that the Bidder submitted for Z cannot exceed the difference¹⁰⁹ between the price of W and Z when the Bidder made its first Bid for Z.

For the purposes of satisfying this condition, it is possible for a Bidder to submit one or more Chain Bids along with a Relaxed Primary Bid, as explained below, provided that none of the Chain Bids exceeds the price of the corresponding Package of Lots at the current Round Prices.

4.74 Note that whether condition (i) in paragraph 4.73 is met only depends on the evolution of Round Prices. In particular:

- If the first Bid that the Bidder made with Activity below the Eligibility of X was the Initial Bid, Y is the Package subject to the Initial Bid. In this case, condition (i) in paragraph 4.73 requires that the difference in price between X and Y at the Round Prices set for the current round cannot exceed the difference in price between X and Y at Reserve Prices.
- If the first Bid that the Bidder made with Activity below the Eligibility of X was a Primary Bid for Package Y, submitted in round R, then condition (i) in paragraph 4.73 requires that the difference in price between X and Y at the Round Prices set for the current round cannot exceed the difference in price between X and Y at the Round Prices in round R.

4.75 In contrast, condition (ii) in paragraph 4.73 depends on the Bids made by the Bidder. It is possible that the second condition may be satisfied given the Bids already submitted by the Bidder. In this case, the Bidder is allowed to submit a Relaxed Primary Bid for X without any further requirements. However, if the condition is not already satisfied, then the Bidder is allowed to submit further Bids for the relevant Packages *along* with the Relaxed Primary Bid in order to satisfy this requirement. Any such Bids are called Chain Bids and potentially arise in respect of Packages that have been subject to a previous Eligibility-

¹⁰⁹ i.e. the price of W less the price of Z, which could be positive, negative or zero.

setting Bid by the Bidder. If the Bidder submits Chain Bids, Condition (ii) in paragraph 4.73 must be satisfied in relation to all of these Chain Bids.

Chain Bids

4.76 The need for any Chain Bids and their required Bid Amounts will be calculated automatically by the EAS on behalf of the Bidder.

4.77 The Bid Amount for Chain Bids must satisfy the following conditions:

- the Bid Amount must be equal to the minimum Bid Amount that is needed to satisfy condition (ii) in paragraph 4.73; and
- the Bid Amount cannot exceed the price of the Package of Lots at the Round Prices set for the current round.

The Bidder is not able to amend the Bid Amount associated with a Chain Bid. This amount will automatically be determined by the EAS when relevant.

4.78 As Round Prices cannot decrease as the Auction progresses, if the Bidder makes a Relaxed Primary Bid for X, then this Bid must be the highest Bid that the Bidder will have submitted for X so far. Therefore, if the first Bid that the Bidder made with Activity below the Eligibility of X was for Package Y, then the minimum Bid Amount for Y required to satisfy condition (ii) in paragraph 4.73 (call this Bid Amount M) is:

- the price of X in the current round; *minus*
- the difference in price between X and Y when the Bidder made its *first* Bid for Y. (If Y is the Package subject to the Bidder's Initial Bid, then the price of Packages when this Bid was made is given by Reserve Prices. If the first Bid for Y was a Primary Bid, then the price of Packages when this Bid was made is given the Round Prices in the round in which the Bidder made its first Bid for Y.)

4.79 If the highest Bid that the Bidder has already submitted for Package Y is already greater than or equal to M, then the Bidder would be able to make a Relaxed Primary Bid for X without submitting any Chain Bids. However, if the highest bid so far for Package Y is less than M, there are two possibilities:

- If M is strictly greater than the price of Package Y at current Round Prices, then the Bidder is not permitted to make a Relaxed Primary Bid for X; or
- If M is less than or equal to the price of Package Y at current Round Prices, then the Bidder may be able to make a Relaxed Primary Bid for X, but only if it also makes a Chain Bid for Package Y increasing its

previous Bid for Package Y to M (subject to such a Bid itself being consistent with the requirements of condition (ii) in paragraph 4.73).

4.80 If a Bidder is required to make a Chain Bid for a Package Y for an amount of M and the Activity of this Bid exceeds the Bidder's Eligibility at the start of the current round, then condition (ii) in paragraph 4.73 must also be satisfied by this Chain Bid. Suppose that the *first* Bid that the Bidder made with Activity below the Eligibility of Y was for Package Z. Then, the minimum Bid Amount for Z required to satisfy condition (ii) in paragraph 4.73 (call this Bid Amount L) is:

- M; *minus*
- the difference in price between Y and Z when the Bidder made its first Bid for Z. (As above, if Z is the Package subject to the Bidder's Initial Bid, then the price of Packages when this Bid was made is given by Reserve Prices. If the first Bid for Z was a Primary Bid, then the price of Packages when this Bid was made is given by the Round Prices in the round in which the Bidder made its first Bid for Z.)

4.81 If the highest Bid that the Bidder has already submitted for Package Z is already greater than or equal to L, then the Bidder would be able to make a Chain Bid for Package Y at amount M without submitting any further Chain Bids. However, if the highest bid so far for Package Z is less than L, there are two possibilities:

- If L is strictly greater than the price of Package Z at current Round Prices, then the Bidder is not permitted to make a Chain Bid for Y at amount M. In turn, this means that the Bidder is not permitted to make a Relaxed Primary Bid for X as this would require a Chain Bid for package Y at amount M; or
- If L is less than or equal to the price of Package Z at current Round Prices, then the Bidder may be able to make a Relaxed Primary Bid for X, but only if it also makes a Chain Bid for Package Y increasing its previous Bid for Package Y to M and also a Chain Bid for Package Z increasing its previous Bid for Package Z to L (subject to such a Bid itself being consistent with the requirements of condition (ii) in paragraph 4.73).

4.82 By applying condition (ii) in paragraph 4.73 recursively to Chain Bids, this identifies the full list of Chain Bids that would be required for the Bidder to be allowed to make a Relaxed Primary Bid for X. For the Bidder to be permitted to make such a Relaxed Primary Bid for X, it is necessary that none of the required Chain Bid Amounts exceed the price of the Package subject to the Chain Bid at current Round Prices.

4.83 If at least one of the associated Chain Bid Amounts exceeds the price of the Package of Lots for which the Chain Bid is to be made at current Round Prices,

it is not possible to make a Relaxed Primary Bid for 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.

4.84 Note that the rules for Relaxed Primary Bids (for Package X) mean that Chain Bids may be required only for Packages subject to Eligibility-setting Bids, that is either the Package of Lots subject to the Bidder's Initial Bid or for Packages of Lots subject to a Primary Bid in a round where the Bidder reduced its Eligibility.

Validity of Primary Bids

4.85 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 a Price not exceeding the specified Bid Amount; and
- pay the appropriate Spectrum Usage Fee over the duration of the Licence.

4.86 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.

4.87 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 for 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

4.88 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.

4.89 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 period between Primary Bid Rounds. Additional Extension rights cannot be granted during a Primary Bid Round.

4.90 In the event that a Bidder with non-zero Eligibility and one or more remaining Extension rights fails to submit a Bid during a Primary Bid Round, the round will

automatically be extended for that particular Bidder, and one of its remaining Extension rights will be deducted. The EAS will automatically extend the time within which that Bidder can submit a Bid by 30 minutes from the scheduled end of the round.

- 4.91 The Extension period will end 30 minutes after the scheduled end of the round, or once all Bidders who are using Extensions have successfully submitted their Bids, whichever is the earlier.
- 4.92 Bidders that have already submitted a Bid during the Primary Bid Round cannot take any further action during the Extension period; they will be informed that the round has been extended and should wait for the announcement that the Extension period has ended.
- 4.93 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 period, and a Zero Bid will be entered automatically on their behalf.
- 4.94 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 effects of technical failures, rather than to provide Bidders with extra time to consider their decisions.
- 4.95 Note that if a Bidder has exhausted its Extension rights and runs into technical difficulties during a round, no additional Extension will be granted at that point. Any Bidder seeking additional Extensions, having exhausted its allowance, should contact ComReg prior to the start of the next round, if any. ComReg will not grant additional Extensions 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 Extensions 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.
- 4.96 A Bidder may notify ComReg, during a Primary Bid Round and through the approved channels of communication, that it is unable to submit a Bid during that Round and is likely to require an Extension period; notification is not mandatory, but would assist administration of the Auction.

Deposit Calls during the Primary Bid Rounds

- 4.97 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.

- 4.98 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 Bid¹¹⁰. 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 the bank account specified by ComReg during the Award Process (details of which are provided in Annex 3).
- 4.99 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.
- 4.100 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.
- 4.101 In the event that a Bidder fails to meet the Deposit Call requirement, ComReg may, among other things, restrict its ability to make further Bids and/or declare some or all of its Bids already submitted as being incapable of becoming Winning Bids.

Information available during the Primary Bid Rounds

- 4.102 Before the start of the first Primary Bid Round, each Bidder will be informed of:
- its own Initial Eligibility;
 - 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.
- 4.103 Information about the Initial Eligibility of other Bidders will not be disclosed.
- 4.104 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 during the round;
 - its Eligibility for the next Primary Bid Round; and

¹¹⁰ The Bidder may be required to increase its Deposit above 100% of its highest Bid if monies held by ComReg are subject to negative interest rates. Any such increase will simply reflect the deficit in the Deposit held by ComReg which would otherwise result from a negative interest rate applied to Exchequer Notes held by ComReg. See Section 3.3.3 above.

- the number of Extension rights it has remaining for the Primary Bid Rounds.

4.105 Upon scheduling of a further Primary Bid Round, each Bidder will be informed of:

- its Eligibility for the forthcoming scheduled round;
- the number of Extension rights it has remaining for the Primary Bid Rounds; and
- the Round Price per Lot for each Lot Category in the forthcoming scheduled round.

4.106 No information will be released about the Bids submitted by other Bidders during the Primary Bid Rounds.

4.107 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.

End of the Primary Bid Rounds

4.108 The Primary Bid Rounds 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.

4.109 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.

4.110 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

4.111 The start time and duration of the Supplementary Bids Round will be announced by ComReg following the completion of the Primary Bid Rounds.

4.112 There will be at least three clear Working Days between the last Primary Bid Round and the start of the Supplementary Bids Round.

- 4.113 ComReg has discretion over the Round Schedule and duration of the Supplementary Bids Round. However, ComReg anticipates that the round will take place between 09.00 and 18.00 hours on a single Working Day.
- 4.114 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. The Extension of the Supplementary Bids Round will not be 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 Bid submission

- 4.115 When the Supplementary Bids Round is in progress, Bidders may submit Supplementary Bids for multiple Packages of Lots using the EAS.
- 4.116 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.
- 4.117 Bidders may submit a Supplementary Bid for any Package of Lots except the Zero Package (i.e. the Package consisting of no Lots in any Lot Category) subject to not breaching the Competition Cap.
- 4.118 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.
- 4.119 The Bid Amount for each Supplementary Bid is discretionary, subject to the restrictions set out in the sections below.
- 4.120 A Supplementary Bids form may contain Bids for up to 1,000 Packages. This limit includes the Bidder's Initial Bid and all Packages for which the Bidder submitted Bids during the Primary Bid Rounds.
- 4.121 Bid submission will follow the two-step process described in Section 4.1.2.
- 4.122 The EAS will prevent a Bidder from submitting a Supplementary Bids form that contains invalid Bids. If a Supplementary Bids form 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 period as appropriate).

- 4.123 A Bidder may submit only one Supplementary Bids form in the Supplementary Bids Round. Once the Bidder has confirmed its Supplementary Bids, the Bidder will not be able to revise or withdraw any of these Bids, or submit further Bids in the Supplementary Bids Round.
- 4.124 A Bidder is deemed not to have submitted Supplementary Bids until such time as confirmation of a valid set of Supplementary Bids is received by the EAS. Receipt of such confirmation will be communicated to the Bidder through the EAS. It is the responsibility of the Bidder to check receipt of the Supplementary Bids confirmation by the EAS, and to alert ComReg if problems are suspected to have prevented successful confirmation.

Restrictions on Bid Amounts for Supplementary Bids

- 4.125 Bid Amounts for Supplementary Bids must be specified in units of EUR 100.
- 4.126 The Bid Amount for a Package of Lots must not be lower than the sum of the Reserve Prices for all Lots included.
- 4.127 The Bid Amount for a Package of Lots for which the Bidder has made a Primary Bid must not be lower than the highest Bid submitted for the Package of Lots (regardless of whether this is a standard Primary Bid, Relaxed Primary Bid or Chain Bid).
- 4.128 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).
- 4.129 All Supplementary Bids for Packages of Lots other than the Final Primary Package are subject to a Final Price Cap (see below) relative to the Bid Amount submitted for the Final Primary Package.
- 4.130 For all Packages of Lots with Eligibility greater than the Bidder's Eligibility at the start of the final Primary Bid Round, the Bid Amount is also subject to a Relative Cap (see below).¹¹¹
- 4.131 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, then there is no cap on the Supplementary Bid Amount that can be submitted for the Final Primary Package.

¹¹¹ 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.

Final Price Cap¹¹²

4.132 For any Package of Lots X, 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

4.133 Relative Caps apply to Supplementary Bids for Packages of Lots with Eligibility greater than the Bidder's Eligibility at the start of the Final Primary Bid Round.

4.134 The Relative Cap limits the Supplementary Bid for a Package X based on the prices when the Bidder made the *first* Bid with Activity below the Eligibility of X. More specifically, let Y denote the Package subject to the *first* Bid with Activity below the Eligibility of X. In this case, the Supplementary Bid for X cannot exceed:

- the Bidder's highest Bid for Y (which may be a Primary Bid, a Relaxed Primary Bid, a Chain Bid or a Supplementary Bid); plus
- the difference between the price of X and Y when the Bidder made its *first* Bid for Y. (If Y is the Package subject to the Bidder's Initial Bid, then the difference in price between X and Y when the Bidder made its first Bid for Y is given by the Reserve Price of each Package. Otherwise, the difference in price between X and Y when the Bidder made its first Bid for Y is given by the price of each Package in the Primary Round in which the Bidder made its first Primary Bid for Y).

How caps apply to the Final Primary Package

4.135 If the Bidder submitted a Zero Bid in the final Primary Bid Round (regardless of whether the Bidder had already submitted a Zero Bid in an earlier Primary Bid Round), then the Final Price Cap means that all Supplementary Bids are constrained to be at most the price of the corresponding Package in the final Primary Bid Round.

4.136 Otherwise, there are two cases to consider, depending on whether or not the Bidder made a Relaxed Primary Bid in the final Primary Bid Round:

¹¹² See examples as per Annex 5.

- If a Bidder's Final Primary Package 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;
- 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 at the start of the final Primary Bid Round. The effect of this rule is that increasing the Bid for the Final Primary Package in the Supplementary Bids Round may require also increasing the Bids for the Packages subject to Eligibility-setting Bids with Activity strictly less than the Eligibility of the Final Primary Package. Provided that the Bids for all of these Packages are increased in step, there is no limit on their Bid Amounts.

4.137 Examples of this situation are discussed in Annex 5, which includes a comprehensive worked example.

Validity of Supplementary Bids

4.138 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 Spectrum Usage Fee over the duration of the Licence.

4.139 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.

4.140 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 Winner and Base Price Determination

4.141 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.

4.142 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.

4.143 Hereafter, within this section any reference to 'Bid' or 'Bids' is solely to Valid Bids.

Winner Determination

4.144 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.

4.145 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 unassigned if only the Bids in the combination are accepted.

4.146 The combination of Winning 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).

4.147 In the event that there are multiple Feasible Combinations of Bids with equal greatest value that meet the conditions above, the winning assignment will be the Feasible Combination of Bids amongst these tied scenarios with greatest total price for the assigned Lots valued at Reserve Prices.

4.148 In the unlikely event that the rules outlined at paragraphs 4.146 and 4.147 do not identify a unique Feasible Combination of Bids, then the winning assignment will be selected at random from all combinations of Bids that satisfy these rules.

Base Price determination

4.149 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).

4.150 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.

4.151 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 Winning Bid Amounts plus the value of any unassigned Lots at corresponding Reserve Prices.

4.152 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 meet 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.

4.153 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 amounts in units of EUR 100 they are rounded up to the nearest EUR 100.

4.2.5 Deposit Calls following the Supplementary Bids Round

4.154 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.

- 4.155 ComReg reserves the right to issue a Deposit Call of up to 100%¹¹³ of a Bidder's highest Bid at this point.
- 4.156 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 the bank account specified by ComReg during the Award Process (details of which are provided in Annex 3).
- 4.157 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.
- 4.158 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 any such Bidder and re-run the Winner and Price Determination algorithm excluding all Bids submitted by any such Bidder during the Award Process.

4.2.6 End of the Main Stage

- 4.159 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.
- 4.160 All Bidders will be informed of the number of Lots won by each Bidder in each Lot Category.
- 4.161 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

- 4.162 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.¹¹⁴
- 4.163 Winning Bidders awarded B-Lots will be able to participate in the Assignment Stage as part of an Alliance, formed with one or more other Winning Bidders.

¹¹³ The Bidder may be required to increase its Deposit above 100% of its highest Bid if monies held by ComReg are subject to negative interest rates. Any such increase will simply reflect the deficit in the Deposit held by ComReg which would otherwise result from a negative interest rate applied to Exchequer Notes held by ComReg. See Section 3.3.3 above.

¹¹⁴ 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).

4.164 The Assignment Stage initially establishes a Provisional Frequency Plan by determining a specific frequency assignment for each Winning Bidder, or Alliance of Winning Bidders, awarded frequency-generic B-Lots. For any Alliance formed, the Provisional Frequency Plan will be established as if each Alliance were a single entity. For this reason, the term 'Assignment Bidder' is used to reference individual entities considered for determining the Provisional Frequency Plan in the Assignment Stage. That is, an Assignment Bidder is either:

- a single Winning Bidder participating independently in the Assignment Stage; or
- a group of Winning Bidders participating as an Alliance in the Assignment Stage.

4.165 The determination of a Provisional Frequency Plan may require an Assignment Round, in which Assignment Bidders are able to express their preferences over the various possible assignments available to them in relation to the B-Lots. Assignment Bidders may be required to pay an amount (the Additional Price) in addition to their Base Prices for the specific frequencies assigned to them.

4.166 A-Lots specify predetermined frequency assignments; therefore frequency assignments for A-Lots do not need to be determined in the Assignment Stage.

4.167 Following the determination of the Provisional Frequency Plan, 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 above state services in one or more Regions, subject to a number of restrictions and approval of ComReg.

4.168 The frequency assignments established following the Negotiation Phase would form the Final Frequency Plan.

4.3.1 Need for an Assignment Round

4.169 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 the Assignment Bidders awarded frequency-generic B-Lots, subject to the requirements that:

- for each Region in which an Assignment Bidder won B-Lots in the Main Stage, the Assignment Bidder is awarded a contiguous block of spectrum within the Region, in accordance with the number of B-Lots it won in that Region;

- any option for assigning frequencies to a particular Assignment Bidder is consistent with all other Assignment Bidders each receiving contiguous spectrum in every Region;
- any Assignment Bidder that has been awarded exactly the same number of B-Lots in every Region is assigned the same frequencies in each Region;
- subject to the previous requirements being satisfied, for Assignment Bidders that have been awarded B-Lots in multiple Regions, the options presented will be those which maximise the extent to which the same frequencies are assigned in each Region¹¹⁵; and
- subject to the previous requirements being satisfied, the extent to which unassigned spectrum rights of use can be combined into the fewest number of contiguous blocks is maximised.

In accordance with these principles, ComReg will establish the feasible frequency assignments through the procedure set out in Annex 9. This procedure ensures that Assignment Bidders are offered alternative positions in the band.

4.170 Each possible assignment of frequencies across all Assignment Bidders and Regions is referred to as a 'frequency plan'. Note that the frequencies assigned in relation to the A-Lots are predetermined and so are fixed across all frequency plans.

4.171 An Assignment Round is required if there are multiple frequency plans that meet the criteria specified above, and there is a need to select one for the formation of the Provisional Frequency Plan.

4.3.2 Participating as an Alliance in the Assignment Stage

4.172 As stated above, Winning Bidders that have been awarded at least one B-Lot may choose to bid together as an Alliance in the Assignment Stage.

4.173 For each Alliance established:

- Assignment Options will be generated as if the members of the Alliance were a single Winning Bidder that had won all of the B-Lots won by the Alliance members in the Main Stage combined; and

¹¹⁵ This is implemented through the procedure presented in Annex 9. In summary, this procedure eliminates Assignment Options with poor alignment of frequencies assigned to each Bidder across different Regions and, for the remaining options, uses unassigned Lots to pad the frequency boundaries between Bidders in specific Regions to improve frequency alignment across Regions.

- the Alliance will submit Assignment Bids or decisions as a single entity during the Assignment Round, using the bidding credentials of a designated Alliance member (the Leading Member).

4.174 Given the limited time available for the formation of such Alliances, it is desirable to ensure that appropriate powers of Authorised Agents are in place at the time of Application. Accordingly, if Applicants wish to have the ability to participate in the Assignment Stage as part of an Alliance, Authorised Agents must further be authorised to delegate the power to make Assignment Stage Bids to up to two Authorised Agents of another member of the Alliance (the “Leading Member”), which are binding on the Applicant on a joint and several basis with all members of the Alliance. Alliance members may put whatever private contractual protections they wish in place between themselves so long as such protections do not undermine ComReg’s ability to rely on such Assignment Bids.

4.175 Winning Bidders will be given a period of ten clear Working Days following the announcement of the Main Stage outcome in which to form any Alliances and provide written notification¹¹⁶ to ComReg of:

- the identity of each Winning Bidder to be included in the Alliance; and
- the identity of a nominated Alliance member (the Leading Member) whose bidding credentials will be used by the Alliance for submitting Assignment Bids and decisions during the Assignment Round.

4.176 The Leading Member of an Alliance will be primarily responsible for:

- payment of any Additional Price relating to the Alliance’s winning Assignment Bid;
- payment of any Deposit increase required by ComReg following the Assignment Round in relation to any Assignment Bids submitted by the Alliance; and
- notifying ComReg of the specific frequencies to be assigned to each Alliance member during the Negotiation Phase.

4.177 Alliance members will be jointly and severally liable for payment of the Deposit relating to the Assignment Bids submitted by the Alliance and the payment of any Additional Price. Should the Leading Member fail to transfer the required funds, ComReg reserves the right to require payment from other Alliance members (see also paragraph 4.211 below).

4.178 A Winning Bidder can be part of at most one Alliance.

¹¹⁶ The Alliance Notification Form provided in Annex 4 must be completed and submitted to ComReg

- 4.179 The formation of an Alliance is prohibited if the total amount of spectrum awarded to the proposed Alliance members would exceed the Competition Cap of 150 MHz in any Region.
- 4.180 Before the start of an Assignment Round, ComReg will notify all Winning Bidders of the formation of any Alliances and the identities of the Alliance members.
- 4.181 Before the end of the Negotiation Phase (see Section 4.3.11 below), the Leading Member of an Alliance will be required to notify ComReg of the specific frequencies to be assigned to each Alliance member, subject to the requirement that in each Region, every Alliance member is awarded a contiguous block of spectrum within the Region in accordance with the number of B-Lots it won and the frequency range assigned to the Alliance in that Region.
- 4.182 If an Alliance fails to notify ComReg of the frequency assignments for members within the time allowed, frequency assignments for the Alliance members will be determined by ComReg.

4.3.3 Assignment Options

- 4.183 If an Assignment Round is required, for each Assignment Bidder the set of feasible frequency plans identified has an associated set of unique frequency assignments that could be assigned to that Assignment Bidder. These are the Assignment Bidder's 'Assignment Options'. The number of Assignment Options available to an Assignment Bidder will be less than or equal to the number of possible frequency plans.¹¹⁷
- 4.184 During the Assignment Round, an Assignment Bidder with multiple Assignment Options will be invited to either:
- submit Assignment Bids for its Assignment Options in the case that its choice of option could conflict with the choice of option of another Assignment Bidder;¹¹⁸ or
 - select its most preferred frequency assignment from amongst the Assignment Options available to it, in the case that its choice of option

¹¹⁷ For example, there may be ten frequency plans that meet the requirements, but the specific assignments for a particular Bidder can only be accommodated in one of two ways in each of the frequency plans. In this case, the Bidder will have only two Assignment Options.

¹¹⁸ For example, if Bidder A and Bidder B win all of the B-Lots in a given Region (and suppose they only win Lots in that Region), 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.

cannot conflict with the choice of option of another Assignment Bidder (if any).¹¹⁹

4.185 In the case that only one Assignment Option is available for an Assignment Bidder that Bidder will simply be assigned the corresponding frequencies and will not participate in the Assignment Round.

4.3.4 Schedule for the Assignment Round

4.186 After the Main Stage (or after the Qualification Stage if a Main Stage is not required) a period of ten clear Working Days will be afforded to Winning Bidders to establish Alliance(s).

4.187 ComReg will then notify all Assignment Bidders of the schedule for the Assignment Round.

4.188 Upon scheduling of the Assignment Round, the EAS¹²⁰ will inform each Assignment Bidder of its Assignment Options, if applicable.

4.189 There will be at least two clear Working Days from the notification of the Assignment Options to Assignment Bidders until the start of the Assignment Round.

4.190 ComReg has discretion over the start time and duration of the round. However, ComReg anticipates that the Assignment Round will take place between 09.00 and 18.00 hours on a single Working Day, and last for at least 2 hours.

4.191 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 Extensions. 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 Primary Bid Rounds.

¹¹⁹ Suppose a Bidder is the only winner of B-Lots in a given Region (and the Bidder does not win spectrum in any other Region). According to the rules for Assignment Option generation, the frequencies assigned to the Bidder could be positioned at the top or the bottom of the frequency range associated with the B-Lots. If there are no unsold Lots in any other Region, the Assignment Option that is ultimately adopted for that Bidder has no impact on any other Bidder's chances of being awarded its preferred frequencies, and so there is no need to use a bidding process for choosing between the two. Instead, the Bidder is allowed to simply choose which of the two options it would like to be assigned.

¹²⁰ Alternatively, in exceptional circumstances, ComReg reserves the right to run the Assignment Round via other means (e.g. sealed envelopes).

4.3.5 Selection of Assignment Option without bidding

- 4.192 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 will be able to do so using the EAS.
- 4.193 The EAS will provide each relevant Assignment Bidder with the functionality to choose its preferred Assignment Option and submit the decision.
- 4.194 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.
- 4.195 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.
- 4.196 The Additional Price for any Assignment Bidder who can select an Assignment Option without bidding will be zero.

4.3.6 Assignment Bid Submission

- 4.197 When the Assignment Round is in progress, a participating Assignment Bidder with the option to submit Assignment Bids may do so for some or all of its Assignment Options.
- 4.198 The EAS will provide each relevant Assignment Bidder with the functionality to check and confirm Assignment Bids through a two-step submission process.
- 4.199 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 Amounts for Assignment Options.
- 4.200 Note that all Assignment Bidders are guaranteed to be assigned the amount of spectrum in each Region 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.
- 4.201 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).
- 4.202 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 a Bid.

4.203 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

4.204 Each Assignment Bid submitted in accordance with the Auction Rules is considered to be a Valid Bid.

4.205 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.

4.206 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 Auction 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, all of the Assignment Bidder's Assignment Bids may be voided (as set out in Section 4.3.8);
- an Assignment Bidder is excluded from the Auction, pursuant to the Auction Rules, in which case all of that Assignment Bidder's Assignment Bids may be voided; or
- ComReg voids the Assignment Round or all Bids submitted in the Auction (as set out in Section 4.1.6), in which case all Assignment Bids submitted by every Assignment Bidder may be voided.

4.3.8 Deposit Call following the Assignment Round

4.207 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%¹²¹ of the amount required to ensure that the Assignment Bidder's Deposit is equal to the sum of its Base Price and the amount of its highest Assignment Bid. For an Alliance, this will be calculated on the basis of

¹²¹ The Bidder may be required to increase its Deposit above 100% of its highest Bid if monies held by ComReg are subject to negative interest rates. Any such increase will simply reflect the deficit in the Deposit held by ComReg which would otherwise result from a negative interest rate applied to Exchequer Notes held by ComReg. See Section 3.3.3 above.

the Deposit and Base Price for the Leading Member responsible for submitting Assignment Bids and paying the Additional Price for the Alliance.

- 4.208 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 the bank account specified by ComReg during the Award Process (details of which are provided in Annex 3).
- 4.209 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.
- 4.210 In the event that ComReg issues a Deposit Call following the completion of the Assignment Round but before the results of the Assignment Round have been announced to Bidders, and one or more Assignment Bidders¹²² do not provide their required funds by the deadline set by ComReg, ComReg reserves the discretion to void all of the Assignment Bidder's Assignment Bids (setting them to zero) before running the Winner and Price Determination algorithm.¹²³
- 4.211 In the case that an Assignment Bidder is an Alliance of Winning Bidders, the transfer of funds for the Deposit should be made by the Leading Member nominated on formation of the Alliance, as set out in Paragraph 4.175. Notwithstanding this, Alliance members will be jointly and severally liable for payment of the Deposit relating to the Assignment Bids submitted by their corresponding Assignment Bidder. Should the Leading Member fail to transfer the required funds, ComReg reserves the right to require payment from other Alliance members.

4.3.9 Winner and Additional Price Determination

Determination of winning Assignment Options

- 4.212 Following the end of the Assignment Round, ComReg will determine the Assignment Option awarded to each Assignment Bidder, based on Assignment Bids submitted during the Assignment Round.
- 4.213 The winning Assignment Bids are the combination of valid Assignment Bids of greatest total value amongst all valid Assignment Bids submitted, subject to the conditions that:

¹²² In respect of an Alliance, the Leading Member is responsible for transferring the required funds.

¹²³ 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 Frequency Plan.

- exactly one Assignment Bid is accepted from each Assignment Bidder; and
- the specific frequency assignments corresponding to the set of winning Assignment Bids correspond to one of the possible frequency plans identified by ComReg.

4.214 In the unlikely event that more than one combination of Assignment Bids meeting the conditions above have equal highest total value, one combination will be selected at random.

Additional Price Determination

4.215 Following the determination of winning Assignment Bidders, Additional Prices will be determined.

4.216 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.

4.217 Additional Prices are determined jointly for all Assignment Bidders in a single calculation. A unique set of Additional Prices 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 must be 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 requirement, the set(s) of Additional Prices that 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

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.

4.218 These requirements characterise a unique Additional Price for each Assignment Bidder that is no more than their winning Assignment Bid. Finally, if these Additional Prices are not amounts in whole euros, they are rounded up to the nearest whole euro.

4.3.10 End of the Assignment Round

4.219 Once ComReg has determined frequency assignments for Assignment Bidders and any Additional Prices (whether an Assignment Round was required or not) these, along with the frequency assignments relating to the A-Lots awarded, will form the Provisional Frequency Plan.

4.220 Bidders will be informed of the specific frequency ranges assigned to each Assignment Bidder in each Region. Where a frequency range is assigned to an individual Bidder, the identity of that Bidder will be revealed. In the case that the frequency range has been assigned to an Alliance, the identity of the members in the Alliance and the Leading Member will be provided.

4.221 Each Assignment Bidder will also be told the Additional Price that will apply to its own winning Assignment Bid.

4.222 From this point, it is considered that the Negotiation Phase is in progress.

4.3.11 Negotiation Phase

4.223 Following the completion of the Assignment Round and announcement of the Provisional Frequency Plan and Additional Prices, Assignment Bidders will be allowed a period of ten clear Working Days (the Negotiation Phase) in which:

- Assignment Bidders¹²⁴ may communicate with each other to negotiate a re-organisation of the frequency assignments in the frequency range 3 475 – 3 800 MHz in each Region; and
- the Leading Member of each Alliance should inform ComReg of the specific frequencies to be assigned to each Alliance member.

Any frequency assignment proposed to ComReg is subject to all Winning Bidders receiving contiguous blocks of spectrum (above and below State

¹²⁴ For the avoidance of doubt an Alliance negotiates in the Negotiation Phase as a single entity i.e. Members of an Alliance cannot negotiate individually during the Negotiation Phase.

Services), in accordance with the amount of spectrum awarded to them in each Region in the Main Stage.

4.224 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

4.225 All Assignment Bidders will have the opportunity to agree amongst themselves an alternative configuration of the frequency assignments in the frequency range 3 475 – 3 800 MHz (relative to the Provisional Frequency Plan) within each Region.

4.226 Specifically, for any given Region, two or more Assignment Bidders awarded B-Lots within the Region may agree on a re-organisation of the specific frequencies assigned to them in the frequency range 3 475 – 3 800 MHz within that Region, provided that:

- following the re-organisation, each of the parties involved is assigned the same total amount of contiguous spectrum within the Region as was awarded to them in the Main Stage;
- all other Assignment Bidders are unaffected by the re-organisation.

4.227 For the avoidance of doubt:

- Assignment Bidders will not be allowed to 'swap' frequencies across Regions; and
- Assignment Bidders will only be allowed to 'swap' their frequencies as a whole.

4.228 If Assignment Bidders are able to successfully negotiate and agree on an alternative frequency plan for one or more Regions, 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 Frequency Plan.

4.229 ComReg reserves the right to refuse any or all requests for amendments to frequency assignments, relative to the Provisional Frequency Plan.

4.230 If Winning Bidders do not submit a request for an alternative configuration of frequency assignments, ComReg will rely on the Provisional Frequency Plan (and valid frequency assignments for Alliance members notified to ComReg).

Frequency assignment for Alliance members

4.231 Before the end of the Negotiation Phase, Leading Members of Alliances must provide written notification to ComReg of the specific frequency assignments (in relation to the B-Lots) for each Alliance member.

4.232 The frequency assignments proposed must be such that, in every Region:

- each Alliance member receives a contiguous block of spectrum corresponding to the number of B-Lots awarded to it in that Region; and
- the frequency assignments for each Alliance member are within the contiguous block of frequencies assigned to the Alliance within the Region, as set out in the Provisional Frequency Plan and subject to any further negotiations the Alliance might have made with other Assignment Bidders during the Negotiation Phase.

4.233 Valid frequency assignments will be adopted in the Final Frequency Plan.

4.234 If the Leading Member does not submit a proposal for frequency assignments for all members of the corresponding Alliance to ComReg before the end of the Negotiation Phase, or if the proposed frequency assignments are invalid according to the Auction Rules, the frequencies to be assigned to each Alliance member will be determined by ComReg at its absolute discretion.

4.3.12 End of the Assignment Stage

4.235 Once ComReg has determined the Final Frequency Plan (the specific frequencies to be assigned to each Winning Bidder), the outcome of the Assignment Stage will be notified to Bidders.

4.236 The following information will be released:

- Each Bidder will be informed of the specific frequency ranges assigned to each Winning Bidder.
- Each Assignment Bidder will be informed of the Additional Price 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

4.4.1 Closing of the Auction

4.237 The Auction ends with the completion of the Assignment Stage. At this point, the results of the Auction will be released to all Bidders and in tandem made public.

4.238 The following information will be released to all Bidders:

- the identity of the Winning Bidders;
- the frequency ranges awarded to each Winning Bidder in each Region;
- the Base Price to be paid by each Winning Bidder; and
- any Additional Price for specific frequency assignments to be paid by each Assignment Bidder.

4.4.2 Upfront Fees

4.239 The Upfront Fee for each Winning Bidder that participated individually in the Assignment Stage will be the sum of their Base Price plus any Additional Price for the specific frequencies assigned to them (in the Assignment Stage).

4.240 Where Winning Bidders participated as an Alliance in the Assignment Stage, the Upfront Fee for the Leading Member will be the sum of its Base Price plus any Additional Price for the Alliance; the Upfront Fee for any other Alliance member will be its Base Price. Therefore, Alliance members will need to agree internally any apportionment of the Alliance's Additional Price amongst themselves. Notwithstanding the Leading Member's responsibility to pay the Additional Price for the Alliance, Alliance members will be jointly and severally liable for the payment of any Additional Price for the Alliance.

4.241 Each Winning Bidder must pay its Upfront Fee 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 prospective Bidders 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 prospective Bidders and their agents in preparing for and understanding the Award Process. This Information Memorandum may not be used for any other purpose and, when using it for the stated purposes above, prospective Bidders are strictly subject to the terms and conditions set out in this Information Memorandum.
- 5.2 In this Information Memorandum an “**Interested Party**” shall have the meaning ascribed to this expression in the Glossary to this Information Memorandum.
- 5.3 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.
- 5.4 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.
- 5.5 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 2.4.7 of this Information Memorandum.

- 5.6 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;
 - ii. they will be awarded any spectrum 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 in 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.
- 5.7 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.
- 5.8 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.
- 5.9 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.
- 5.10 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 5.32 of this Chapter 5.

- 5.11 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.
- 5.12 Any conflict of interest or potential conflict of interest – including but not limited to any conflict arising under the rules set out in Sections 3.3.4 and 3.3.5 of this Information Memorandum – must be disclosed to ComReg by any Interested Party or by any prospective or actual Bidder 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.
- 5.13 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;
 - Consultation 15/70;
 - Response to Consultation and Draft Decision 15/140; and
 - Response to Consultation and Decision 16/57.

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.

- 5.14 No legal obligations on the part of ComReg to grant any Licensees will arise unless and until the granting and commencement of a Licence or Licences by ComReg following the completion of the Award Process.
- 5.15 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).
- 5.16 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

- 5.17 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 **16 November 2016**. 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); and
 - iii. the Auction Rules and Transition Rules described in Section 5.2.3 below.
- 5.18 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.

- 5.19 All Applications will be assessed in accordance with Section 3.3 of this Information Memorandum.
- 5.20 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 5.15 above, 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 **16 November 2016**, such Applicant will remain bound by the contract described in paragraph 5.15.

5.2.2 Canvassing

- 5.21 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 Auction and Transition Rules / Bidder behaviour / Improper Influence

- 5.22 The Award Process and Auction 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 above and by submitting an Application, the Applicant agrees to be bound by and to comply with the Auction Rules and the Transition Rules. Without prejudice to the detailed Auction 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

- 5.23 No publicity whatsoever regarding this Information Memorandum and/or Award Process is permitted 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.

- 5.24 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 Information¹²⁵, 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 related Licence or Licences at any time.
- 5.25 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 a Bidder 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

- 5.26 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 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

- 5.27 The publication of this Information Memorandum does not warrant or imply that any Interested Party will be awarded a Licence or Licences.
- 5.28 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, for any reason whatsoever at its discretion:
- to reject Applications which do not comply with the Auction Rules;
 - not to proceed with any part of the Award Process described in this Information Memorandum;

¹²⁵ ComReg Guidelines on the treatment of confidential information, Document 05/24.

- 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

5.29 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.

5.30 This applies in all cases, including if the Award Process is suspended or terminated for any reason whatsoever.

5.2.8 Waiver

5.31 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

5.32 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

- 5.33 The conclusion of the Award Process as set out in Section 4.4, 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.
- 5.34 Additional continuing obligations are imposed on Applicants pursuant to the contract formed by Section 5.2.1 of this Chapter.

Annex 1: Glossary

A1.1 Definitions

- A 1.1 The definitions in this glossary shall apply to this Information Memorandum as a whole save that they shall not apply to the final 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 Information Memorandum 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 Information Memorandum or the Annexes or Schedules hereto.
- A 1.6 Terms defined in this Information Memorandum shall, unless the context otherwise requires or admits, have the meaning set out below:

3.6 GHz Band	The radio frequency spectrum in the range 3 400 MHz to 3 800 MHz.
3.6 GHz Band Liberalised Use Licence	A Licence in the form as set out in Schedule 1 of the Regulations, which entitles the holder to use certain specific Lots of spectrum in the 3.6 GHz Band in one or more than one Region, subject to the terms and conditions set out therein.
3.6 GHz Band Preparatory Licence	A Licence in the form as set out in Schedule 3 of the Regulations, which entitles the holder to possess and install Apparatus designed or configured for operation in certain specific Lots of spectrum in the 3.6 GHz Band in one or more than one Region,

	but which does not permit any wireless telegraphy transmissions, subject to the terms and conditions set out therein.
3.6 GHz Band Spectrum Lease Licence	A Licence in the form as set out in Schedule 2 of the Regulations, which entitles the holder to use certain specific Lots of spectrum in the 3.6 GHz Band in one or more than one Region, subject to the terms and conditions set out therein.
3.6 GHz Band Transition Protected Licence (TPL)	A Licence in the form as set out in Schedule 4 of the Regulations, which entitles the holder to keep and have possession of Apparatus for the provision of FWA services in one or more than one FWALA Service Area, subject to the terms and conditions set out therein.
3.6 GHz Band Transition Unprotected Licence (TUL)	A Licence in the form as set out in Schedule 4 of the Regulations, which entitles the holder to keep and have possession of Apparatus for the provision of FWA services in one or more than one FWALA Service Area on a Non-Interference and Non-Protected Basis, subject to the terms and conditions set out therein.
A-Lot	A single 25 MHz frequency-specific Lot using the frequency range 3 410 MHz – 3 435 MHz in each region.
Activity	In a given Primary Bid Round, the number of Eligibility Points Associated with the Bid submitted by a Bidder in that round.
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	The price Associated with the assignment of B-Lots as a result of the Assignment Stage of the Award Process. This price will be determined in the Assignment Stage using an Opportunity Cost pricing methodology, and will be no greater than the amount Bid by the winning Assignment Bidder for these specific Lots.

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.
Aggregate Misalignment	The sum of the Misalignments of all the individual frequency assignments under that frequency plan.
Aggregate RBV	The sum of RBV of all subgroups in the partition.
Alliance	<p>A group of Winning Bidders who are permitted to coordinate at the beginning of the Assignment Stage to participate together as one Assignment Bidder, which will be presented with Assignment Options in the Assignment Round to Bid on as if it were a single Winning Bidder.</p> <p>Assignment Options would be generated for the Alliance as a whole, as if the Alliance members were a single Winning Bidder (winning all frequency-generic Lots awarded to the individual Alliance members in the Main Stage).</p>
Alliance Notification Form	<p>The Alliance Notification Form, as set out in Annex 4 of this Document, to be submitted by Winning Bidders to ComReg wishing to notify ComReg of the formation of an Alliance consisting of:</p> <ul style="list-style-type: none"> • Part 1: Administrative Information • Part 2: Alliance Declaration.
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 the 3.6 GHz Band
Applicant	An Entity that submits an Application to ComReg to be assigned at least one Lot of the Lots being made available in the Award Process.
Applicant Declaration	Part 2 of the Application Form.
Application	The Application to participate in the Award Process made by an Applicant.

	A valid Application is a binding commitment to pay the sum of the Reserve Prices (and SUFs) for all Lots contained in the Package of Lots specified on the Applicant's Lot Application Form.
Application Date	The date by which Interested Parties must submit an Application to participate in the Award Process together with the required monetary Deposit.
Application Form	The application form, as set out in Annex 5 of this Document, to be delivered as part of an Application consisting of: <ul style="list-style-type: none"> • Part 1: Administrative Information • Part 2: Applicant Declaration • Part 3: Initial Bid Form • any supporting documentation required to be delivered including Ownership Structure
Application Stage	The stage of the Award Process described in Section 3.3 of this Information Memorandum, which runs from the day on which the Information Memorandum is published up to and including the Application Date.
Assignment Bid	A bid submitted during the Assignment Round by an Assignment Bidder for an Assignment Option.
Assignment Bidder	Each individual entity considered for determining the Provisional Frequency Plan in the Assignment Stage. An Assignment Bidder is either: <ul style="list-style-type: none"> • a single Winning Bidder participating independently in the Assignment Stage; or • an Alliance comprising a group of Winning Bidders.
Assignment Options	The set of unique feasible assignments that could be assigned to each Assignment Bidder. The number of Assignment Options available to an Assignment Bidder will be less or equal to the possible number of Candidate Frequency Plans.
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 within the frequency range 3 475 MHz – 3 800 MHz in each Region.
Assignment Stage	The stage of the Auction where Assignment Bidders are assigned specific Lots in accordance with the number of Lots they have won either from their Initial Bid or from the results of the Main Stage of the Award.
Associate	As defined in Annex 8 of the Information Memorandum.
Associated Bidders	As defined in Annex 8 of the Information Memorandum.
Auction	The mechanism 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 Day	A day upon which one or more rounds of the Auction are scheduled to run.
Auction Rules	Rules and procedures relating to the Auction, as presented in this Information Memorandum and its Annexes.
Auctioneer	ComReg.
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 3.6 GHz Band in the event that at least one Applicant submits a valid Application for at least one Lot at the stated Reserve Prices.
Award Spectrum	The radio frequency spectrum in the range 3 410 – 3 435 MHz and 3 475 – 3 800 MHz

B-Lot	Sixty five (65) 5 MHz frequency-generic Lots in the 3 475 MHz – 3 800 MHz frequency range in each Region.
Base Price	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 an opportunity cost rule).
Bid	A binding offer to buy a Package of Lots for 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.
Bidder	An Interested Party that has both submitted an Application and associated initial Deposit to ComReg to be assigned a Package of Lots in the Award Process (thereby becoming an Applicant) and had its Application approved by ComReg, qualifying it to either be assigned such Lots (where a Main Stage of the Award Process is not required) or to compete for Packages of Lots in the Auction.
Bidding Group	A Bidder and its Connected Persons as defined in Annex 8 of the Information Memorandum.
Bidder Materials	Information made available to Bidders regarding the EAS
Candidate Frequency Plan	A frequency plan constructed from the Assignment Bidder orderings and re-arrangements of unassigned blocks in accordance with the rules on Assignment Option generation. The Candidate Frequency Plans correspond to the Assignment Bidders' Assignment Options. One of the Candidate Frequency Plans becomes the Provisional Frequency Plan.
Centre Point	The geographic location at the centre of an Existing Licence to which a 3.6 GHz Band Transition Protected Licence (TPL) or 3.6 GHz Band Transition Unprotected Licence (TUL) relates as the case may be.
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.
Communications Provider	A provider of electronic communications networks or services as those terms are defined in the Framework Regulations.
Competition Cap	Explicit maximum limits set on the amount of spectrum that any one Bidder can be awarded in the Award Process. All Bidders are subject to a Competition Cap of 150 MHz in each Region. The Competition Cap only applies for the duration of the Award Process.
Confidential Information	Details of what may constitute Confidential Information for the purposes of this Award Process are provided in Section 3.3.5.
Connected Person	Shall have the meaning ascribed to it in Annex 8 of the Information Memorandum.
Constrained Package	Any Package of Lots subject to the Relative Cap in the Supplementary Bids Round.
Constraining Package	The Package of Lots that originated the Relative Cap and is either the Package of the Primary Bid that led to the Bidder losing Eligibility or where a Bidder wishes to Bid above Initial Eligibility, the Package of the Bidders Initial Bid. Shall have the meaning ascribed to it in Chapter 3 of the Information Memorandum.
Constraining Price Differential	The difference in the price between the Constrained Package of Lots and the Constraining Package of Lots at the time in which the Bidder chose to make that Bid for the Constraining Package
Controlled Person	As defined in Annex 8 of the Information Memorandum.
Controlling Person	As defined in Annex 8 of the Information Memorandum.
CPI	Consumer Price Index as published by the Central Statistics Office of Ireland

	Note: In some documents prepared by DotEcon, published alongside this Information Memorandum, CPI refers to consumer price indices published by the World Bank in respect of multiple jurisdictions.
Deposit	<p>A monetary amount lodged 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 be equal to the sum of the Reserve Prices of Lots specified by the Applicant in its Lot Application Form.</p> <p>If a Main Stage and /or an Assignment stage of the Auction is required, ComReg may require that this Deposit be increased, as described in this Information Memorandum, during the Primary Bid Rounds, Supplementary Bids Round or Assignment Round.</p>
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.
Draft Regulations	Means the Wireless Telegraphy Draft Regulations as set out in Annex 2 of this document.
Drive Test Measurement	Measurements collected using a motor vehicle
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 Main 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 Primary Bid Round of the Auction, other than by submitting a Relaxed Primary Bid. This is expressed as a number of Eligibility Points and is calculated for each Lot Category in each Region and is equal to:</p> <ul style="list-style-type: none"> • In the first Primary Bid Round, the number of Eligibility Points Associated with a Bidder's Application, as specified on its Lot Application Form (its Initial Eligibility); and • In subsequent Primary Bid Rounds, the number of Eligibility Points Associated with a Bidder's Bid for Lots in the previous round.

Eligibility Points	The numerical expression of a Bidder's ability to make further Bids.
Existing Licence	A Licence currently held under the Wireless Telegraphy (Fixed Wireless Access Local Area Licence) Regulations, 2003 (S.I. No. 79 of 2003).
Existing Licensee	A holder of an Existing Licence.
Extension	An extension of the deadline for submission of a Bid in the round (or Bids in the case of the Supplementary Bids Round) by up to 30 minutes for the Bidder (or Bidders) that have utilised an Extension right in the round. 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 (or Bids in the Supplementary Bids Round) by the scheduled end time of the round.
Final Frequency 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	The Package of Lots Bid for by a Bidder in the final Primary Bid Round.
FWA or Fixed Wireless Access	The wireless provision of Electronic Communications Services between a single base station at a fixed location and multiple subscriber terminal stations at fixed locations where the base station is connected to an Electronic Communications Network
FWALA Service Area	The geographic area defined by way of a circle around the Centre Point with a maximum radius of 20km from that Centre Point

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.
Guard Band Spectrum	Radio frequency spectrum in the range 3 400 MHz to 3 410 MHz.
Information Memorandum	This Information Memorandum including all of the Annexes and Schedules hereto.
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 Application Form, submitted to ComReg at the Application Stage.
Indexation	The adjustment of prices for inflation. The index of inflation that will be used will be the Consumer Price Index as published by the Central Statistics Office.
Insider	Shall have the meaning ascribed to it in Section 3.3.5
Interested Party	Includes, to the extent that the context requires or admits, any of the following: <ul style="list-style-type: none"> • a respondent to the draft Information Memorandum; • a prospective Bidder; • an Applicant; • a Bidder; or • an agent of any of the foregoing.
Leading Member	The Alliance member designated by the Alliance to submit Assignment Bids or decisions for the Alliance during the Assignment Stage

Lease	The leasing by a Licensee (“the Lessor”) of some or all of a right of use granted under a 3.6 GHz Band Liberalised Use Licence to another party (“the Leaseholder”) for a period less than the entire remaining duration of the right of use, after which the right of use reverts to the Lessor.
Licence	A 3.6 GHz Band Liberalised Use Licence, a 3.6 GHz Band Preparatory Licence, a 3.6 GHz Band Transition Protected Licence (TPL), a 3.6 GHz Band Transition Unprotected Licence (TUL), a 3.6 GHz Band Spectrum Lease Licence or an Existing Licence as the case may be and “Existing Licensee” and “Licensee” shall be construed accordingly.
Lot	A 5 MHz or 25 MHz block of spectrum in the 3.6 GHz Band.
Lot Category	Lots are divided into 18 Categories A1-A9 and B1-B9, two Lot Categories for each Region as further defined in Section 3.1
Main Stage	The stage of the Auction that determines the number of Lots assigned to different Bidders and the associated prices in the case where there is excess demand for Lots in any of the Lot Categories expressed by Bidders at the Application Stage. This consists of a number of Primary Bid Rounds and a Supplementary Bids Round.
Misalignment	The Misalignment of an Assignment Bidder’s frequency assignment is the difference between the number of different 5 MHz frequency blocks assigned to the Assignment Bidder in one or more Regions and the maximum number of B-Lots assigned to that Assignment Bidder in any single Region.
Negotiation Phase	The two week period allowed after the Assignment Round where Assignment Bidders can attempt to agree an alternative frequency plan.
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 Upfront Prices are paid by Winning Bidders, less their Deposits and Licences are granted to Winning Bidders and Deposits are returned to Unsuccessful Bidders.
Notional Bidder	For the purpose of determining Assignment Bidder orderings a Notional Bidder is created who is assigned all B-Lots that have been unassigned at the end of the Main Stage.
Opportunity Cost	Shall have the meaning ascribed to it in paragraph 4.151
Ownership Structure Document	Shall have the meaning ascribed to it in Section 3.3.2
Package of Lots / Package	<p>A selection of one or more Lots:</p> <ul style="list-style-type: none"> • Specified in a Bidder's Application; • Bid for in one or more Primary Bid Rounds; and/or • Bid for in the Supplementary Bids Round. <p>Such a selection of Lots will only be considered in its entirety, in combination with the Associated Bid Amount, in determining the Winning Combination of Bids and Associated Base Prices.</p>
Payment Deadline	The last day upon which Winning Bidders can increase their Deposits to the level of their Upfront Fee in order to receive 3.6 GHz Band Liberalised Use Licences for the Lots assigned to them within the Award Process.
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 Frequency 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 Frequency Plan will be the unique frequency assignments for each Assignment Bidder.</p>
Qualification Stage	A stage of the Award Process during which ComReg assesses Applications to be assigned Lots in the Award Process submitted before the deadline for Applications, evaluates which Applications are valid and determines which Applicants qualify to become Bidders in the Award Process. Based on the level of demand for Lots by Bidders, these Bidders will either be assigned the Lots in their respective Applications or Bid for Lots in the Main Stage of the Auction.
Region	Each of the nine distinct non-overlapping regional areas of the State as defined in Section 2.2 where A-Lots and B-Lots are available for assignment.
Regional Bandwidth Variation (RBV)	The difference between the maximum and the minimum number of B-Lots assigned to the Assignment Bidder or group of Assignment Bidders across all Regions.
Regulation	Regulations intended to be made by ComReg, subject to obtaining the prior consent of the Minister, in the form of the Draft Regulations, as may be amended prior to enactment.
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	A Primary Bid submitted by a Bidder whose Activity exceeds the Bidder's Eligibility to Bid in one or more Regions 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.

Reserve Price	The minimum Bid for a Lot for such a Lot to be assigned. This minimum Bid might be met based on demand expressed by Applicants at the Application Stage or in the Main Stage of the Auction.
Round Price	The Price per Lot within a specified Lot Category in a given round.
Round Schedule	The scheduled start and end time of a round.
Spectrum Usage Fees (SUFs)	Annual Fees which a successful Bidder must pay in respect of spectrum rights of use assigned in the Award Process.
State Services Spectrum	Radio frequency spectrum in the range 3 435 MHz to 3 475 MHz.
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.
Transition Activities	Adjustments as maybe required by Existing Licensees 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	The process of completing all Transition Activities.
Transition Plan	A plan which outlines interim milestones for Transition Activities for Existing FWALA Licensees.
Transition Plan Proposals	Proposals formulated by Winning Bidders and Existing Licensees who have agreed to abide by the Transition Rules.

Transitional Rules	Rules regarding Transition, as set out in Section 3.8 of this document
Unsuccessful Bidder	An Interested Party that submits an Application to ComReg to be assigned Lots in the Award Process, is declared a Bidder but is not assigned any Lots in the Auction.
Upfront Price/Upfront Fee	The sum of the Base Price and any Additional Prices to be paid by a Winning Bidder for the spectrum assigned to it within the Award Process.
Valid Bid	A Bid submitted within the Auction or by way of the Lot Application Form that is in accordance with the Auction Rules.
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	The optimum allocation of Lots among Bidders.
Working Day	Working Day” means a day which is not a Saturday or Sunday or a public holiday as defined in section 2(1) of the Organisation of Working Time Act 1997.
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>

A1.2 European and Governmental Bodies, Regulatory and Standardisation Organisations

ComReg	Commission for Communications Regulation
EC	European Commission
EU	European Union

A1.3 Primary and Secondary Legislation

SI	Statutory Instrument
2002 Act	The Communications Regulation Act 2002 (No. 20 of 2002), as amended ¹²⁶
Act of 1926	The Wireless Telegraphy Act 1926 (No. 45 of 1926) as amended
Authorisation Regulations	European Communities (Electronic Communication Networks and Services) (Authorisation) Regulations 2011 (S.I. No 335 of 2011)
Framework Directive	Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services, as amended
Framework Regulations	European Communities (Electronic Communications Networks and Services) (Framework) Regulations 2011 (S.I. No 333 of 2011)
The Minister	Minister for Communications, Climate Action and Environment

¹²⁶ 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.

Specific Regulations	Specific Regulations has the same meaning as set out in Regulation 2 of Framework Regulations 2011 (S.I. No. 333 of 2011)
----------------------	---

A1.4 Glossary of Technical Terms

3G	Third Generation Mobile System (e.g. UMTS)
Combinatorial Auction (CCA)	Clock An Auction format that progresses in two distinct phases. The first phase consists of a number of open rounds, which provide for price discovery (the 'Primary Bid Rounds'). This is followed by a single round of bidding (the 'Supplementary Bids Round') during which Bidders can express their demand for all Packages of Lots that they value, subject to certain constraints.
ECS	Electronic Communications Service as defined under the Framework Regulations
EIRP (or eirp)	Equivalent Isotropically Radiated Power
FDD	Frequency Division Duplex
GHz	Gigahertz (1,000,000,000 Hertz)
Harmful Interference	Bears the meaning ascribed to it in the Framework Regulations being: interference which endangers the functioning of a radio navigation service or other safety services or which otherwise seriously degrades, obstructs or repeatedly interrupts a radiocommunications service operating in accordance with a requirement under the International Telecommunication Union Radio Regulations, a Regulation of the European Union or legislation giving effect to an act, or a provision of an act, adopted by an institution of the European Union relating to the provision of an electronic communications service, electronic communications network or an associated facility or the radio frequency spectrum or regulations made under the Act of 1926.

Hertz	Unit of Frequency
LTE	Long Term Evolution of 3G
MHz	Megahertz (1,000,000 Hertz)
MoU	Memorandum / Memoranda of Understanding
QoS	Quality of Service
R&TTE	Radio Equipment And Telecommunications Terminal Equipment
RED	Radio Equipment Directive: Directive 2014/53/EU of the European Parliament and of the Council, 16th April 2014, on harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC
SUF	Spectrum Usage Fee
TDD	Time Division Duplex

Annex 2: **Draft Regulations**

STATUTORY INSTRUMENTS

S.I. No. of 2016

WIRELESS TELEGRAPHY (3.6 GHZ BAND LICENCES) REGULATIONS 2016

WIRELESS TELEGRAPHY (3.6 GHZ BAND LICENCES) REGULATIONS 2016

The Commission for Communications Regulation, in exercise of the powers conferred on it by section 6 of the Wireless Telegraphy Act 1926 (No. 45 of 1926) as amended and with the consent of the Minister for Communications, Climate Action and Environment, pursuant to section 37 of the Communications Regulation Act 2002 (No. 20 of 2002), hereby makes the following regulations:

DRAFT

Citation

1. These Regulations may be cited as the Wireless Telegraphy (3.6 GHz Band Licences) Regulations 2016.

DRAFT

Interpretation

2. (1) In these Regulations:

“3.6 GHz Band” means radio frequency spectrum in the range 3400 MHz to 3800 MHz but excluding the Guard Band Spectrum and the State Services Spectrum;

“3.6 GHz Band Liberalised Use Licence” means a Licence in the form set out in Schedule 1 to keep and have possession of Apparatus in one or more than one Region, in accordance with and subject to the terms and conditions contained in the licence;

“3.6 GHz Band Preparatory Licence” means a Licence in the form set out in Schedule 3 to keep and have possession of Apparatus in one or more than one Region, in accordance with and subject to the terms and conditions contained in the Licence;

“3.6 GHz Band Spectrum Lease Licence” means a Licence in the form set out in Schedule 2 to keep and have possession of Apparatus in one or more than one Region, in accordance with and subject to the terms and conditions contained in the Licence;

“3.6 GHz Band Transition Protected Licence” means a Licence in the form set out in Schedule 4 to keep and have possession of Apparatus for the provision of FWA services in one or more than one FWALA Service Area, in accordance with and subject to the terms and conditions contained in the Licence;

“3.6 GHz Band Transition Unprotected Licence” means a Licence in the form set out in Schedule 5 to keep and have possession of Apparatus for the provision of FWA services in one or more than one specified FWALA Service Area on a Non-Interference and Non-Protected Basis, in accordance with and subject to the terms and conditions contained in the Licence;

“Act of 1926” means Wireless Telegraphy Act 1926 (No. 45 of 1926);

“Act of 1972” means Wireless Telegraphy Act 1972 (No. 5 of 1972);

“Act of 2002” means Communications Regulation Act 2002 (No. 20 of 2002);

“Additional Price” has the meaning set out in the Information Memorandum;

“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 the 3.6 GHz Band;

“Award” means the competitive award procedure used by the Commission for the purpose of granting individual rights of use for radio frequencies in the 3.6 GHz Band, as detailed in the Information Memorandum;

“Award Rules” means the rules and procedures relating to the Award as set out in the Information Memorandum;

“Authorisation Regulations” means the European Communities (Electronic Communications Networks and Services) (Authorisation) Regulations 2011 (S.I. 335 of 2011);

“Base Price” has the meaning set out in the Information Memorandum;

“Bidder” has the meaning set out in the Information Memorandum;

“Commission” means the Commission for Communications Regulation;

“CPI” means the Consumer Price Index as published from time to time by the CSO;

“CPI Adjustment” means a negative or positive adjustment to the SUF, calculated using the CPI according to the methodology set out in the Information Memorandum;

“CSO” means the Central Statistics Office or its successor;

“Decision of 2008” means European Commission Decision 2008/411/EC of 21 May 2008 on the harmonisation of the 3400-3800 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Community;

“Decision of 2014” means European Commission Implementing Decision (2014/276/EU) of 2 May 2014 on amending Decision 2008/411/EC on the harmonisation of the 3400-3800 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Community;

“Electronic Communications Network” and “Electronic Communications Service” have the meanings assigned to them in the Framework Regulations;

“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;

“Existing Licence” means a licence under the Wireless Telegraphy (Fixed Wireless Access Local Area Licence) Regulations 2003 (S.I. No. 79 of 2003);

“Existing Licensee” means a holder of an Existing Licence;

“Fixed Wireless Access” or “FWA” means the wireless provision of Electronic Communications Services between a single base station at a fixed location and multiple subscriber terminal stations at fixed locations where the base station is connected to an Electronic Communications Network;

“Framework Regulations” means the European Communities (Electronic Communications Networks and Services) (Framework) Regulations 2011 (S.I. No. 333 of 2011);

“FWALA Service Area” means the geographic area defined by way of a circle around the centre point specified in an Existing Licence with a maximum radius of 20 kilometres from that centre point less any geographic areas as may be excluded by the Commission;

“General Authorisation” means an authorisation for an undertaking to provide an electronic communications network or service under and in accordance with Regulation 4 of the Authorisation Regulations;

“Guard Band Spectrum” means radio frequency spectrum in the range 3400 MHz to 3410 MHz;

“Harmful Interference” has the meaning set out in the Framework Regulations;

“Information Memorandum” means the information memorandum which was published on 24 August 2016 and set out in the Commission’s Document numbered 16/71 for the purposes of outlining in detail the processes and procedures the Commission will follow in running the Award;

“Lease” means the leasing by a Licensee (“the Lessor”) of some or all of a right of use granted under a 3.6 GHz Band Liberalised Use Licence to another party (“the Leaseholder”) for a period less than the entire remaining duration of the right of use, after which the right of use reverts to the Lessor;

“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 defined geographic area, being one of:

- (a) a 3.6 GHz Band Liberalised Use Licence;
- (b) a 3.6 GHz Band Spectrum Lease Licence;
- (c) a 3.6 GHz Band Preparatory Licence;

(d) a 3.6 GHz Band Transition Protected Licence; or

(e) a 3.6 GHz Band Transition Unprotected Licence,

as the case may be;

“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;

“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 on the radio frequency spectrum specified in the Licence;

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

“R&TTE Regulations” means the European Communities (Radio Equipment and Telecommunications Terminal Equipment) Regulations 2001 (S.I. 240 of 2001);

“Radiocommunication Service” means a service as defined in the Radio Regulations of the International Telecommunication Union involving the transmission, emission or reception of radio waves for specific telecommunication purposes;

“Region” means a regional area of the State specified in Schedule 10;

“Reserve Price” means the relevant price as detailed in Schedule 6;

“Spectrum Usage Fee” or “SUF” means the relevant fee as detailed in Schedule 7;

“State Services Spectrum” means radio frequency spectrum in the range 3435 MHz to 3475 MHz;

“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);

“Type A Spectrum Block” means a 25 MHz unpaired block of radio frequency spectrum in the range 3410 MHz – 3435 MHz;

“Type B Spectrum Block” means a 5 MHz unpaired block of radio frequency spectrum in the range 3475 MHz – 3800 MHz;

“Undertaking” has the meaning set out in the Framework Regulations;

“Upfront Fee” has the meaning set out in the Information Memorandum;

“Winning Bidder” has the meaning set out in the Information Memorandum; and

“Working Day” means a day which is not a Saturday or Sunday or a public holiday.

(2) In these Regulations:

(a) a reference to an enactment or regulation shall be construed as a reference to the enactment or regulation as amended or extended by or under any subsequent enactment or regulation;

(b) a reference to a Regulation or a Schedule is to a Regulation of or Schedule to these Regulations unless it is indicated that a reference to some other enactment is intended;

(c) a reference to a paragraph or subparagraph is to the paragraph or subparagraph of the provision in which the reference occurs unless it is indicated that reference to some other provision is intended;

(d) a reference to a Directive of the European Parliament and Council shall be the Directive as amended or extended by any subsequent Directive; and

(e) a reference to a Decision of the European Commission shall be the Decision as amended or extended by any subsequent Decision.

(3) 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.

(4) 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.

(5) 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.

(6) The Interpretation Act 2005 (No. 23 of 2005) applies to these Regulations.

Licences to which these Regulations apply

3. (1) These Regulations apply to:

- (a) 3.6 GHz Band Liberalised Use Licences,
- (b) 3.6 GHz Band Spectrum Lease Licences,
- (c) 3.6 GHz Band Preparatory Licences,
- (d) 3.6 GHz Band Transition Protected Licences, and
- (e) 3.6 GHz Band Transition Unprotected Licences.

DRAFT

Application for the Grant and Form of Licences

4. (1) Application for the grant of a 3.6 GHz Band Liberalised Use Licence, 3.6 GHz Band Preparatory Licence or 3.6 GHz Band Transition Protected 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 3.6 GHz Band Liberalised Use Licence, 3.6 GHz Band Preparatory Licence or 3.6 GHz Band Transition Protected Licence on foot of the Award following payment by the applicant of the relevant fees prescribed in Regulation 8.
- (3) Application for the grant of a 3.6 GHz Band Transition Unprotected Licence 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. The Commission may grant a 3.6 GHz Band Transition Unprotected 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.
- (4) The Commission may grant a 3.6 GHz Band Liberalised Use Licence to a transferee in accordance with the Transfer Regulations.
- (5) Application for the grant of a 3.6 GHz Band 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 3.6 GHz Band Spectrum Lease Licence to a Leaseholder following the approval of the relevant spectrum Lease by the Commission in accordance with paragraphs 18 and 19 of Regulation 6.
- (6) A person who makes an application under paragraphs (1), (3) or (5) shall furnish to the Commission such information as the Commission may reasonably require for the purposes

of these 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 3.6 GHz Band 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.

(8) A 3.6 GHz Band 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.

(9) A 3.6 GHz Band 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.

(10) A 3.6 GHz Band Transition Protected 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.

(11) A 3.6 GHz Band Transition Unprotected Licence to which these Regulations apply shall be in the form specified in Schedule 5, 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.

Duration of Licences

5. (1) The commencement date of a 3.6 GHz Band Liberalised Use Licence shall be 1 August 2017 or such other date as may be specified by the Commission. Unless it has been withdrawn or had its duration reduced under Regulation 7(2), a 3.6 GHz Band Liberalised Use Licence to which these Regulations apply shall in any event expire on 31 July 2032.

- (2) The commencement date and expiry date of a 3.6 GHz Band Spectrum Lease Licence shall be set by the Commission and specified in the 3.6 GHz Band Spectrum Lease Licence. A 3.6 GHz Band Spectrum Lease Licence to which these Regulations apply shall in any event expire before 31 July 2032.

- (3) The commencement date and expiry date of a 3.6 GHz Band Preparatory Licence shall be set by the Commission and specified in the 3.6 GHz Band Preparatory Licence.

- (4) The commencement date of a 3.6 GHz Band Transition Protected Licence shall be 1 August 2017 or such other date as may be specified by the Commission. The expiry date of a 3.6 GHz Band Transition Protected Licence shall be set by the Commission and specified in the 3.6 GHz Band Transition Protected Licence.

- (5) The commencement date and expiry date of a 3.6 GHz Band Transition Unprotected Licence shall be set by the Commission and specified in the 3.6 GHz Band Transition Unprotected Licence. Unless it has been withdrawn or had its duration reduced under Regulation 7(2), a 3.6 GHz Band Transition Unprotected Licence to which these Regulations apply shall in any event expire on 31 July 2022.

Conditions of Licences

6. It shall be a condition of any Licence to which these Regulations apply that the Licensee shall:

- (1) ensure that it complies with the conditions contained within the Licence concerned and these Regulations;
- (2) ensure that any Apparatus complies with the Decision of 2008 and the Decision of 2014;
- (3) ensure that Apparatus installed, maintained, possessed or kept under the Licence is capable of operating within the radio frequency spectrum specified in the Licence concerned;
- (4) ensure that where the Apparatus is worked or used, as appropriate, it is worked or used on such radio frequency spectrum as specified in the Licence concerned;
- (5) comply with any rules to prevent spectrum hoarding as may be laid down by the Commission under the Framework Regulations;
- (6) ensure that it makes payment of the fees set out in Regulation 8;
- (7) ensure that in advance of the Licence Commencement Date and on or before 1 August 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 3.6 GHz Band Liberalised Use Licence, Parts 1, 2 and 3 of its 3.6 GHz Band Spectrum Lease Licence, Parts 2 and 5 of its 3.6 GHz Band Transition Protected Licence and/or Parts 2 and 5 of its 3.6 GHz Band Transition Unprotected Licence, as the case may be;
- (8) furnish such information and reports as may be requested by the Commission from time to time;

- (9) ensure that the Apparatus, or any part thereof, shall be installed, maintained, and where a Licence other than a 3.6 GHz Band Preparatory Licence is held, worked and used, so as not to cause Harmful Interference;
- (10) ensure that the Apparatus or any part thereof complies with the R&TTE Regulations;
- (11) comply with any special conditions imposed under section 8 of the Act of 1972;
- (12) (a) notify the Commission, not less than 6 months prior to the proposed cessation of use of any terrestrial system listed in Part 2 of the 3.6 GHz Band Liberalised Use Licence or 3.6 GHz Band Spectrum Lease Licence as the case may be; and
- (b) use all reasonable endeavours to ensure that any adverse effects on users caused by the cessation of use of a terrestrial system are minimised;
- (13) 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;
- (14) comply with all obligations under relevant international agreements relating to the use of Apparatus or the frequencies to which they are assigned;
- (15) notify the Commission of its intention to transfer any rights of use for radio frequencies attaching to a Licence;
- (16) only transfer the rights of use for radio frequencies attaching to a Licence in accordance with the Transfer Regulations;
- (17) notify the Commission of its intention to lease any rights of use for radio frequencies attaching to a Licence;

(18) subject to paragraph 19, 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 under Regulation 19 of the Framework Regulations;

(19) where the Commission has not yet put in place procedures referred to in paragraph 18 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

(20) 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.

DRAFT

Enforcement, Amendment, Withdrawal and Suspension

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) A Licence may be suspended or withdrawn by the Commission 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 3.6 GHz Band Liberalised Use Licence granted on foot of the Award is the sum of the Upfront 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) The Reserve Price per Type A Spectrum Block and Type B Spectrum Block per Region is detailed in Schedule 6.
- (3) The Base Price and the Additional Price for a 3.6 GHz Band Liberalised Use Licence shall be determined using the pricing methodology set out in the Information Memorandum.
- (4) The annual Spectrum Usage Fee before CPI Adjustment per Type A Spectrum Block and Type B Spectrum Block per Region is detailed in Schedule 7.
- (5) The Spectrum Usage Fee for a 3.6 GHz Band Liberalised Use Licence is the sum of the annual SUFs before CPI Adjustment associated with each Type A Spectrum Block and Type B Spectrum Block identified in the Licence and the CPI Adjustment for each Type A Spectrum Block and Type B Spectrum Block identified in the Licence.
- (6) In the case of a Spectrum Usage Fee for a period of less than one year, the Spectrum Usage Fee shall be the relevant sum as detailed in paragraph 5 adjusted on a *pro rata* daily basis for such period.
- (7) Where the commencement date of a 3.6 GHz Band Liberalised Use Licence is delayed due to circumstances as described 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.

(8) The Upfront Fee, as specified in paragraph 1 of this Regulation, less any adjustments or refunds applicable to the Licensee, shall be paid to the Commission on a date specified by the Commission in accordance with the Information Memorandum, by way of 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.

(9) The Spectrum Usage Fees for a 3.6 GHz Band Liberalised Use Licence granted on foot of a Transfer are the Spectrum Usage Fees specified in paragraphs 5 and 6 of this Regulation.

(10) The Spectrum Usage Fees 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 3.6 GHz Band Liberalised Use Licence or prior to 1 August of each respective calendar year during the term of the 3.6 GHz Band Liberalised Use Licence, as the case may be.

(11) If a 3.6 GHz Band Liberalised Use Licence is suspended or withdrawn under Regulation 7(3) or Regulation 7(4), the Licensee shall not be entitled to be repaid any part of the Upfront Fee or Spectrum Usage Fee paid by the Licensee under this Regulation, but shall still be liable to pay any sums, including interest, that are outstanding.

(12) If the amount of radio frequency spectrum specified in a 3.6 GHz Band Liberalised Use Licence is reduced under Regulation 7(2), the Licensee may be entitled to a refund of Spectrum Usage Fees already paid and a reduction on future SUFs on a *pro rata* basis having regard to the nature of the amendment. The Licensee shall not be entitled to any refund of its Upfront Fee.

(13) If the duration of a 3.6 GHz Band Liberalised Use Licence is reduced at the request of the Licensee, the Licensee may be entitled to a refund of Spectrum Usage Fees already paid,

on a *pro rata* basis having regard to the reduced duration. The Licensee shall not be entitled to any refund of its Upfront Fee.

(14) The fee for a 3.6 GHz Band 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 under Regulation 19 of the Framework Regulations.

(15) The fee for a Preparatory Licence is €100.

(16) The fee per FWALA Service Area in a 3.6 GHz Band Transition Protected Licence is detailed in Schedule 8.

(17) The fee per FWALA Service Area in a 3.6 GHz Band Transition Unprotected Licence is detailed in Schedule 9.

(18) Any payment to be paid by a Licensee under this Regulation, with the exception of the Upfront Fee as specified in paragraph 1 of this Regulation, shall be made by way of 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.

(19) Failure by a Licensee to make any payment required to be made under this Regulation on or before the date it falls due constitutes non-compliance by the Licensee with these Regulations. The Commission, in addition to enforcement actions in accordance with Regulation 7 of these Regulations, may take steps to recover the fees due in accordance with paragraphs 20 and 21 of this Regulation.

(20) Where payment of any fee is not made in due time, then the Licensee shall pay to the Commission interest on the fees 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).

(21) An amount payable by a person in respect of a fee under this Regulation may be recovered by the Commission from the person as a simple contract debt in any court of competent jurisdiction.

DRAFT

Licensee to satisfy all Legal Requirements

9. (1) Licences granted pursuant to these Regulations do not grant to the Licensee any right, interest or entitlement other than the right to keep, and have possession of, install, and maintain, and for Licences other than a 3.6 GHz Band Preparatory Licence, to work and use, at a specified location or locations in the State, Apparatus for wireless telegraphy for terrestrial systems capable of providing Electronic Communications Services.

DRAFT

SCHEDULE 1

WIRELESS TELEGRAPHY ACT, 1926

WIRELESS TELEGRAPHY (3.6 GHz BAND LICENCES) REGULATIONS 2016

**3.6 GHz Band Liberalised Use Licence for terrestrial systems capable of providing
Electronic Communications Services**

Licence under section 5 of the Wireless Telegraphy Act, 1926 (No. 45 of 1926) as amended, 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 Wireless Telegraphy Act 1926 (No. 45 of 1926) as amended, hereby grants the following licence to _____ of _____ (“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 to this Licence, subject to such apparatus being installed, maintained, worked and used in accordance with the terms and conditions and restrictions set out in the Wireless Telegraphy (3.6 GHz Band Licences) Regulations, 2016 (S.I. No. _____ of 2016) (“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, under which this Licence is issued, 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 under which this Licence is issued.

This Licence shall come into effect on DD/MM/YY (the “Licence Commencement Date”) and, subject to revocation, suspension or withdrawal, expires on DD/MM/YY.

Signed: _____

For and on behalf of the Commission for Communications Regulation

Date of Issue: _____

Official Stamp

Part 1

Commencement and Expiry dates per Type A and Type B Spectrum Block per Region

Region	Name of Spectrum Block	Frequency Assigned to Spectrum Block	Commencement Date per Spectrum Block	Expiry Date per Spectrum Block
	<i>Block A, B, C etc.</i>	<i>From _____ MHz to _____ MHz</i>	<i>DD Month YYYY</i>	<i>DD Month YYYY</i>

Part 2

The Apparatus to which this Licence applies

Equipment Index Reference	Terrestrial System	Equipment Description	Manufacturer	Model

Part 3

Apparatus Location and Details

Region	County	Site Identity	Eastings	Northings	Equipment Index Reference	Maximum EIRP

Fixed outdoor Terminal Stations with a directional antenna

Region	County	Site Identity	Eastings	Northings	Equipment Index Reference	Maximum EIRP

Part 4

Licence Conditions

Section 1: General

1. Definitions

The following additional definitions shall apply to this Licence:

“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;

“Licensed Spectrum Blocks” means the Spectrum Blocks set out in Part 1 of the Licence;

“Terrestrial Systems” means terrestrial systems capable of providing Electronic Communications Services that are in compliance with the technical implementing measures adopted pursuant to EC Decision No 2008/411/EC (as amended) and in conformity with the standards referred to in Parts 4; and

“Licensed Regions” means the Regions specified in Part 1 of the Licence.

2. Provision of Maps and Data

For the purposes of complying with rollout obligations (see Section 4) and quality of service obligations (see Section 5) compliance assessments, the Licensee shall, on request, provide to the Commission the following:

- (a) Maps showing rollout as required under Section 4;
- (b) An up-to-date list of the locations of Base Stations including the Rollout Base Stations covered by the Licence; and
- (c) An adequate number of Terminal Stations, Subscriber Identity Modules (SIM) cards or equivalents for testing as applicable.

Section 2: Technical Conditions

1. Definitions

The following additional definitions shall apply to this Licence:

“Base Station” means Apparatus connected to a backhaul network, which provides a Radiocommunication Service to Terminal Stations using the 3.6 GHz Band;

“dBm” means decibels of power referenced to one milliwatt;

“Downlink” means transmissions from a Base Station to a Terminal Station;

“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;

“Indoor Small Cell” means a Base Station with an EIRP of less than or equal to 24 dBm per 20 MHz carrier that is located indoors either within a residential or non-residential property;

“Inter-Licensee Co-ordination Agreement” means bi-lateral or multi-lateral agreements between Licensees on field strength co-ordination threshold levels at the boundaries of Regions;

“Inter-Licensee Synchronisation Procedure” means the synchronisation procedure set out in Section 3;

“Permissive Block Edge Mask” means the Base Station technical conditions defined in Table 1 below;

“*Restrictive Block Edge Mask*” means the Base Station technical conditions defined in Table 2 below;

“*TDD*” means time-division duplex;

“*TD-LTE*” means the TDD variant of LTE (Long Term Evolution) technology;

“*Terminal Station*” means mobile user equipment and fixed customer premise equipment which communicate with a Base Station using the 3.6 GHz Band; and

“*Uplink*” means transmissions from a Terminal Station to a Base Station.

2. Technical Conditions

- (1) Only Terrestrial Systems compatible with Decision 2008/411/EC (as amended) can be worked and used in the 3.6 GHz Band.
 - (2) In the 3400 – 3600 MHz frequency range of the 3.6 GHz Band, the preferred duplex mode of operation is TDD.
 - (3) In the 3600 – 3800 MHz frequency range of the 3.6 GHz Band, the duplex mode of operation is TDD.
- (a) Base Stations**
- (4) Where the Inter-Licensee Synchronisation Procedure specified in Section 3 determines that the Permissive Block Edge Mask applies, the technical conditions defined in Table 1 below shall apply to Base Stations.

Table 1: Permissive Block Edge Mask

BEM Element	Frequency Range	Power Limit
In-block	Block assigned to the Licensee	68 dBm/5 MHz per antenna
Transitional Region	-5 to 0 MHz offset from lower block edge 0 to 5 MHz offset from upper block edge	Min(PMax - 40,21) dBm/5 MHz EIRP per antenna
Transitional Region	-10 to -5 MHz offset from lower block edge 5 to 10 MHz offset from upper block edge	Min(PMax - 43,15) dBm/5 MHz EIRP per antenna
Baseline	3400-3800 MHz (except for in-block and transitional regions)	Min(PMax - 43,13) dBm/5 MHz
Additional baseline	Below 3400 MHz and above 3800 MHz	-34 dBm/5 MHz EIRP per cell

- (5) Where the Inter-Licensee Synchronisation Procedure specified in Section 3 determines that the Restrictive Block Edge Mask applies, the technical conditions defined in Table 2 below shall apply. In order to meet the Restrictive Block Edge Mask, a Licensee may be required to adopt guard bands within its Licensed Spectrum Block(s).

Table 2: Restrictive Block Edge Mask

BEM Element	Frequency Range	Power Limit
In-block	Block assigned to the Licensee	68 dBm/5 MHz per antenna
Baseline	3400-3800 MHz (except for in-block frequencies)	-34 dBm/5 MHz EIRP per cell
Additional baseline	Below 3400 MHz and above 3800 MHz	-34 dBm/5 MHz EIRP per cell

- (6) The Licensee shall comply with all memoranda of understanding agreed from time to time between the Commission and the national regulatory authority responsible for communications matters in the UK, Ofcom, or its successor, in relation to the 3.6 GHz Band.¹
- (7) A co-ordination threshold limit of 32 dB μ V/m/5MHz for 90% of the time and 90% of the locations at a height of 10 m at the borders of each Region shall apply.²
- (8) The co-ordination threshold limit specified at paragraph 7 may be relaxed when an Inter-Licensee Co-ordination Agreement is in place between all potentially affected Licensees. Inter-Licensee Co-ordination Agreements may be guided by ECC Recommendation (15) 01³ or subsequent relevant guidance documents.
- (9) 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, ComReg may mediate in accordance with its statutory functions, objectives and duties.

(b) Terminal Stations

- (10) With the exception of fixed outdoor Terminal Stations with a directional antenna the maximum in-block power for a Terminal Station shall not exceed 25 dBm/5 MHz EIRP.
- (11) The maximum in-block power limit for fixed outdoor Terminal Stations with a directional antenna shall not exceed 37 dBm/5 MHz EIRP.
- (12) Fixed outdoor Terminal Stations with a directional antenna shall:
 - (a) be installed, controlled by and remain the responsibility of the Licensee; and
 - (b) not cause Harmful Interference to any other users, be that Base Stations, other Terminal Stations, or other apparatus for wireless telegraphy in other radio frequency spectrum bands.

Section 3: Inter-Licensee Synchronisation Procedure

1. Definitions

¹ See Annex 3 of ComReg Document 06/17R7 for a list of memoranda of understanding in place at the date of making of the Regulations..

² The field prediction method used shall be in accordance with Recommendation ITU-R P.452-16, unless otherwise specified by the Commission

³ See ECC Recommendation (15)01 – Cross-border coordination for mobile/fixed communications networks (MFCN) in the frequency bands: 694-790 MHz, 1452-1492 MHz, 3400-3600 MHz and 3600-3800 MHz - <http://www.erodocdb.dk/Docs/doc98/official/pdf/REC1501.PDF>

The following additional definitions shall apply to this Licence:

“*Default Frame Structure*” means the frame structure as detailed in 3(1) below; and

“*Other Frame Structure*” means a frame structure other than the Default Frame Structure.

2. Introduction

- (1) Licensees shall co-operate in such a way that one network deployment does not cause Harmful Interference to that of another Licensee within the 3.6 GHz Band.
- (2) Licensees shall be bound by the Inter-Licensee Synchronisation procedure.
- (3) This procedure sets out the circumstances in which Licensees may use the Permissive Block Edge Mask and the Restrictive Block Edge Mask, so as to minimise the risk of Harmful Interference to other Licensees.

3. Conditions for Permissive Block Edge Masks

- (1) Default Frame Structure - The technical conditions for Permissive Block Edge Mask set out in Section 2 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 Figure 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;
 - (b) Timeslots shall have a duration of 1 millisecond; and
 - (c) Licensees shall ensure that frames start at a common reference time ($\pm 1.5 \mu\text{s}$) so that all Licensees’ frames are aligned and transmissions synchronised.

Figure 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 Block Edge Masks

- (1) Other Frame Structure - the technical conditions for Restrictive Block Edge Mask set out in Section 2 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 subframe 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 Block Edge Mask 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

- (1) Indoor Small Cells are exempted from synchronisation. The Permissive Block Edge Mask set out in Section 2 applies to such Indoor Small Cells on the condition that they do not cause Harmful Interference to any other Licensees.

Section 4: Rollout Requirements

1. Definitions

The following additional definitions shall apply to this Licence:

“Network-Controlled Wireless Telegraphy Apparatus” means apparatus which has backhaul capability⁴ 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; and

“Rollout Base Station” means a Network Controlled Wireless Telegraphy Apparatus in the 3.6 GHz Band with a minimum spectrum efficiency capability of 4 bits/Hz.

2. Base Station Minimum Rollout Requirements

- (1) For each Licensed Region, the Licensee shall achieve and maintain the Rollout Base Station obligation detailed in Table 3 below within 3 years of the Licence Commencement Date relevant to its Licensed Regions.

⁴ If the 3.6 GHz Band is 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 3: Rollout Base station obligation by Region

Reference Number of Region	Name of Region	Number of Rollout Base Stations to be worked and used	
		Licensee holding up to and including 100 MHz in the 3.6 GHz band in that Region	Licensee holding over 100 MHz in the 3.6 GHz band in that Region
1	Borders, Midlands and West	15	25
2	East	15	25
3	South East	15	25
4	South West	15	25
5	Dublin city and suburbs	10	15
6	Cork city and suburbs	2	4
7	Limerick city and suburbs	2	4
8	Galway city and suburbs	2	4
9	Waterford city and suburbs	2	4

- (2) For Regions 1, 2, 3 and 4 in Table 3 above, the Licensee is required to work and use Rollout Base Stations in at least 4 counties for each Licensed Region⁵.
- (3) Where a Licensee has a Rollout Base Station in one county and this Rollout Base Station is worked and used to provide service to another county, the Rollout Base Station will be counted as being worked and used in the county it serves (and not the county in which it is located).

⁵ Each of the areas of South Tipperary and North Tipperary will be deemed to be a county for the purposes of determining compliance with the rollout obligation.

- (4) Where a Licensee has a Rollout Base Station in one county and this Rollout Base Station is worked and used to provide services to more than one county (i.e. the county in which it is located in and also neighbouring counties), the Rollout Base Station will only be counted as a single Rollout Base Station for the purposes of meeting the Rollout Base Station obligation and the Licensee may chose the county in which such a Rollout Base Station is to be counted for this purpose.
- (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 has a spectrum leasing arrangement for a Rollout Base Station in a Region not contained in the Licensed Regions and this Rollout Base Station is being worked and used to serve a Region contained in the Licensed Regions, such a Rollout Base Station will be counted as being worked and used in the county and Region which it serves.
- (7) 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 in their respective Licensed Regions, 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 rollout within 31 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 relevant rollout obligation specified in Section 4 (2) above. Where the Licensee has failed to meet the relevant rollout obligation, the Licensee shall provide adequate reasons and supporting information for same.
- (3) The information required for this annual 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 annual compliance report.
- (4) Failure by the Licensee to submit the annual compliance report to the Commission within the specified time period shall be deemed to be non-compliance by the Licensee with both the reporting obligations and the relevant Base Station Rollout obligation.
- (5) The Commission reserves the right to inspect any Rollout Base Station 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.

Section 5: Quality of Service (QoS) Obligations

1. Definitions

The following additional definitions shall apply to this Licence:

“Network” means any Terrestrial System which uses the Licensed Spectrum Blocks; and

“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.

“Voice Call” means all relevant non-VOIP (Voice over Internet Protocol) and managed VOIP call services⁶ 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.

2. The Minimum “Availability of the Network” Standard

- (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 4 below) per six month period.

⁶ See for example, paragraph 2.6 of ComReg Document 14/89, Market Review: Retail Access to the Public Telephone Network at a Fixed Location for Residential and Non Residential Customers in relation to the fixed voice calls.

Table 4: 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	1	2	4
For periods between 00.00 and 07.00	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 customers and provided to third party customers by the Licensee via contractual or other arrangements with the Licensee.
 - (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 network log, or as may be appropriate part thereof, shall be made available 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 the calculation.
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 5 below.

Table 5: Minimum Voice Call Standards for each 6 month period for annual reporting

	Average	Worst Case
Maximum Permissible Blocking Rates (maximum percentage of total Voice Call attempts which are unsuccessful during the time consistent busy hour ⁷)	2%	4%
Maximum Permissible Dropped Call Rates (maximum percentage of total originating calls which are prematurely released by the Network within 3 minutes of the Voice Call being made.)	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. 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 5, 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 adequate means of assessing whether the Licensee is complying with these standards.

⁷ “Time consistent busy hour” means the period of one-hour starting at the same time each day for which the average traffic of the network concerned is greatest over the days under consideration. The time consistent busy hour shall be determined from an analysis of traffic data obtained from the service and be subject to the Commission’s approval.

The ‘Time consistent busy hour’ is determined from the Licensee’s voice traffic. It is the one-hour period during which there is the highest level of traffic. The blocked call rates are measured for the same one-hour period during each review period (i.e. 6 months). The one-hour period is determined by the Licensee and is subject to the Commission’s approval.

- (2) The Licensee shall measure and submit to the Commission, within 31 days of each anniversary of the commencement of the Licence, an annual compliance report on the performance of its Network against the Minimum Voice Call Standards in Table 5.
- (3) In the annual compliance report the Licensee shall notify the Commission whether or not it has met the Minimum Voice Call Standards in Table 5. Where the Licensee has failed to meet any of these standards, the Licensee shall provide adequate reasons and supporting information for same.
- (4) The annual compliance report shall have sufficient detail and granularity to allow the Commission to verify the Licensee's measurements.
- (5) Failure by the Licensee to submit the annual compliance report to the Commission within the specified time period shall be deemed to be non-compliance by the Licensee with both these reporting obligations and the Voice Call standards.
- (6) The Licensee shall, upon request by the Commission⁸, 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.
- (7) 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.

⁸ 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;
- 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.

SCHEDULE 2

WIRELESS TELEGRAPHY ACT, 1926

WIRELESS TELEGRAPHY (3.6 GHz BAND LICENCES) REGULATIONS 2016

**3.6 GHz Band Spectrum Lease Licence for terrestrial systems capable of providing
Electronic Communications Services**

Licence under section 5 of the Wireless Telegraphy Act, 1926 (No. 45 of 1926) as amended, 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 Wireless Telegraphy Act 1926 (No. 45 of 1926) as amended, hereby grants the following licence to _____ of _____ (“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 to this Licence, subject to such apparatus being installed, maintained, worked and used in accordance with the terms and conditions and restrictions set out in the Wireless Telegraphy (3.6 GHz Band Licences) Regulations, 2016 (S.I. No. _____ of 2016) (“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, under which this Licence is issued, 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 under which this Licence is issued.

This Licence shall come into effect on DD/MM/YY (the “Licence Commencement Date”) and, subject to revocation, suspension or withdrawal, expires on DD/MM/YY.

Signed: _____

For and on behalf of the Commission for Communications Regulation

Date of Issue: _____

Official Stamp

Part 1

Commencement and Expiry dates per leased Type A and Type B Spectrum Block per Region

Lessor 3.6 GHz Band Liberalised Use Licence Number	Region	Name of Spectrum Block	Frequency Assigned to Spectrum Block	Commence ment Date per Spectrum Block	Expiry Date per Spectrum Block
		<i>Block A, B, C etc.</i>	<i>From _____ MHz to _____ MHz</i>	<i>DD Month YYYY</i>	<i>DD Month YYYY</i>

Part 2

The Apparatus to which this Licence applies

Equipment Index Reference	Terrestrial System	Equipment Description	Manufacturer	Model

Part 3

Apparatus Location and Details

Region	County	Site Identity	Eastings	Northings	Equipment Index Reference	Maximum EIRP⁹

Fixed outdoor Terminal Stations with a directional antenna

Region	County	Site Identity	Eastings	Northings	Equipment Index Reference	Maximum EIRP

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.

⁹ EIRP is the Equivalent Isotropically Radiated Power

SCHEDULE 3

WIRELESS TELEGRAPHY ACT, 1926

WIRELESS TELEGRAPHY (3.6 GHz BAND LICENCES) REGULATIONS 2016

**3.6 GHz Band Preparatory Licence for terrestrial systems capable of providing
Electronic Communications Services**

Licence under section 5 of the Wireless Telegraphy Act, 1926 (No. 45 of 1926) as amended, 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 Wireless Telegraphy Act 1926 (No. 45 of 1926) as amended, hereby grants the following licence to _____ of _____ (“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 to this Licence, subject to such apparatus being installed and maintained in accordance with the terms and conditions and restrictions set out in the Wireless Telegraphy (3.6 GHz Band Licences) Regulations 2016 (S.I. No. _____ of 2016) (“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, under which this Licence is issued, 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 under which this Licence is issued.

This Licence shall come into effect on DD/MM/YY (the “Licence Commencement Date”) and, subject to revocation, suspension or withdrawal, expires on DD/MM/YY.

Signed: _____

For and on behalf of the Commission for Communications Regulation

Date of Issue: _____

Official Stamp

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

Statement of Authorised Apparatus

To Include:

Region	Commencement Date	Expiry Date	Description of Apparatus
	<i>DD Month YYYY</i>	<i>DD Month YYYY</i>	

SCHEDULE 4

WIRELESS TELEGRAPHY ACT, 1926

WIRELESS TELEGRAPHY (3.6 GHz BAND LICENCES) REGULATIONS

**3.6 GHz Band Transition Protected Licence for terrestrial systems capable of providing
Electronic Communications Services**

Licence under section 5 of the Wireless Telegraphy Act, 1926 (No. 45 of 1926) as amended, 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 Wireless Telegraphy Act 1926 (No. 45 of 1926) as amended, hereby grants the following licence to _____ of _____ (“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 5 to this Licence, subject to such Apparatus being installed, maintained, worked and used for the provision of FWA services in accordance with the relevant terms and conditions and restrictions set out in the Wireless Telegraphy (3.6 GHz Band Licences) Regulations, 2016 (S.I. No. _____ of 2016) (“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, under which this Licence is issued, and within Parts 6, 7, 9 and 10 of this Licence; and
- (2) The Licensee shall ensure that it makes payment of all fees as detailed in the Regulations under which this Licence is issued.

This Licence shall come into 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: _____

Official Stamp

Part 1

Definitions

1. The following additional definitions shall apply to this Licence:

“Interference Contour” means a circle around the Centre Point of the FWALA Service Area with a radius of 30 kilometres; and

“Minimum Loading Criteria” means criteria set down by the Commission to define the minimum usage of the frequency channel used by the FWA apparatus.

Part 2

Commencement and Expiry dates per FWALA Service Area

FWALA Service Area Reference Number	Existing Licence Reference Number	Centre Point of FWALA Service Area	Frequency Assigned	Commencement Date	Expiry Date
			<i>From _____ MHz to _____ MHz and From _____ MHz to _____ MHz</i>	<i>DD Month YYYY</i>	<i>DD Month YYYY</i>

Part 3

Licensee

Part 4

Address for notices

Part 5

Description and Characteristics of Fixed Wireless Access Apparatus

Part 6

Technical Conditions for Fixed Wireless Access Apparatus

Part 7

Minimum Loading Criteria, if applicable

Part 8

Roll-out Plan, if applicable

Part 9

Licence commencement and termination dates

Part 10

Commitments made by the licensee in the course of a comparative evaluation selection procedure

DRAFT

SCHEDULE 5

WIRELESS TELEGRAPHY ACT, 1926

WIRELESS TELEGRAPHY (3.6 GHz BAND LICENCES) REGULATIONS 3.6 GHz

**Band Transition Unprotected Licence for terrestrial systems capable of providing
Electronic Communications Services**

Licence under section 5 of the Wireless Telegraphy Act, 1926 (No. 45 of 1926) as amended, to keep and have possession of apparatus for wireless telegraphy for terrestrial systems capable of providing Electronic Communications Services on a Non-Interference and Non-Protected Basis.

The Commission for Communications Regulation, in exercise of the powers conferred on it by section 5 of the Wireless Telegraphy Act 1926 (No. 45 of 1926) as amended, hereby grants the following licence to _____ of _____ (“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 4 to this Licence, subject to such apparatus being installed and maintained in accordance with the terms and conditions and restrictions set out in the Wireless Telegraphy (3.6 GHz Band Licences) Regulations, 2016 (S.I. No. _____ of 2016) (“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 3.6 GHz Band Regulations, under which this Licence is issued, and within Parts 6, 7, 9 and 10 of this Licence; and

- (2) The Licensee shall ensure that it makes payment of all fees as detailed in the Regulations under which this Licence is issued.

This Licence shall come into effect on DD/MM/YY (the “Licence Commencement Date”) and, subject to revocation, suspension or withdrawal, expires on DD/MM/YY.

Signed: _____

For and on behalf of the Commission for Communications Regulation

Date of Issue: _____

Official Stamp

Part 1

Definitions

1. The following additional definitions shall apply to this Licence:

“Minimum Loading Criteria” means criteria set down by the Commission to define the minimum usage of the frequency channel used by the FWA apparatus.

Part 2

Commencement and Expiry dates per FWALA Service Area

FWALA Service Area Reference Number	Existing Licence Reference Number	Centre Point of FWALA Service Area	Frequency Assigned	Commencement Date	Expiry Date
			<i>From _____ MHz to _____ MHz and From _____ MHz to _____ MHz</i>	<i>DD Month YYYY</i>	<i>DD Month YYYY</i>

Part 3

Licensee

Part 4

Address for notices

Part 5

Description and Characteristics of Fixed Wireless Access Apparatus

Part 6

Technical Conditions for Fixed Wireless Access Apparatus

Part 7

Minimum Loading Criteria, if applicable

Part 8

Roll-out Plan, if applicable

Part 9

Licence commencement and termination dates

Part 10

Commitments made by the licensee in the course of a comparative evaluation selection procedure

DRAFT

SCHEDULE 6

Reserve price for Type A and Type B Spectrum Block per Region

Region	Reserve Price per Type A Spectrum Block €	Reserve Price per Type B Spectrum Block €
Border, Midlands and West	114,000	22,800
South West	72,000	14,400
East	64,000	12,800
South East	44,000	8,800
CSO Boundary for Dublin City and Suburbs	178,000	35,600
CSO Boundary for Cork City and Suburbs	34,000	6,800
CSO Boundary for Limerick City and Suburbs	16,000	3,200
CSO Boundary for Galway City and Suburbs	14,000	2,800
CSO Boundary for Waterford City and Suburbs	8,000	1,600

SCHEDULE 7

Annual Spectrum Usage Fee before CPI Adjustment for Type A and Type B Spectrum

Blocks per Region

Region	Annual Spectrum Usage Fee before CPI Adjustment per Type A Spectrum Block €	Annual Spectrum Usage Fee before CPI Adjustment per Type B Spectrum Block €
Border, Midlands and West	17,670	3,534
East	12,800	1,984
South East	8,800	1,364
South West	14,400	2,232
CSO Boundary for Dublin City and Suburbs	35,600	5,518
CSO Boundary for Cork City and Suburbs	6,800	1,054
CSO Boundary for Limerick City and Suburbs	3,200	496
CSO Boundary for Galway City and Suburbs	2,800	434
CSO Boundary for Waterford City and Suburbs	1,600	248

SCHEDULE 8

Annual fee per FWALA Service Area in a 3.6 GHz Band Transition Protected Licence

Radio frequency spectrum bandwidth (paired channel)	Annual Fee (€)
Up to 7MHz	1500
Over 7 MHz and up to 14 MHz	2000
Over 14 MHz and up to 28 MHz	2800

The fee for an unpaired channel is calculated by reference to its “equivalent” paired channel bandwidth.

Where a spectrum rights for a FWALA Service Area in a Licence is granted for a portion of a year the fee to be paid by the licensee shall be calculated as follows:

$$A \times (B/12) = C$$

Where:

- A is the relevant annual fee set out in this Schedule;
- B is the number of whole months for which the spectrum rights for a FWALA Service Area in the Licence is granted (if granted for a period of less than one month then, for the purpose of these calculations only, it shall be considered as a being granted for a period of one month); and
- C is the appropriate fee to be paid.

SCHEDULE 9

Annual fee per FWALA Service Area in a 3.6 GHz Band Transition Unprotected

Licence

Radio frequency spectrum bandwidth (paired channel)	Annual Fee (€)
Up to 7MHz	1,783
Over 7 MHz and up to 14 MHz	2,378
Over 14 MHz and up to 28 MHz	3,329

The fee for an unpaired channel is calculated by reference to its “equivalent” paired channel bandwidth.

Where a spectrum rights for a FWALA Service Area in a Licence is granted for a portion of a year the fee to be paid by the licensee shall be calculated as follows:

$$A \times (B/12) = C$$

Where:

- A is the relevant annual fee set out in this Schedule;
- B is the number of whole months for which the spectrum rights for a FWALA Service Area in the Licence is granted (if granted for a period of less than one month then, for the purpose of these calculations only, it shall be considered as a being granted for a period of one month); and
- C is the appropriate fee to be paid.

SCHEDULE 10

DESCRIPTION OF THE REGIONS

REGION NAME	REGION DESCRIPTION
Border, Midlands and West	That area of the State comprising counties Donegal, Leitrim, Sligo, Mayo, Roscommon, Cavan, Monaghan, Louth, Longford, Westmeath, Offaly, Laois and Galway, but excluding the respective parts of these counties contained in CSO Boundary for Galway City and Suburbs region, and as further specified in the Information Memorandum.
East	That area of the State comprising counties Meath, Kildare, Wicklow and Dublin, but excluding the respective parts of these counties contained in the CSO Boundary for Dublin City and Suburbs region, and as further specified in the Information Memorandum.
South East	That area of the State comprising counties Carlow, Wexford, the former local authority area of South Tipperary (as originally referred to as Tipperary South Riding in the Local Government Act 1898), Kilkenny and Waterford, but excluding the respective parts of these counties contained in the CSO Boundary of Waterford City and Suburbs region, and as further specified in the Information Memorandum.

South West	That area of the State comprising counties Clare, Limerick, Kerry, Cork and the former local authority area of North Tipperary (as originally referred to as Tipperary North Riding in the Local Government Act 1898) but excluding the respective parts of these counties contained in the CSO Boundary for Cork City and Suburbs region and the CSO Boundary for Limerick City and Suburbs region, and as further specified in the Information Memorandum.
CSO Boundary for Dublin City and Suburbs	That area of the State as defined by the CSO in the Census 2011 Boundary Files for Dublin City and Suburbs, and as further specified in the Information Memorandum.
CSO Boundary for Cork City and Suburbs	That area of the State as defined by the CSO in the Census 2011 Boundary Files for Cork City and Suburbs, and as further specified in the Information Memorandum.
CSO Boundary for Limerick City and Suburbs	That area of the State as defined by the CSO in the Census 2011 Boundary Files for Limerick City and Suburbs, and as further specified in the Information Memorandum.
CSO Boundary for Galway City and Suburbs	That area of the State as defined by the CSO in the Census 2011 Boundary Files for Galway City and Suburbs, and as further specified in the Information Memorandum.
CSO Boundary for Waterford City and Suburbs	That area of the State as defined by the CSO as per the Census 2011 Boundary Files for Waterford City and Suburbs, and as further specified in the Information Memorandum.

GIVEN under the official seal of the Commission for Communications Regulation this

2016

Jeremy Godfrey, Commissioner

For and on behalf of the Commission for Communications Regulation

The Minister for Communications, Climate Action and Environment consents to the making of the foregoing Regulations.

GIVEN under the official seal of the Minister for Communications, Climate Action and Environment this 2016

Denis Naughten

Minister for Communications, Climate Action and Environment

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 3.6 GHz Band.

DRAFT

Annex 3: Application Form¹²⁷

Applicants must complete Parts 1, 2 and 3 of this Application Form. Any additional documentation required to be supplied by the Applicant as part of its Application is to be appended to this Application Form.

Part 1: Administrative Information

For an Application to be complete, the administrative information listed in Table 1 below must be provided. Note that the Applicant name provided will be that to whom licences will be awarded where relevant. Contact details for Authorised Agents are those that will be used by ComReg for circulating Bidder Materials for the Auction and for contacting the Bidder during the Auction if necessary.

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 and, if different, address to which all communications will be sent regarding the Award Process	Address 1:
	Address 2 (if different):
Telephone/ fax number for Applicant	Telephone: Fax:
Bank details of Applicant (for the purpose of returning part	Name of Bank and address of relevant branch:

¹²⁷ A writeable PDF format of this form will be made available on the ComReg website.

Information required	Information provided
or all of the Applicant's Deposit where applicable)	Account Number: 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, fax number and e-mail address of Applicants Authorised Agent 1	Telephone (fixed): Telephone (mobile): Fax: Email:
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:
Position of Applicant's Authorised Agent 2	Position:

Information required	Information provided
Telephone numbers, fax number and e-mail address of Applicants Authorised Agent 2	Telephone (fixed): Telephone (mobile): Fax: Email:
Specimen signature of Applicant’s Authorised Agent 2 Witnessed By	Signature: Name: Position: Signature:

Table 1: Administrative information

* Note: In the case of Applicants that are bodies corporate, attach a certified copy of Certificate of Registration along with Articles of Association and Memorandum of Association or equivalent together with a certified translation thereof into English or Irish, where the original is not in English or Irish. Company Secretary or 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 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 spectrum. If Applicants wish to have the ability to participate in the Assignment Stage as part of an Alliance, Authorised Agents must further be authorised to delegate the power to make Assignment Stage Bids, which are binding on the Applicant on a joint and several basis with all members of the Alliance, to up to two Authorised Agents of another member of the Alliance.

*** Note: Applicants can authorise one more person, who could act as the Alternate Authorised Agent in case of unavailability of the primary Authorised Person. In case of any duplication of submissions made on behalf of the Bidder by different Authorised Agents, the submission made by the first Authorised Agent would be considered as final and binding.

Appropriate evidence of the authorisation of Authorised Agents, as per Section 3.3.2 of the Information Memorandum, must be attached hereto.

Part 2: Applicant Declaration

The terms “Auction 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 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.
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 it is 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 and 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 to the date of the issue of the Licences.

6. The Applicant has ensured and will ensure that the Applicant - and, to the best knowledge of the Applicant, any Connected Persons and any Insiders - neither prior to the submission of the Application, nor after the submission thereof and until the Licences have been issued, 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
 - regulate 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, 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 the above paragraph, 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, any Connected Persons and any Insiders – both prior to and after the submission of an Application and until the Licences have been issued, refrains from any action that could have an adverse effect on the Award Process.

10. The Applicant shall comply with the Auction Rules as contained in the Information Memorandum including, without limitation, the provisions of Chapter 5 at all times and shall procure that its personnel, Insiders and Connected Persons, to the extent appropriate, shall also comply with the Auction Rules 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 filing of its Application, the Applicant takes 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 relevant changes to its ownership structures 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, the relevant partners or participants are not, nor is 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, the relevant partners or participants are not, nor is 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 the Licence, if the Applicant is awarded such Licence.
15. The Applicant agrees that any disclosure made under paragraph 13 and/or paragraph 14 above must 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 Auction Rules and to comply with the terms of the Licence. The Applicant agrees that 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. The Applicant agrees that 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. The Applicant agrees that, even if they are unsuccessful in becoming a Bidder, they remain bound by the Auction Rules, 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 has the legal capacity to enter into an Alliance, and we have been expressly authorised by the Applicant to:*

- notify ComReg that the Applicant has joined an Alliance for the purpose of Bidding in the Assignment Stage; and
- delegate the power to make Assignment Stage Bids, which are binding on the Applicant on a joint and several basis with all members of such an Alliance, to up to two Authorised Agents of another member of the Alliance.

18. The Applicant has not put in train any steps for the formation of an Alliance and will not do so until it is informed of the results of the Main Stage.

**Delete entire paragraph 17 if the Applicant does not wish to have the ability to make Assignment Stage Bids as part of an Alliance.*

Applicant Name: _____

For and on behalf of the Applicant:

(Signature of those persons who are empowered to bind the Applicant or otherwise authorised to bind the Applicant)

Name in block capitals: _____

Date (DD/MM/YYYY):

--	--	--	--	--	--	--	--

If the Applicant is a partnership, a joint venture or equivalent, the Declaration must also be signed by the relevant partners or participants:

As partner/participant:

(Signature)

Name in block capitals: _____

Date (DD/MM/YYYY):

--	--	--	--	--	--	--	--

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 upfront and annual fees 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 Table 2 below. Note that for an Initial Bid Form to be valid, it must:

- Adhere to the Auction Rules on Competition Caps; and
- Be accompanied by a Deposit paid into ComReg's bank account that shall at least correspond to the sum of the Reserve Prices of Lots requested by the Applicant by the deadline of 23:59 hours on Wednesday **26 October 2016**.

All Deposits are to be paid into ComReg's bank account. Transfers to ComReg's account should be made to:

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 "3.6 GHz Award"; and
- Your Bank quotes your Account Number (if an existing ComReg account holder) in making the transfer to ComReg.

Information Required	Information Provided
Applicant Name:	
Total no. Lots applied for:	
Total amount of Deposit:	

Lot Category	Region	Frequency band	Number of Lots available	Lot size	Reserve Price per Lot (€)	Annual SUF per Lot (€)	Eligibility Points per Lot	Number of Lots applied For per Lot Category
A1	Border, Midlands & West	3 410 – 3 435 MHz	1	25 MHz	114,000	17,670	50	
B1	Border, Midlands & West	3 475 – 3 800 MHz	65	5 MHz	22,800	3,534	10	
A2	South West	3 410 – 3 435 MHz	1	25 MHz	72,000	11,160	25	
B2	South West	3 475 – 3 800 MHz	65	5 MHz	14,400	2,232	5	
A3	East	3 410 – 3 435 MHz	1	25 MHz	64,000	9,920	25	
B3	East	3 475 – 3 800 MHz	65	5 MHz	12,800	1,984	5	
A4	South East	3 410 – 3 435 MHz	1	25 MHz	44,000	6,820	25	
B4	South East	3 475 – 3 800 MHz	65	5 MHz	8,800	1,364	5	
A5	Dublin CSO boundary for City and Suburbs	3 410 – 3 435 MHz	1	25 MHz	178,000	27,590	75	
B5	Dublin CSO boundary for City and Suburbs	3 475 – 3 800 MHz	65	5 MHz	35,600	5,518	15	
A6	Cork CSO boundary for City and Suburbs	3 410 – 3 435 MHz	1	25 MHz	34,000	5,270	10	
B6	Cork CSO boundary for City and Suburbs	3 475 – 3 800 MHz	65	5 MHz	6,800	1,054	2	
A7	Limerick CSO boundary for City and Suburbs	3 410 – 3 435 MHz	1	25 MHz	16,000	2,480	5	
B7	Limerick CSO boundary for City and Suburbs	3 475 – 3 800 MHz	65	5 MHz	3,200	496	1	
A8	Galway CSO boundary for City and Suburbs	3 410 – 3 435 MHz	1	25 MHz	14,000	2,170	5	

Lot Category	Region	Frequency band	Number of Lots available	Lot size	Reserve Price per Lot (€)	Annual SUF per Lot (€)	Eligibility Points per Lot	Number of Lots applied For per Lot Category
B8	Galway CSO boundary for City and Suburbs	3 475 – 3 800 MHz	65	5 MHz	2,800	434	1	
A9	Waterford CSO boundary for City and Suburbs	3 410 – 3 435 MHz	1	25 MHz	8,000	1,240	5	
B9	Waterford CSO boundary for City and Suburbs	3 475 – 3 800 MHz	65	5 MHz	1,600	248	1	

Table 2: Initial Bid Form

Applicant Name: _____

(Signature of those persons who are empowered to bind the Applicant or otherwise authorised to bind the Applicant)

Name in block capitals: _____

Date (DD/MM/YYYY):

--	--	--	--	--	--	--	--	--

Application Checklist

Tick the boxes to ensure that all the required information is included in your Application. A complete Application must consist of the following:

Part 1: Administrative Information - All sections of Table 1 completed and signed.

- Appropriate evidence for signatory of Application as specified in Section 3.3.2 of the Information Memorandum
- Ownership Structure Document as specified in Section 3.3.2

Part 2: Applicant Declaration signed

Part 3: Initial Bid Form completed and signed

Application Procedure

The Application procedure is set out in Section 3.3.6 of the Information Memorandum and states that:

In order to take part in the Award Process, Applicants must submit four completed and identical Application Forms on paper including four identical copies of an Ownership Structure Document and an electronic copy of same in an editable format on CD-ROM. The container(s) in which the Application Form and Ownership Structure Documents and CD-ROM are submitted must not in any way disclose the identity of the Applicant.

ComReg will only accept applications on Working Days from **20 October 2016 to 26 October 2016** between **10.00 and 16.00 hours (Irish time)**. Applicants are required to make an appointment with ComReg to submit an Application. To make an appointment to submit an Application, Applicants are required to contact **Mr Joseph Coughlan** on Working Days between **18 October 2016 and 25 October 2016**, and between 10.00 to 13:00 and 14:00 to 16.00 hours (Irish time) at:

Phone: 00 353 (0)1 804 9767

All Applications will be date and time stamped. Applicants will be given a receipt acknowledging the submission of their Application.

An Application can be replaced at any time up to 16.00 hours (Irish time) on the Application Date, **26 October 2016**. In the event that an Applicant submits more than one Application prior to 16.00 on the Application Date, only the latest Application received from that Applicant will be taken into consideration.

On the submission of a second or subsequent Application prior to the Application Date, the Applicant must return the receipt for the prior Application to ComReg. This receipt will be endorsed to indicate that the earlier Application has been superseded and will not be evaluated. However, any superseded Applications will not be returned until after the Qualification Stage of the Award Process.

No Applications will be opened by ComReg until after 16:00 hours (Irish time) on the Application Date **26 October 2016**. Applications will be opened in the presence of an independent auditor.

The deadline for receipt of Deposits, as set out in Section 3.3.3, will be 23:59 hours (Irish time) on the Application Date **26 October 2016**.

Annex 4: Alliance Notification Form¹²⁸

Winning Bidders wishing to notify ComReg of the formation of an Alliance must complete Parts 1 and 2 of this notification form.

Part 1: Administrative Information

We hereby notify ComReg that we have formed an Alliance for the purposes of the Assignment Stage of the Award Process

Names of Alliance Members	Information provided
Name of Winning Bidder 1 (The Leading Member)	
Name of Winning Bidder 2	
Name of Winning Bidder 3	
Name of Winning Bidder 4	
Name of Winning Bidder 5 ¹²⁹	
Agents authorised to bind the Alliance	
Agent 1	Name:
Agent 2	Name:

Table 1: Administrative information

Note: This form must be signed by an Authorised Agent on behalf of each Winning Bidder participating in the Alliance. Forms signed by one or more Winning Bidders may be exchanged between Winning Bidders by Fax, or scanned email copies and, in signing this form, Winning Bidders agree that such a composite copy shall be binding.

Note: An Alliance may nominate at most two individuals who may act as Authorised Agent on behalf of the Alliance as a whole in submitting Assignment Stage bids. In case of any duplication of submissions made on behalf of the Alliance by different Authorised Agents, the submission made by the first Authorised Agent would be considered as final and binding.

¹²⁸ A writeable PDF format of this form will be made available on the ComReg website.

¹²⁹ Add continuation sheets if there are more than 5 Winning Bidders participating in the Alliance.

Part 2: Alliance Declaration

The concepts of “Alliance”, “Assignment Round”, “Auction Rules”, “Connected Person”, “Insider”, and “Winning Bidder” for the purposes of this declaration shall be construed as defined in the Information Memorandum.

We, the undersigned, each being an Authorised Agent of a Winning Bidder being a member of the Alliance (a “**Member**”) hereby undertake, warrant and declare, and to the extent that anything contemplated hereunder remains to be done, covenant, on our own behalf and on behalf of the Member for whom we act, that:

1. The Alliance has been formed in accordance with the rules set out in the Information Memorandum.
2. The Member for whom we act has ensured and will ensure that all information and all declarations contained in this form are correct and accurate.
3. The Alliance and each of the Members shall comply with the Auction Rules as contained in the Information Memorandum including, without limitation, the provisions of Chapter 5 at all times and shall procure that each Member’s personnel, Insiders and Connected Persons, to the extent appropriate, shall also comply with the Auction Rules.
4. Each of the Members of the Alliance hereby confirms that it shall be bound by any Bid submitted in the Assignment Round by either of the Alliance’s Authorised Agents set out in Part 1 above, which agents are already each Authorised Agents on behalf of a Member.

Name of Winning Bidder 1 – the “Leading Member” (in block capitals)

(Signature Authorised Agent of Winning Bidder)

Name in block capitals: _____

Date (DD/MM/YYYY):

--	--	--	--	--	--	--	--

Name of Winning Bidder 2 (in block capitals)

(Signature Authorised Agent of Winning Bidder)

Name in block capitals: _____

Date (DD/MM/YYYY):

--	--	--	--	--	--	--	--

Name of Winning Bidder 3 (in block capitals)

(Signature Authorised Agent of Winning Bidder)

Name in block capitals: _____

Date (DD/MM/YYYY):

--	--	--	--	--	--	--	--

Name of Winning Bidder 4 (in block capitals)

(Signature Authorised Agent of Winning Bidder)

Name in block capitals: _____

Date (DD/MM/YYYY):

--	--	--	--	--	--	--	--

Name of Winning Bidder 5 (in block capitals)¹³⁰

(Signature Authorised Agent of Winning Bidder)

Name in block capitals: _____

Date (DD/MM/YYYY):

--	--	--	--	--	--	--	--

¹³⁰ Add continuation pages if more than 5 Members.

Annex 5: Worked Example of Activity Rules for the Primary Bid Rounds and Caps on Supplementary Bids

- A 5.1 This annex presents a worked example¹³¹ 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 all the calculations (similar to those described below e.g. 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 5.2 The Supplementary Bids Round example is shown in several variations to illustrate how the application of the caps can differ depending on a Bidder's Final Primary Package.
- A 5.3 The first part of the example shows how a Bidder can state its demand for Lots in Primary Bid Rounds and change it as Round Prices evolve, including:
- changing the number of Lots it bids for;
 - switching between Regions;
 - switching between Lot Types; and
 - using Relaxed Primary Bids.
- A 5.4 The example then proceeds to illustrate the mechanics of the Supplementary Bids Round and the constraints that apply to Supplementary Bids.
- A 5.5 Bidders will be assisted with their Bid decisions throughout the Auction by the EAS, which will automatically make the necessary calculations¹³² on behalf of the Bidder (e.g. calculating the Bid Amount and Eligibility Associated with the Bidder's selected Package during the Primary Bid Rounds, calculating the relevant floors and caps that apply to Supplementary Bids) and will allow the

¹³¹ 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.

¹³² 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.

Bidder to check this information before either confirming or amending its Bid decisions.

A5.1 Set-up

- A 5.6 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 5.7 The example assumes there are two Regions (Region 1 and Region 2) with two Lot types (A and B) in each Region; A-Lots are frequency-specific whereas B-Lots are frequency-generic. This gives four Lot Categories in total (A1, B1, A2 and B2).
- A 5.8 Eligibility Points assigned to the A-Lots are five times as high as for B-Lots. For simplicity, the Eligibility Points for Region 1 and Region 2 are the same. Lot Category information is summarised in Table 1 below.

Lot Category	Number of Lots	Size	Eligibility Points
A1	1	25 MHz	5
B1	65	5 MHz	1
A2	1	25 MHz	5
B2	65	5 MHz	1

Table 1: Example Lot Categories and Eligibility Points

- A 5.9 There are no Competition Caps in this example.
- A 5.10 The example focuses on a Bidder which obtains an Initial Eligibility of 8 from its application form (see paragraph A 5.20 below).
- A 5.11 Suppose the Bidder is interested in winning spectrum in just one Region – either Region 1 or Region 2. The Bidder wishes to acquire at least 40 MHz in Region 1, or at least 25 MHz in Region 2. The Bidder wishes to acquire a contiguous frequency assignment within each Region, meaning that it may consider bidding for either of the Lot Types in Region 2 (where it could obtain 25 MHz of contiguous spectrum by winning one A-Lot or five B-Lots), but it will not consider bidding for the A-Lot in Region 1 (because by winning the A-Lot and winning at least 40 MHz in total the Bidder would receive a non-contiguous frequency assignment).
- A 5.12 More specifically, suppose the Bidder is interested in the following Packages, and has estimated a valuation for each Package representing the net present value of profit that the Bidder would expect to generate from the use of the spectrum, based on the Bidder's particular business case.

Lots in Package			Valuation (€)	Eligibility Points
B1	A2	B2		
8	0	0	440,000	8
0	0	8	435,000	8
0	0	6	350,000	6
0	0	5	305,000	5
0	1	0	260,000	5

Table 2: Packages of Lots and corresponding valuations and Eligibility

A 5.13 In this example, the Bidder will make bidding decisions based on the ‘surplus’ associated with each Package. Surplus is calculated by subtracting the Bid Amount for a Package from the Bidder’s valuation for that Package. For example, if the Bidder bids for eight B1 Lots and the Bid Amount is €400,000, the surplus associated with this Bid is €40,000.

A 5.14 Defined in this way, the surplus represents the net return that the Bidder would expect if it won the Package 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.¹³³

A 5.15 For the purposes of this example we assume that the Bidder bids according to its valuations, in the sense that:

- it will never bid for a Package when the surplus is negative, because this would entail the possibility of winning spectrum with a negative expected return; and
- when there are multiple Packages with positive surplus, the Bidder will prefer to bid on the Package that has the highest surplus, as this is the Package that gives the highest expected return.¹³⁴

A5.2 Primary Bid Rounds

Initial Bid

A 5.16 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 specified and corresponding total price is the Bidder’s Initial Bid.

¹³³ For simplicity, here we ignore any Additional Price that the Bidder may have to pay following the Assignment Stage.

¹³⁴ We do not consider the possibility of ties as these do not arise in the example.

A 5.17 In our example, the Bidder is interested only in Lot Categories B1, A2 and B2. The Reserve Price per Lot for each of these Lot Categories are as set out in Table 3 below.

Lot Category	Reserve Price (€)
B1	38,000
A2	198,000
B2	38,000

Table 3: Reserve Prices

A 5.18 Based on these prices, the Bidder can calculate the surplus associated with each of the five Packages it is interested in. As explained in the previous section, the surplus is calculated as the Bidder's valuation for a Package minus the relevant price for that Package (in this case, based on Reserve Prices). The surplus for each Package at Reserve Prices is shown in Table 4 below, with the Bidder's preferred Package¹³⁵ highlighted in green.

Package			Valuation (€)	Reserve Prices (€)	Surplus (€)
B1	A2	B2			
8	0	0	440,000	304,000	136,000
0	0	8	435,000	304,000	131,000
0	0	6	350,000	228,000	122,000
0	0	5	305,000	190,000	115,000
0	1	0	260,000	198,000	62,000

Table 4: Bidder's preferences at Reserve Prices

A 5.19 The Bidder would therefore want to be awarded eight B1 Lots at Reserve Prices and this would be the Package it would include in its Initial Bid, with an associated Bid Amount of €304,000.

A 5.20 The Bidder's Initial Eligibility is therefore 8, equal to the sum of the Eligibility Points assigned to each of the Lots included in the Package selected in its Initial Bid.

A 5.21 The 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

¹³⁵ Note that references to a Bidders preferred Package in this example mean the Package 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 may change relative to the Package specified in its Initial Bid(or earlier Primary Bid Rounds), in line with changing relative prices.

on Initial Bids, the Round Price would be equal to the Reserve Price for that Lot Category.

A 5.22 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 Reserve Prices for the first Primary Bid Round.

Lot Category	Reserve Price (€)	Aggregate Demand	Excess demand	Round 1 price (€)
B1	38,000	95	30	40,000
A2	198,000	2	1	200,000
B2	38,000	85	20	40,000

Table 5: Round 1 Prices

The first Primary Bid Round

A 5.23 In the first Primary Bid Round, Bidders need to state their demand for 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 5.24 Based on the Round 1 prices, the Bidder can calculate the surplus associated with each of the five Packages it is interested in. The surplus for each Package is shown in Table 6 below, with the Bidder's preferred Package at Round 1 prices highlighted in green.

Package			Valuation (€)	Package price at current Round Prices (€)	Surplus (€)
B1	A2	B2			
8	0	0	440,000	320,000	120,000
0	0	8	435,000	320,000	115,000
0	0	6	350,000	240,000	110,000
0	0	5	305,000	200,000	105,000
0	1	0	260,000	200,000	60,000

Table 6: Bidder's preferences in Round 1

A 5.25 The Bidder would therefore, acting rationally, Bid in the first round for a Package of eight B1 Lots. Upon entering this selection, the EAS would calculate and display the Bid Amount corresponding to this Package (€320,000) and the Eligibility of the Package (8), allowing the Bidder to confirm the decision (or to change the selection if it so wished). The Activity of the Bidder's Bid in the round is equal to the Bidder's Initial Eligibility, so the Bidder maintains its Eligibility for the next Primary Bid Round.

A 5.26 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 Lot Categories with excess demand (i.e. more

Aggregate Demand than there are Lots available) would increase in price. To illustrate this, Table 7 shows Aggregate Demand for the three Lot Categories the Bidder is interested in for this example. At the end of Round 1 there is excess demand in all three Lot Categories, so all three prices will increase in the next Primary Bid Round.

Lot Category	Round1 price (€)	Aggregate Demand	Excess demand	Round 2 prices (€)
B1	40,000	95	30	43,000
A2	200,000	2	1	201,000
B2	40,000	85	20	41,000

Table 7: Round 1 results

Switching between Regions

A 5.27 From one Primary Bid Round to another, a Bidder is free to change the number of Lots that it bids for in different Regions, as long as the Eligibility of the Package Bid for does not exceed the Bidder's Eligibility.

A 5.28 In Round 2, the Bidder again decides which Package to bid for by choosing the Package with the highest surplus based on Round 2 prices, as shown in Table 8 below.

Package			Valuation (€)	Package price at current Round Prices (€)	Surplus (€)
B1	A2	B2			
8	0	0	440,000	344,000	96,000
0	0	8	435,000	328,000	107,000
0	0	6	350,000	246,000	104,000
0	0	5	305,000	205,000	100,000
0	1	0	260,000	201,000	59,000

Table 8: Bidder's preferences in Round 2

A 5.29 After a relatively large increase in the price of B1 Lots, the preferred Package is now the Package of eight B2 Lots. The Bidder Bids for this Package. The Eligibility of this Package, 8, is equal to the Bidder's Eligibility, so the Bidder maintains its Eligibility for the next Primary Bid Round.

A 5.30 The outcome of Round 2 is shown in Table 9 below. This time there is excess demand for B1 and B2 Lots but not for the A2 Lot, so the price of the A2 Lot does not increase in Round 3.

Lot Category	Round 2 price (€)	Excess demand	Round 3 prices (€)
B1	43,000	Yes	45,000
A2	201,000	No	201,000
B2	41,000	Yes	44,000

Table 9: Round 2 results

Reducing Demand

A 5.31 As prices increase, a Bidder may wish to reduce its demand by bidding for fewer Lots. If a Bidder bids for a Package with Eligibility that is less than the Bidder's Eligibility at the start of the round, the Bidder's Eligibility for the next Primary Bid Round is reduced. In our example, the Bidder's Eligibility at the beginning of Round 3 is 8. The Bidder's preferences in this round are shown in Table 10 below.

Package			Package price at current		
B1	A2	B2	Valuation (€)	Round Prices (€)	Surplus (€)
8	0	0	440,000	360,000	80,000
0	0	8	435,000	352,000	83,000
0	0	6	350,000	264,000	86,000
0	0	5	305,000	220,000	85,000
0	1	0	260,000	201,000	59,000

Table 10: Bidder's preferences in Round 3

A 5.32 After the price of B2 Lots has increased again, in Round 3 the Bidder prefers to reduce demand and bid for a Package of six B2 Lots, with Associated Eligibility of 6. As this is lower than the Bidder's Eligibility, submitting this Bid means that the Bidder's Eligibility for the following Primary Bid Round is reduced from 8 to 6. The outcome of Round 3 is shown in Table 11 below.

Lot Category	Round 3 price (€)	Excess demand	Round 4 prices (€)
B1	45,000	Yes	50,000
A2	201,000	Yes	211,000
B2	44,000	Yes	50,000

Table 11: Round 3 results

A 5.33 In Round 4, the Bidder's Eligibility is 6 and the Bidder's preferences are illustrated in Table 12 below.

Package			Valuation (€)	Package price at current	
B1	A2	B2		Round Prices (€)	Surplus (€)
8	0	0	440,000	400,000	40,000
0	0	8	435,000	400,000	35,000
0	0	6	350,000	300,000	50,000
0	0	5	305,000	250,000	55,000
0	1	0	260,000	211,000	49,000

Table 12: Bidder's preferences in Round 4

A 5.34 In order to maximise surplus, following another price increase the Bidder now bids for a Package of five B2 Lots. The Eligibility of this Package, 5, is less than the Bidder's Eligibility, so the Bidder's Eligibility is reduced from 6 to 5 for the next Primary Bid Round.

A 5.35 The outcome of Round 4 is shown in Table 13 below.

Lot Category	Round 4 price (€)	Excess demand	Round 5 prices (€)
B1	50,000	No	50,000
A2	211,000	No	211,000
B2	50,000	Yes	56,000

Table 13: Round 4 results

Switching between Lot Types

A 5.36 As well as switching between Regions, a Bidder is free to switch demand between different Lot Types within the same Region, subject to the Eligibility of the Package bid for being less than or equal to the Bidder's Eligibility at the start of the round.

A 5.37 In Round 5, the Bidder's Eligibility is 5. The surplus the Bidder would achieve at Round 5 prices is shown in Table 14 below.

Package			Valuation (€)	Package price at current	
B1	A2	B2		Round Prices (€)	Surplus (€)
8	0	0	440,000	400,000	40,000
0	0	8	435,000	448,000	-13,000
0	0	6	350,000	336,000	14,000
0	0	5	305,000	280,000	25,000
0	1	0	260,000	211,000	49,000

Table 14: Bidder's preferences in Round 5

A 5.38 B2 Lots have become more expensive and the Bidder now prefers to bid for a single A2 Lot. The Eligibility of this Package, 5, is equal to the Bidder's Eligibility, so the Bidder maintains its Eligibility for the next Primary Bid Round.

A 5.39 The outcome of Round 5 is shown in Table 15 below.

Lot Category	Round 5 price (€)	Excess demand	Round 6 prices (€)
B1	50,000	No	50,000
A2	211,000	Yes	230,000
B2	56,000	Yes	61,000

Table 15: Round 5 results

Making Relaxed Primary Bids and Chain Bids

A 5.40 A Bidder that has reduced its Eligibility in one or more Primary Bid Rounds and/or submitted an Initial Bid resulting in Initial Eligibility strictly below the maximum possible may still be able, under certain conditions, to make a Bid for a Package with Eligibility greater than the Bidder's current Eligibility. This is known as a Relaxed Primary Bid. In some cases, making a Relaxed Primary Bid will require that the Bidder also make additional new Bids for other Packages. These are known as Chain Bids.

A 5.41 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 Bidders will not be required to perform any of these calculations in practice. 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 pre-determined valuations, as in this example. Therefore, Bidders that adopt this bidding approach know that they will be able to bid for their preferred Package at all times and need not worry about the detailed conditions for Relaxed Primary Bids to be allowed.

A 5.42 In Round 6, the Bidder's Eligibility is 5. Following an increase in the price of the A2 Lot, the Bidder's preferences are shown in Table 16 below.

Package			Package price at current		
B1	A2	B2	Valuation (€)	Round Prices (€)	Surplus (€)
8	0	0	440,000	400,000	40,000
0	0	8	435,000	488,000	-53,000
0	0	6	350,000	366,000	-16,000
0	0	5	305,000	305,000	0
0	1	0	260,000	230,000	30,000

Table 16: Bidder's preferences in Round 6

A 5.43 In Round 6 the Bidder's preferred Package consists of eight B1 Lots. The Eligibility of this Package, 8, is greater than the Bidder's Eligibility of 5. In order to determine whether a Relaxed Primary Bid for the Package of eight B1 Lots is allowed, the EAS will check two conditions. To do this, the EAS

identifies the last Primary Bid Round in which the Bidder had sufficient Eligibility to Bid for eight B1 Lots, which was Round 3. In Round 3, the Bidder had Eligibility equal to 8 and opted to bid instead for a Package of six B2 Lots, with Associated Eligibility equal to 6. The conditions to be checked relate to these two Packages, which we can call 'Package X' (eight B1 Lots) and 'Package Y' (six B2 Lots).

A 5.44 For a Relaxed Primary Bid for Package X to be allowed, the first condition is that the difference in price between Package X and Package Y at Round 6 prices must not exceed the difference in price between the two Packages at Round 3 prices:

- At Round 3 prices, the price of Package X was €360,000 and the price of Package Y was €264,000. The difference in price is €96,000.
- At Round 6 prices, the price of Package X is €400,000 and the price of Package Y is €366,000. The difference in price is €34,000.
- Since €34,000 is less than €96,000, the condition is satisfied.

A 5.45 The second condition is that the difference between the price of Package X at Round 6 prices and the highest Bid Amount submitted for Package Y at any point should not exceed the difference in price of the two Packages at Round 3 prices.

- At Round 6 prices, the price of Package X is €400,000.
- The highest Bid Amount submitted for Package Y was €264,000, in Round 3.
- The difference between these two amounts is €136,000.
- The difference in price of the two Packages at Round 3 prices was €96,000.
- Since €136,000 is greater than €96,000, the condition is not satisfied.

A 5.46 In order to satisfy the second condition, the Bidder must make a higher Bid for Package Y (a Chain Bid). The required Bid Amount for this Chain Bid is just high enough to satisfy the (second) condition above i.e. the Bid Amount for the Chain Bid is calculated as the price of Package X at Round 6 prices (€400,000), minus the difference in price of the two Packages at Round 3 prices (€96,000). Therefore, in order to submit a Relaxed Primary Bid for Package X, the Bidder must submit a Chain Bid of €304,000 for Package Y.¹³⁶

¹³⁶ Note that a Chain Bid is only permissible if the Bid Amount does not exceed the price of the relevant Package at current Round Prices, a condition which is satisfied here because the price of Package Y at Round 6 prices is €366,000.

A 5.47 Having determined the required Chain Bid for Package Y, the EAS would check whether there have been any further Eligibility reductions after Round 3. The Bidder further reduced its Eligibility in Round 4 by bidding on a Package of five B2 Lots – call this ‘Package Z’. Because of this, and the increased Bid Amount for Y, a Chain Bid may be required for Package Z.

A 5.48 The relevant condition is that the difference between the highest Bid Amount for Package Y (in this case the Bid Amount for the Chain Bid to be entered) and the highest Bid Amount submitted for Package Z should not exceed the difference in the price of the two Packages at Round 4 prices.¹³⁷

- The highest Bid for Package Y is the Chain Bid of €304,000.
- The highest Bid Amount submitted for Package Z was €250,000, in Round 4.
- The difference between these two amounts is €54,000.
- The difference between the price of the two Packages at Round 4 prices was €300,000 – €250,000 = €50,000.
- Since €54,000 is greater than €50,000, the condition is not satisfied.

A 5.49 In order for the Relaxed Primary Bid to be possible, the Bidder’s Bids must satisfy the above condition, which requires making a higher Bid for Package Z (another Chain Bid).

A 5.50 The required Bid Amount for this Chain Bid is calculated as the Chain Bid Amount for Package Y (€304,000), minus the difference between the prices of the two Packages at Round 4 prices (€50,000), which gives €254,000. Therefore, in order to submit a Relaxed Primary Bid for Package X, the Bidder must submit a Chain Bid for Package Z of €254,000,¹³⁸ as well as a Chain Bid for Package Y of €304,000.

A 5.51 As there are no further Eligibility reductions after Round 4, there is no possibility of further Chain Bids being required.

A 5.52 In summary, in Round 6 the Bidder makes the following Bids:

- a Relaxed Primary Bid for eight B1 Lots, at Round 6 prices;
- a Chain Bid for six B2 Lots with Bid Amount €304,000; and
- a Chain Bid for five B2 Lots with Bid Amount €254,000.

¹³⁷ Otherwise the relative Bid Amounts for Y and Z would be inconsistent with the Bidder’s decision to Bid for Z instead of Y in Round 4.

¹³⁸ Note that a Chain Bid is only permissible if the Bid Amount does not exceed the price of the relevant Package at current Round Prices, a condition which is satisfied here because the price of Package Z at Round 6 prices is €305,000.

A 5.53 As mentioned, the EAS would automatically inform the Bidder that a Relaxed Primary Bid was possible for Package X and that it would require these particular Bids for Packages Y and Z.

A 5.54 Table 17 below shows that the Bidder is happy to make the necessary Chain Bids, as they all have a positive surplus.

Package			Type of Bid	Valuation (€)	Bid Amount	
B1	A2	B2			(€)	Surplus (€)
8	0	0	Relaxed Primary Bid	440,000	400,000	40,000
0	0	6	Chain Bid	350,000	304,000	46,000
0	0	5	Chain Bid	305,000	254,000	51,000

Table 17: Bidder's decision in Round 6

A 5.55 As mentioned earlier, for any Bidder that bids consistently according to pre-determined valuations (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 5.56 The outcome of Round 6 is shown in Table 18 below.

Lot Category	Round 6 price (€)	Excess demand	Round 7 prices (€)
B1	50,000	Yes	54,000
A2	230,000	No	230,000
B2	61,000	No	61,000

Table 18: Round 6 results

A 5.57 Note that the Activity Rules allow for Relaxed Primary Bids to be submitted for Packages with Eligibility that exceeds the Bidder's Initial Eligibility. Suppose for example that the Bidder wished to submit a Relaxed Primary Bid for Package W, with Eligibility of 9, which exceeds the Bidder's Initial Eligibility of 8. For this Relaxed Primary Bid to be allowed, the two conditions that must be satisfied are that:

- the difference in price between Package W and the Package specified in the Bidder's Initial Bid at current Round Prices must not exceed the difference in price between the two Packages at Reserve Prices; and
- the difference between the price of Package W at current Round Prices and the highest Bid Amount submitted for the Package specified in the

Bidder's Initial Bid at any point should not exceed the difference in price between the two Packages at Reserve Prices.¹³⁹

A 5.58 Chain Bids may also be required if there is a need to increase the Bid Amount submitted for the Package specified in the Bidder's Initial Bid. 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.

The final Primary Bid Round

A 5.59 In Round 7, the Bidder's Eligibility is again 5. Following an increase in the price of B1 Lots, the Bidder's decision is shown in Table 19 below.

Package			Package price at current		
B1	A2	B2	Valuation (€)	Round Prices (€)	Surplus (€)
8	0	0	440,000	432,000	8,000
0	0	8	435,000	488,000	-53,000
0	0	6	350,000	366,000	-16,000
0	0	5	305,000	305,000	0
0	1	0	260,000	230,000	30,000

Table 19: Bidder's preferences in Round 6

A 5.60 The Bidder now bids for a Package of one A2 Lot.

A 5.61 Suppose that, at the end of Round 7, there is no excess demand in any Lot Category. Round 7 is the final Primary Bid Round, and the Package consisting of a single A2 Lot becomes the Bidder's Final Primary Package.

A 5.62 A summary of the Primary Bids submitted by this Bidder is shown in Table 20 below.

¹³⁹ That is, the conditions are the same as for other Relaxed Primary Bids, except that the last point at which the Bidder is considered to have been eligible to submit a Bid for the Package is at the Application Stage, when it chose to submit an Initial Bid for a different Package (in this case the Package with eight B2 Lots).

Round	Eligibility	Activity	Package			Type of Primary Bid	Bid Amount (€)
			B1	A2	B2		
1	8	8	8	0	0	Standard	320,000
2	8	8	0	0	8	Standard	328,000
3	8	6	0	0	6	Standard	264,000
4	6	5	0	0	5	Standard	250,000
5	5	5	0	1	0	Standard	211,000
6	5	8	8	0	0	Relaxed	400,000
			0	0	6	Chain	304,000
			0	0	5	Chain	254,000
7	5	5	0	1	0	Standard	230,000

Table 20: Summary of Primary Bids submitted

A 5.63 Notice that some of the Bids submitted in the earlier Primary Bid Rounds are 'dominated' by higher Bids submitted in the later Primary Bid Rounds. For example, the Bid of €264,000 for a Package of six B2 Lots submitted in Round 3 became redundant when the Bidder submitted a higher Bid of €304,000 for the same Package in Round 6; it is impossible for the lower Bid to become a Winning Bid. Therefore, it is informative to look only at the highest Bids that the Bidder has submitted for each Package, as summarised in Table 21 below.

Package			Valuation (€)	Highest Amount (€)	Surplus (€)
B1	A2	B2			
8	0	0	440,000	400,000	40,000
0	0	8	435,000	328,000	107,000
0	0	6	350,000	304,000	46,000
0	0	5	305,000	254,000	51,000
0	1	0	260,000	230,000	30,000

Table 21: Highest Primary Bids submitted for each Package

A 5.64 For all Packages the Bidder has a positive surplus at these Bid Amounts, meaning that the Bidder can make yet higher Bids in the Supplementary Bids Round in order to increase its chances of winning one of the Packages while still avoiding the risk of a negative return on the spectrum won.

A5.3 Supplementary Bids Round

A 5.65 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 bid on during the Primary Bid Rounds; and
- add additional Packages with corresponding Bid Amounts.

- A 5.66 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 to the Bidder's list of Supplementary Bids.
- A 5.67 A Bidder is able to submit Supplementary Bids for up to 1,000 Packages, including the Package specified in the Bidder's Initial Bid and any Package the Bidder Bid for during the Primary Bid Rounds. In this example, the Bidder has already submitted Bids for 5 Packages, so can submit Supplementary Bids for an additional 995 Packages.
- A 5.68 The Package 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 by any amount, unless the FPP is a Zero Bid or a Relaxed Primary Bid.
- A 5.69 Supplementary Bids for all other Packages are subject to caps on the Bid Amount.
- A 5.70 The rules for calculating these caps are explained in Section 4.2.3. All Supplementary Bids (other than for the FPP) are subject to a Final Price Cap. Additionally, all Supplementary Bids for Packages with Eligibility larger than the Bidder's Eligibility at the start of the final Primary Bid Round are subject to Relative Caps.
- A 5.71 This section demonstrates the Supplementary Bid cap rules under three different versions of the example of the Primary Bid Rounds used above:
- Case 1: the Primary Bid Round 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;
 - Case 2: we assume an additional round in which the Bidder submitted a Zero Bid; and
 - Case 3: the Primary Bid Rounds ended after Round 6, so that the Bidder's FPP is a Relaxed Primary Bid.
- A 5.72 In all three versions, we assume the Bidder's valuations to be as in the example above and shown in Table 22.
- A 5.73 These calculations are for illustrative purposes only. Bidders do not necessarily have to perform these calculations themselves. When trying 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.

B1	Package		Valuation (€)	Eligibility Points
	A2	B2		
8	0	0	440,000	8
0	0	8	435,000	8
0	0	6	350,000	6
0	0	5	305,000	5
0	1	0	260,000	5

Table 22: Packages of Lots and corresponding example valuations and Eligibility

A 5.74 In this example, the Bidder only has valuations for five Packages and has already submitted Bids for all of them in the Primary Bid Rounds. The Bidder therefore simply needs to raise the Bid Amounts in the Supplementary Bids Round. In addition, all Packages the Bidder is interested in have associated Eligibility less than or equal to the Bidder's Initial Eligibility. Note, however, that the Supplementary Bid cap calculations for newly added Packages and for Packages larger (in terms of Eligibility Points) than the Package specified in the Bidder's Initial Bid work in exactly the same way as the example calculations shown in this section.¹⁴⁰

Case 1: Non-zero Final Primary Package within Eligibility

A 5.75 Suppose that the Primary Bid Round history is as set out in the example above and shown in Table 23. Initially, the EAS will show a list of Supplementary Bids containing the five Packages the Bidder has bid on in the Primary Bid Rounds at the highest Bid Amounts submitted for the Package so far. The Bidder can increase these Bid Amounts and add additional Packages to its list of Supplementary Bids.

Round	Eligibility	Activity	Package			Type of Primary Bid	Bid Amount (€)
			B1	A2	B2		
1	8	8	8	0	0	Standard	320,000
2	8	8	0	0	8	Standard	328,000
3	8	6	0	0	6	Standard	264,000
4	6	5	0	0	5	Standard	250,000
5	5	5	0	1	0	Standard	211,000
6	5	8	8	0	0	Relaxed	400,000
			0	0	6	Chain	304,000
			0	0	5	Chain	254,000
7	5	5	0	1	0	Standard	230,000

Table 23: Summary of Primary Bids submitted

¹⁴⁰ For Packages with Eligibility in excess of the Bidder's Initial Eligibility, the Relative Cap is calculated on the basis that the last point at which the Bidder could have Bid for the Package but chose not to do so was in the Application Stage, when it chose to Bid (at Reserve Prices) for the Package included in its Initial Bid instead.

A 5.76 The Bids do not fully express the Bidder's valuations, so in this example the Bidder submits Supplementary Bids up to its valuations.

A 5.77 The Packages for which the Bidder has valuations are considered in increasing order of Package Eligibility. This is because the relevant caps are linked and it is therefore important to raise the Bid Amounts for 'Constraining Packages' (Packages the Bidder bid on in Eligibility-reducing rounds) first.

A 5.78 First, the Bidder wishes to increase the Bid Amount for its FPP, which is non-zero and not a Relaxed Primary Bid. There is no restriction on the Bid Amount for the FPP in this case, so the Bidder simply increases the Bid Amount from €230,000 to €260,000.

A 5.79 Secondly, the Bidder wishes to increase the Bid Amount for the Package of 5 B2 Lots, as its valuation for the Package (€305,000) exceeds the highest Bid Amount on the Package so far (€254,000). The Final Price Cap for this Package X is calculated as:

- the highest Bid Amount for the FPP (€260,000); plus
- the difference between the price of X and the FPP at the Round Prices in the final Primary Bid Round (€305,000 – €230,000 = €75,000).

A 5.80 The Final Price Cap for the Package of five B2 Lots is therefore €335,000. This is higher than the Bidder's valuation for the Package, and the Bidder can therefore increase the Bid Amount to €305,000 as it would like to do. Note that the Package of five B2 Lots is not subject to a Relative Cap because the Bidder had sufficient Eligibility to bid for the Package in the final Primary Bid Round.

A 5.81 Next, the Bidder wishes to increase the Bid Amount for the Package of six B2 Lots, for which it has a valuation of €350,000 and so far a Bid Amount of €304,000. As above, the Final Price Cap for this Package Y is calculated as:

- the highest Bid Amount for the FPP (€260,000); plus
- the difference between the price of Y and the FPP at the Round Prices in the final Primary Bid Round (€366,000 – €230,000 = €136,000).

A 5.82 This gives a Final Price Cap of €396,000. Additionally, this Package is subject to a Relative Cap because the Bidder's Eligibility in the final Primary Bid Round was insufficient to bid for this Package. The Bidder was last eligible to bid on this Package Y in Round 4, but chose to bid on the Package of five B2 Lots instead. The Relative Cap for Y is calculated as follows:

- the highest Bid for the Package of five B2 Lots (€305,000 – a Supplementary Bid, as set out above); plus

- the difference between the price of Y and the price of five B2 Lots at the prices in Round 4 (€300,000 – €250,000 = €50,000).

A 5.83 This gives a Relative Cap of €355,000, which is tighter than the Final Price Cap, but still allows the Bidder to submit a Bid Amount of €350,000 (its valuation) for this Package.

A 5.84 Caps for the other Packages the Bidder has valuations for are calculated in a similar manner. All caps and Bid Amounts (equal to valuations) are shown in Table 24.

Package			Final Price Cap (€)	Relative Cap (€)	Bid Amount (€)
B1	A2	B2			
8	0	0	462,000	446,000	440,000
0	0	8	518,000	438,000	435,000
0	0	6	396,000	355,000	350,000
0	0	5	335,000	-	305,000
0	1	0	-	-	260,000

Table 24: Supplementary Bid caps and Bid Amounts

A 5.85 Note that none of the caps are binding and the Bidder can bid up to its valuation for all Packages. This is a direct consequence of the Bidder's behaviour in the Primary Bid Rounds. Because its bidding was consistent with its valuations in every round, the Supplementary Bids caps are not restrictive. This is not necessarily the case when there is inconsistent bidding behaviour in the Primary Bid Rounds.

Case 2: Zero Final Primary Package

A 5.86 In this alternative version of the example, assume that there was still excess demand in Round 7, but in Round 8 prices were such that the Bidder had no positive surplus for any Packages and it reduced demand to zero in all Lot Categories. The Primary Bid Rounds ended after round 8, and final Round Prices are shown in Table 25.

Lot Category	Round 8 price (€)	Package of Lots
B1	56,000	0
A2	261,000	0
B2	62,000	0

Table 25: Primary Bid Round 8 prices

A 5.87 Clearly, there is now a restriction on the Bidder's FPP: as it is the Zero Bid, the Bid Amount can only be zero. Therefore, the Final Price Cap and Relative Cap apply to all non-zero Packages.

A 5.88 As before, the Bidder still wishes to submit higher Supplementary Bid Amounts for its Packages.

A 5.89 First, it wishes to raise the Bid Amount for the Package of one A2 Lot. The Final Price Cap is calculated as follows:

- the highest Bid Amount for the FPP (€0); plus
- the difference between the price of one A2 Lot and the FPP at the Round Prices in the final Primary Bid Round (€261,000 – €0 = €261,000).

A 5.90 There is no additional Relative Cap for this package as the Eligibility of the Package is equal to the Bidder's Eligibility at the start of the final Primary Bid Round. The Bidder submits a Supplementary Bid for the Package of one A2 Lot at €260,000 (equal to valuation).

A 5.91 Similarly, the Final Price Cap for the Package of five B2 Lots is equal to the price of the Package at Final Primary Round Prices (€310,000), and the Bidder submits a Supplementary Bid at its valuation of €305,000.

A 5.92 For the larger Packages, Relative Caps also apply in addition to the Final Price Cap, calculated exactly as shown in Case 1 above.

A 5.93 All caps and Bid Amounts are shown in Table 26. As before, the caps are not binding and the Bidder can bid up to its valuation for all Packages it is interested in.

Package			Final Price Cap (€)	Relative Cap (€)	Bid Amount (€)
B1	A2	B2			
8	0	0	448,000	446,000	440,000
0	0	8	496,000	438,000	435,000
0	0	6	372,000	355,000	350,000
0	0	5	310,000	-	305,000
0	1	0	261,000	-	260,000

Table 26: Supplementary Bid caps and Bid Amounts

Case 3: Relaxed Primary Bid for the Final Primary Package

A 5.94 In this version, assume that after Round 6 there was no excess demand and the Primary Bid Rounds ended. This means that the FPP was the subject of a Relaxed Primary Bid. Final prices and the Bidder's demand are shown in Table 27. In this case the FPP is subject to a Relative Cap because the Bidder had insufficient Eligibility to bid on this Package in the last round.

Lot Category	Round 6 price (€)	Package of Lots
B1	50,000	8
A2	230,000	0
B2	61,000	0

Table 27: Primary Bid Round 6 prices

A 5.95 We start with the cap calculations for the Constraining Packages. These are the Packages bid on in Eligibility-reducing rounds (Rounds 4 and 3). The Final Price Cap for the Package of five B2 Lots (Round 4 Package) is calculated as:

- the highest Bid Amount for the FPP (€400,000, the Relaxed Primary Bid submitted in the final Primary Bid Round); plus
- the difference between the price of five B2 Lots and the FPP at the Round Prices in the final Primary Bid Round (€305,000 – €400,000).

A 5.96 This gives a Final Price Cap of €305,000. The Supplementary Bid for the Package is not subject to a Relative Cap because the Bidder's Eligibility in the final Primary Bid Round was sufficient to bid on it. The Bidder's valuation for this Package is €305,000, which is equal to the Final Price Cap, so the Bidder is allowed to submit a Supplementary Bid for the Package at valuation.¹⁴¹

A 5.97 Similarly, the Final Price Cap for the Package of six B2 Lots (Round 3 Package) is equal to the price of the Package at the Round Prices in the final Primary Bid Round (€366,000). This Package is also subject to a Relative Cap. The last round in which the Bidder was eligible to bid on the Package was Round 4, when it bid on five B2 Lots instead. The Relative Cap is:

- the highest Bid Amount for five B2 Lots (€305,000); plus
- the difference between the price of six B2 Lots and five B2 Lots at the Round Prices in Round 4 (€300,000 – €250,000 = €50,000).

A 5.98 This gives a Relative Cap of €355,000, so the Bidder can submit a Bid Amount of €350,000, which is its valuation for the Package.

A 5.99 The Relative Cap for the FPP is calculated with respect to Round 3, which is the most recent round in which the Bidder was eligible to bid on its FPP but chose to bid on another Package (six B2 Lots) instead. The Relative Cap is:

- the highest Bid Amount for six B2 Lots (€350,000); plus
- the difference in between the price of the FPP and six B2 Lots at the Round Prices in Round 3 (€360,000 – €264,000 = €96,000).

¹⁴¹ Note that the cap increases if the Bid Amount for the FPP is raised.

A 5.100 This gives a cap of €446,000, so the Bidder can raise the Bid Amount for the FPP to €440,000, its valuation for the Package. Note that the €40,000 increase of the FPP Bid Amount raises the Final Price Cap for all other Packages by €40,000.

A 5.101 The caps on Supplementary Bid Amounts for other Packages are calculated in exactly the same manner. All caps, and Bid Amounts equal to valuation are shown in Table 28 below.

Package			Final Price Cap (€)	Relative Cap (€)	Bid Amount (€)
B1	A2	B2			
8	0	0	-	446,000	440,000
0	0	8	528,000	438,000	435,000
0	0	6	406,000	355,000	350,000
0	0	5	345,000	-	305,000
0	1	0	270,000	-	260,000

Table 28: Supplementary Bid caps and Bid Amounts

Annex 6: Example of Winner and Price Determination

A 6.1 This section gives a very simple example of the winner and price determination process. There are four Bidders and two Lot Categories, 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 1, with the optimal allocation highlighted in green.

Bidder	Package		Bid Amount
	Lot Category A	Lot Category B	
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

Table 1: All Valid Bids in this example

- A 6.2 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 and Bidder 2's Bid for (1,1), generating a total value of 30 (shown in green in Table 1 above). The notation (x,y) refers to x A Lots and y B Lots.
- A 6.3 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).
- A 6.4 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 6.5 If we were to take Bidder 1's Bid for (0,2), we could only accommodate Bidder 2's Bid for (2,0), producing a total value of 28.
- A 6.6 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 6.7 This means that accepting Bids for (1,1) from Bidder 2 and (1,1) from Bidder 3 is the unique Winning Combination of Bids.

A7.2 Base Price determination

A 6.8 Taking the example provided above, we establish the Opportunity Cost Associated with Bidder 2's Winning Bid.

Bidder	Package		Bid Amount (Difference to optimal outcome)
	Lot Category A (Difference to optimal outcome)	Lot Category B (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)

Table 2: Outcome when excluding Bidder 2 (difference to optimal outcome)

A 6.9 If we eliminated Bidder 2 completely from the Auction, the winning combination 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 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 6.10 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 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.

Bidder	Package		Bid Amount (Difference to optimal outcome)
	Lot Category A (Difference to optimal outcome)	Lot Category B (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)

Table 3: Outcome when excluding Bidder 3 (difference to optimal outcome)

A 6.11 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 Costs of the two Bidders is 24.

Bidder	Package		Bid Amount (Difference to optimal outcome)
	Lot Category A (Difference to optimal outcome)	Lot Category B (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)

Table 4: Jointly excluding Bidder 2 and Bidder 3 (difference to optimal outcome)

A 6.12 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 6.13 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 6.14 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 rule splits the additional cost above the sum of individual Opportunity Costs equally. So Bidder 2's Base Price is 10.5 and Bidder 3's Base Price is 13.5.¹⁴²

A 6.15 Box 1 of Annex 8 of Document 15/140 may also be of assistance to interested parties in aiding their understanding of Opportunity Cost based pricing.

¹⁴² This is for illustrative purpose only and ignores that Base Prices will be rounded to the nearest Euro.

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 the winning of spectrum.
- A 7.2 Please note that this annex is not an extension of the example set out in Annex 5 and should be considered separately.

A8.1 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 (with a single Lot) and B (with 65 Lots). Suppose that Reserve Prices are €5,000 for A-Lots and €1,000 for B-Lots, and that the Round Prices in the final Primary Bid Round are €15,000 for A-Lots and €8,000 for B-Lots.
- A 7.6 Suppose that a Bidder's Final Primary Package consists of eight 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 ten B-Lots would be €116,000;¹⁴³

¹⁴³ 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 (€80,000 - €64,000 = €16,000).

whilst the Final Price Cap on the Package containing only the A-Lot would be €51,000.¹⁴⁴

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 Cap¹⁴⁵ 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).

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 Bids Round. We refer to these Lots as 'provisionally unassigned Lots'. Such unassigned 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:

¹⁴⁴ 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 (€15,000 - €64,000 = -€49,000).

¹⁴⁵ 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.

- the value of that Package based on the Round Prices in the final Primary Bid Round;
- plus the value of provisionally unassigned Lots at Final Round Prices less their value at Reserve Prices;
- plus a further positive increment (e.g. €100);
- 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 Round.

A 7.11 Following the example above, suppose that Aggregate Demand in the final Primary Bid Round was such that the A Lot and three B-Lots would remain provisionally unassigned. The Round Price of provisionally unassigned Lots would be $€15,000 + 3 \times €8,000 = €39,000$. The Reserve Price of these lots is $€5,000 + 3 \times €1,000 = €8,000$. The difference between the value of the Lots at Final Round Prices and Reserve Prices would be $€39,000 - €8,000 = €31,000$. Therefore, if the Bidder in the example followed this first strategy it would make a Supplementary Bid of $€64,000 + €31,000 + €100 = €95,100$ for its Final Primary Package of eight B-Lots, and ensure that none of its other Supplementary Bids exceeds 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 could be less than or equal to the Bid Amount submitted.

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 unassigned Lots at Final Round Prices less their value at Reserve Prices, plus a further positive increment (e.g. €100); 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 at least that applied to the Bid for the Final Primary Package.

A 7.14 Following the example above, if the Bidder followed this second strategy it would make a Supplementary Bid of €95,100 for the Final Primary Package of eight 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 makes a Bid of €15,100 for the Package that contains only the A Lot.

- A 7.15 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 could be less than or equal to the Bid Amount submitted.
- A 7.16 A Bidder whose Primary Bid in the final Primary Bid Round was not a Relaxed Primary Bid or 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.

A8.2 Mathematical derivation

Notation¹⁴⁶

A 7.18 Let L denote the set of all Lot Categories. Therefore,

$$L = \{A1, B1, A2, B2, A3, B3, A4, B4, A5, B5, A6, B6, A7, B7, A8, B8, A9, B9\}.$$

A 7.19 Let $s = (s_{A1}, s_{B1}, \dots, s_{B9})$ denote the number of Lots available in each Lot Category. Therefore,

$$s_i = \begin{cases} 1 & \text{if } i \in \{A1, A2, A3, A4, A5, A6, A7, A8, A9\} \\ 65 & \text{if } i \in \{B1, B2, B3, B4, B5, B6, B7, B8, B9\} \end{cases}$$

A 7.20 We represent a Package of Lots as a vector

$$q = (q_{A1}, q_{B1}, q_{A2}, q_{B2}, \dots, q_{A9}, q_{B9}),$$

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 has made for any particular package.

¹⁴⁶ This annex uses the same vector and set notation as used in Annex 5 unless otherwise indicated.

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 $u = (u_{A1}, u_{B1}, \dots, u_{B9})$ denote the number of provisionally unassigned Lots in the Final Primary Round, given by:

$$u = s - \sum_{j \in J} q^{j,f}$$

A 7.24 Let $\rho = (\rho_{A1}, \rho_{B1}, \dots, \rho_{B9})$ denote the Round Prices in the final Primary Bid Round and $r = (r_{A1}, r_{B1}, \dots, r_{B9})$ be the Reserve Prices.

A 7.25 The value of the feasible outcome in which each Bidder receives its 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 value¹⁴⁷ of the unassigned Lots at Reserve Prices r .

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 unassigned 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. As Supplementary Bids need to be specified in units of €100, ε could be as small as €100 in practice.) Notice that the Bidder's bid at the end of the Primary 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

¹⁴⁷ $r \cdot u$ is the scalar product $\sum_i r_i u_i$

$$(B) \quad s_i \geq \sum_{j \in J} q_i^{j,t} \quad \forall i \in L$$

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 unassigned Lots are valued at Reserve Prices.

A 7.29 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 7.30 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 7.31 Adding together inequality (C) for Bidder \hat{j} and the inequalities (D) for each Bidder $j \neq \hat{j}$ gives that

$$\begin{aligned} \sum_{j \in J} b^{j,f} &\geq \rho \cdot q^{\hat{j},f} + \sum_{j \in J \setminus \hat{j}} [b^{j,t} + \rho \cdot (q^{j,f} - q^{j,t})] + (\rho - r) \cdot \left(\sum_{j \in J} q^{j,t} - \sum_{j \in J} q^{j,f} \right) + \varepsilon \\ &= \sum_{j \in J \setminus \hat{j}} b^{j,t} + \rho \cdot q^{\hat{j},t} - r \cdot \left(\sum_{j \in J} q^{j,t} - \sum_{j \in J} q^{j,f} \right) + \varepsilon \end{aligned}$$

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 7.32 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 7.33 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 7.34 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 7.35 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 7.36 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 Bids Round plus ε .

A 7.37 In such a case, Bidder \hat{j} does not have available a 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 .

A8.3 Cautionary remarks

A 7.38 The analysis presented in this Annex holds in theory but might be affected by exceptional circumstances in practice.

A 7.39 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 unassigned 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 their Bids could be excluded from the determination of Winning Bids.

A 7.40 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: Relationships, resolution of Bidder connections, exemptions and changes

Ownerships rules – relationship examples

A 8.1 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 3.3.4. The following is not meant to be an exhaustive or comprehensive description of the relationships that may fall within each category.

- (a) A “**Bidding Group**” includes a Bidder and its Connected Persons.
- (b) A person is considered to be a “**Connected Person**” in relation to a Bidder where the Connected Person and/or any of its Controlling Persons and/or any of its Controlled Persons:
 - (i) either by itself or in concert with another person or other persons Controls the Bidder;
 - (iii) 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;
 - (iv) is a partner of the Bidder;
 - (v) either by itself or in concert with another person or other persons has an agreement, wholly or partly, to finance or otherwise assist the Bidder in connection with the Award Process;
 - (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.
- (c) 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;

- (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.

- (d) 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.
- (e) 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.
- (f) 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.
- (g) “**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 8.2 It is possible at the 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 8.3 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 relation 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 3.81 of the 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 8.4 If one of the above-mentioned relations 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. 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 8.5 ComReg may, in exceptional circumstances and at its sole discretion, grant exemption from the ownership rules described in Section 3.3.4 of the Information Memorandum. Furthermore, ComReg may attach terms to a decision granting exemption from the ownership rules.

A 8.6 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 8.7 If one of the relations described in Section 3.3.4 of the Information Memorandum exists between two or more Bidders, ComReg may grant 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 8.8 After the Application Date, 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 8.9 In any event, the Bidder must notify ComReg of any changes that impact on its ownership structures on which its Application is based after the date the Application is submitted.

Bidders subject to Restructuring

A 8.10 ComReg may, but does not guarantee to, 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 9: Methodology for generating Assignment Options

A 9.1 The determination of Assignment Options consists of three steps:

- Step 1: we establish a number of possible orderings for winners of B-Lots and unassigned B-Lots.
- Step 2: we construct a Candidate Frequency Plan for each of the Assignment Bidder orderings identified in Step 1, by positioning Assignment Bidders in the band from left to right according to the ordering and positioning of unassigned B-Lots with a view to narrowing the total range of frequencies assigned to each Assignment Bidder across different Regions (or leaving them in the position determined by the ordering if we cannot narrow the total range of frequencies assigned to each Assignment Bidder across different Regions by repositioning the unassigned B-Lots).
- Step 3: the Assignment Options for each Assignment Bidder are the frequency assignments that the Assignment Bidder would receive in any of the Candidate Frequency Plans identified in Step 2.

A10.1 Step1: Determining possible Bidder orderings

A 9.2 We define the 'Regional Bandwidth Variation' (or 'RBV') for an Assignment Bidder or group of Assignment Bidders as the difference between the maximum and the minimum number of B-Lots assigned to the Assignment Bidder or group of Assignment Bidders across all Regions.

A 9.3 We define the 'Aggregate RBV' of a partition of a group of Assignment Bidders as the sum of RBV of all the subgroups in the partition.

A 9.4 In order to determine the possible Assignment Bidder orderings we progressively partition the set of all Bidders plus a 'Notional Bidder' who is assigned all the B-Lots that have been unassigned at the end of the Main Stage. At each split we select a partition that minimises the aggregate RBV across all the possible partitions of the corresponding group of Assignment Bidders and the Notional Bidder. In the event that there are several partitions that achieve the smallest possible Aggregate RBV, we select one of these partitions by applying the following criteria:

- select the partitions which give the greatest number of subgroups;

- amongst these, select the partitions for which the maximum number of Assignment Bidders (including the 'Notional Bidder') in any of the subgroups is smallest;
- amongst these, select one partition at random.

A 9.5 The process of successively subdividing the set of Assignment Bidders can be represented by a tree (strictly, a direct routed tree or 'branching'). In such a tree:

- each node is associated with a group of Assignment Bidders;
- the branches leaving a node partition that group into smaller sets of Assignment Bidders, with each set associated one of the successor nodes;
- the initial node of the tree is the set of all Assignment Bidders; and
- the leaves of the tree (i.e. nodes with no successors) are individual Assignment Bidders.

A 9.6 We then use the grouping of Assignment Bidders represented by this tree to create the possible Assignment Bidder orderings. These Assignment Bidder orderings are obtained by combining all possible orderings of the branches within the tree. This first step is illustrated in Example 1.

Consider a simplified example with four Regions and ten B-Lots in each Region. Suppose that the number of B-Lots won by each Assignment Bidder, and that B-Lots that have remained unassigned at the end of the Main Stage, are as follows:

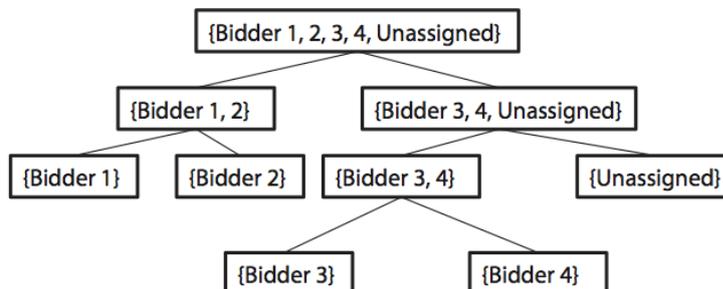
	Bidder 1	Bidder 2	Bidder 3	Bidder 4	Unassigned
Region 1	1	4	4	0	1
Region 2	2	2	3	1	2
Region 3	2	2	3	3	0
Region 4	2	2	1	4	1

We start with the set of all Assignment Bidders (including a 'Notional Bidder' to represent all the B-Lots that have remained unassigned at the end of the Main Stage, which we label as 'Unassigned', which would include one lot in each of Region 1 and Region 4, and two lots in Region 2)). There are two ways of grouping Assignment Bidders that minimise aggregate RBV:

- {Bidder 1}, {Bidder 2, Bidder 3, Bidder 4, Unassigned}; and
- {Bidder 1, Bidder 2}, {Bidder 3, Bidder 4, Unassigned}.

These partitions have the same aggregate RBV of two, so we apply the criteria listed above to choose between them. Both partitions contain only two sets. However, the maximum number of Assignment Bidders in any subgroup is smaller in the second partition, so this one is chosen.

At the next level, the group consisting of two Assignment Bidders can only be split up into individual Assignment Bidders. The other group is first split up into {Bidder 3, Bidder 4} and {Unassigned} and then into individual Bidders. The resulting tree looks as follows:



To create the possible Assignment Bidder orderings we combine all possible orderings of the tree branches. We obtain the following orderings:

1. Bidder 1, Bidder 2, Bidder 3, Bidder 4, Unassigned
2. Bidder 1, Bidder 2, Bidder 4, Bidder 3, Unassigned
3. Bidder 1, Bidder 2, Unassigned, Bidder 3, Bidder 4
4. Bidder 1, Bidder 2, Unassigned, Bidder 4, Bidder 3
5. Bidder 2, Bidder 1, Bidder 3, Bidder 4, Unassigned
6. Bidder 2, Bidder 1, Bidder 4, Bidder 3, Unassigned
7. Bidder 2, Bidder 1, Unassigned, Bidder 3, Bidder 4
8. Bidder 2, Bidder 1, Unassigned, Bidder 4, Bidder 3
9. Bidder 3, Bidder 4, Unassigned, Bidder 1, Bidder 2
10. Bidder 4, Bidder 3, Unassigned, Bidder 1, Bidder 2
11. Unassigned, Bidder 3, Bidder 4, Bidder 1, Bidder 2

- | |
|--|
| 12. Unassigned, Bidder 4, Bidder 3, Bidder 1, Bidder 2 |
| 13. Bidder 3, Bidder 4, Unassigned, Bidder 2, Bidder 1 |
| 14. Bidder 4, Bidder 3, Unassigned, Bidder 2, Bidder 1 |
| 15. Unassigned, Bidder 3, Bidder 4, Bidder 2, Bidder 1 |
| 16. Unassigned, Bidder 4, Bidder 3, Bidder 2, Bidder 1 |

Example 1: Procedure for generating Assignment Bidder orderings

A10.2 Step2: Positioning unassigned B-Lots

A 9.7 We define the '**Misalignment**' of a specific assignment of frequencies to an individual Assignment Bidder as the difference between:

- the number of different 5MHz frequency blocks assigned to the Assignment Bidder in one or more Regions; and
- the maximum number of B-Lots assigned to the Assignment Bidder in any single Region.

A 9.8 This can be seen in Example 2 below.

Suppose that an Assignment Bidder has won the following B-Lots:

	B-Lots won
Region 1	3
Region 2	3
Region 3	2
Region 4	1

Consider the following three options for assigning frequency blocks to the Assignment Bidder, where the frequency blocks assigned to the Assignment Bidder are coloured green:

Option 1

Region 1						
Region 2						
Region 3						
Region 4						

Option 2

Region 1						
Region 2						
Region 3						
Region 4						

Option 3

Region 1						
Region 2						
Region 3						
Region 4						

The maximum number of B-Lots the Assignment Bidder has won in any single Region is three.

Under Option 1, the Assignment Bidder is assigned five different frequency blocks. Therefore, the Misalignment of this Assignment Option is two (five minus three).

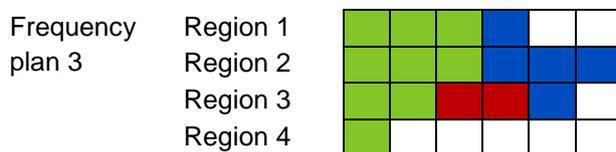
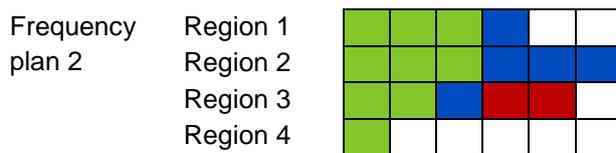
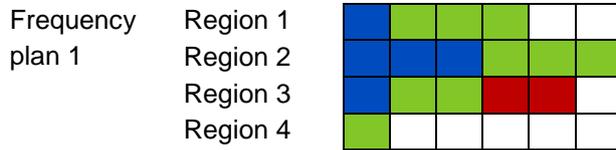
Under Option 2, the Assignment Bidder is assigned three different frequency blocks. Therefore, the Misalignment of this Assignment Option is zero (three minus three).

Under Option 3, the Assignment Bidder is also assigned three different frequency blocks. Therefore, the Misalignment of this Assignment Option is also zero (three minus three).

Example 2: Measuring Misalignment of a frequency assignment

A 9.9 We define the ‘**Aggregate Misalignment**’ of a frequency plan as the sum of the Misalignments of all the individual frequency assignments under that frequency plan. See Example 3 below.

Consider the following frequency plans (where the blocks are coloured with respect to the Assignment Bidder to which they are assigned, and a white background shows unassigned B-Lots):



In Frequency plan 1, the Misalignment of frequency assignments from left to right are zero (for blue), three (for green) and zero (for red). Therefore, the Aggregate Misalignment of Frequency plan 1 is three.

In Frequency plan 2, the Misalignment of frequency assignments from left to right are zero (for green), one (for blue) and zero (for red). Therefore, the Aggregate Misalignment of Frequency plan 2 is one.

In Frequency plan 3, the Misalignment of frequency assignments from left to right are zero (for green), zero (for red) and zero (for blue). Therefore, the Aggregate Misalignment of Frequency plan 3 is zero.

In Frequency plan 4, the Misalignment of frequency assignments from left to right are zero (for red), one (for green) and zero (for blue). Therefore, the Aggregate Misalignment of Frequency plan 1 is one.

Example 3: Aggregate Misalignment of a frequency plan

A 9.10 For each of the provisional Assignment Bidder orderings identified in Step 1 we construct a 'Candidate Frequency Plan' as follows:

- We start by positioning Assignment Bidders, including the Notional Bidder, in the band from left to right in the order given by that specific Assignment Bidder ordering.
- Then, we check whether it is possible to reduce the Aggregate Misalignment by re-position unassigned blocks (allowing the B-Lots assigned to the Notional Bidder in each Region to be split into separate unassigned blocks and placed anywhere in the band), subject to only introducing unassigned blocks between two Assignment Bidders if this reduces the Misalignment for an Assignment Bidder that would then be adjacent to the unassigned blocks.
- If it is possible to make all possible reductions to the Aggregate Misalignment with the unassigned B-Lots available, then this will be the Candidate Frequency Plan for that Assignment Bidder ordering.
- Otherwise, we consider the frequency plans that would correspond to an alternative placing of unassigned B-Lots such that the Aggregate Misalignment is reduced (subject to only introducing an unassigned block between two Assignment Bidders if this reduces the Misalignment for an Assignment Bidder that would then be adjacent to the unassigned block).

A 9.11 The Candidate Frequency Plan for that Assignment Bidder Ordering is the frequency plan that achieves the minimum possible Aggregate Misalignment with any ties broken at random.

A 9.12 The process for positioning unassigned B-Lots is illustrated in Example 4 below.

A10.3 Step3: Determination of Assignment Options

A 9.13 For each Assignment Bidder, its Assignment Options will be each of the frequency assignments that it would be assigned in any of the possible Candidate Frequency Plans identified in Step 2.

Consider a simplified example with four Regions and ten B-Lots in each Region. Suppose that four Assignment Bidders have been assigned the following B-Lots:

	Bidder 1	Bidder 2	Bidder 3	Bidder 4
Region 1	1	4	3	0
Region 2	2	2	3	1
Region 3	2	2	3	1
Region 4	2	2	1	3

Therefore, there are two B-Lots unassigned in each Region, so the Notional Bidder has two B-Lots in each Region.

Consider the Assignment Bidder ordering Bidder 1, Bidder 2, Bidder 3, Bidder 4, Notional Bidder.

If we position the Assignment Bidders in the band from left to right according to this ordering, we obtain the following frequency plan:

Region 1	Green	Blue	Blue	Blue	Blue	Red	Red	Red		
Region 2	Green	Green	Blue	Blue	Red	Red	Red	Yellow		
Region 3	Green	Green	Blue	Blue	Red	Red	Red	Yellow		
Region 4	Green	Green	Blue	Blue	Red	Yellow	Yellow	Yellow		

The Misalignment of the frequency assignment for each of Bidder 1, Bidder 2 and Bidder 4 is zero. The Misalignment of the frequency assignment to Bidder 3 is one. Therefore, the Aggregate Misalignment of this frequency plan is one.

We now check if we can reduce the Aggregate Misalignment by positioning unassigned lots between Assignment Bidders. Bidder 1 and Bidder 2 already have zero Misalignment and thus we cannot reduce the Misalignment for these Assignment Bidders by placing unassigned B-Lots between them. However, we can reduce Bidder 3’s Misalignment by placing one unassigned B-Lot in each of Regions 2, 3 and 4 between Bidder 2 and Bidder 3. We would obtain the following frequency plan:

Region 1	Green	Blue	Blue	Blue	Blue	Red	Red	Red		
Region 2	Green	Green	Blue	Blue		Red	Red	Red	Yellow	
Region 3	Green	Green	Blue	Blue		Red	Red	Red	Yellow	
Region 4	Green	Green	Blue	Blue		Red	Yellow	Yellow	Yellow	

The Misalignment of the frequency assignment for each of the Assignment Bidders is zero, and so is the Aggregate Misalignment. Therefore, no further adjustments are needed and this is the Candidate Frequency Plan for the Assignment Bidder ordering Bidder 1, Bidder 2, Bidder 3, Bidder 4, Notional Bidder.

Example 4: Positioning unassigned B-Lots

A 9.14 Example 5 illustrates the complete process for generating Assignment Options.

Consider a simplified example with four Regions and ten B-Lots in each Region where the number of B-Lots won by each Assignment Bidder is as follows:

	Bidder 1	Bidder 2	Bidder 3
Region 1	3	7	0
Region 2	4	5	1
Region 3	3	5	1
Region 4	4	3	3

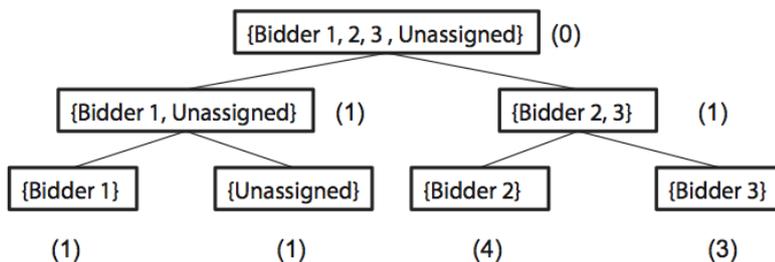
Step 1:

We start from the set of all Assignment Bidders (including the Notional Bidder who would be assigned one lot in Region 3).

There are three partitions that minimise the Aggregate RBV: $\{\{1, \text{Unassigned}\}, \{2,3\}\}$; $\{\{1\}, \{2,3, \text{Unassigned}\}\}$; and $\{\{1,2,3\}, \{\text{Unassigned}\}\}$, each yielding an Aggregate RBV of two. All three of these have the same number of subgroups; however out of these three partitions the maximum number of Assignment Bidders in any subgroup is smallest for $\{\{1, \text{Unassigned}\}, \{2,3\}\}$, and thus we select this partition.

At the next nodes, there is only one possible partition for each group.

The tree that yields the Assignment Bidder orderings are as follows (RBV for each group shown in brackets):



The Assignment Bidder orderings are then generated by combining all possible branch orderings.

From the first node we obtain two possible orders of the groups:

- A) $\{1, \text{unassigned}\}$ are placed at the bottom; $\{2,3\}$ at the top
- B) $\{2,3\}$ are placed at the bottom; $\{1, \text{unassigned}\}$ at the top

We then branch out from these options using the groups from the second set of nodes.

From A) we obtain four options:

A.1) 1, unassigned, 2, 3

Region 1	Green	Green	Green	Blue	Blue	Blue	Blue	Blue	Blue	Blue
Region 2	Green	Green	Green	Green	Blue	Blue	Blue	Blue	Blue	Red
Region 3	Green	Green	Green	White	Blue	Blue	Blue	Blue	Blue	Red
Region 4	Green	Green	Green	Green	Blue	Blue	Blue	Red	Red	Red

A.2) 1, unassigned, 3, 2

Region 1	Green	Green	Green	Blue	Blue	Blue	Blue	Blue	Blue	Blue
Region 2	Green	Green	Green	Green	Red	Blue	Blue	Blue	Blue	Blue
Region 3	Green	Green	Green	White	Red	Blue	Blue	Blue	Blue	Blue
Region 4	Green	Green	Green	Green	Red	Red	Red	Blue	Blue	Blue

A.3) unassigned, 1, 2, 3

Region 1	Green	Green	Green	Blue	Blue	Blue	Blue	Blue	Blue	Blue
Region 2	Green	Green	Green	Green	Blue	Blue	Blue	Blue	Blue	Red
Region 3	White	Green	Green	Green	Blue	Blue	Blue	Blue	Blue	Red
Region 4	Green	Green	Green	Green	Blue	Blue	Blue	Red	Red	Red

A.4) unassigned, 1, 3, 2

Region 1	Green	Green	Green	Blue	Blue	Blue	Blue	Blue	Blue	Blue
Region 2	Green	Green	Green	Green	Red	Blue	Blue	Blue	Blue	Blue
Region 3	White	Green	Green	Green	Red	Blue	Blue	Blue	Blue	Blue
Region 4	Green	Green	Green	Green	Red	Red	Red	Blue	Blue	Blue

From B) we obtain four more options (which are mirror images of the options above):

B.1) 3, 2, 1, unassigned

Region 1	Blue	Green	Green	Green						
Region 2	Red	Blue	Blue	Blue	Blue	Blue	Green	Green	Green	Green
Region 3	Red	Blue	Blue	Blue	Blue	Blue	Green	Green	Green	White
Region 4	Red	Red	Red	Blue	Blue	Blue	Green	Green	Green	Green

B.2) 3, 2, unassigned, 1

Region 1	Blue	Green	Green	Green						
Region 2	Red	Blue	Blue	Blue	Blue	Blue	Green	Green	Green	Green
Region 3	Red	Blue	Blue	Blue	Blue	Blue	White	Green	Green	Green
Region 4	Red	Red	Red	Blue	Blue	Blue	Green	Green	Green	Green

B.3) 2, 3, 1, unassigned

Region 1	Blue	Green	Green	Green						
Region 2	Blue	Blue	Blue	Blue	Blue	Red	Green	Green	Green	Green
Region 3	Blue	Blue	Blue	Blue	Blue	Red	Green	Green	Green	White
Region 4	Blue	Blue	Blue	Red	Red	Red	Green	Green	Green	Green

B.4) 2, 3, unassigned, 1

Region 1	Blue	Green	Green	Green						
Region 2	Blue	Blue	Blue	Blue	Blue	Red	Green	Green	Green	Green
Region 3	Blue	Blue	Blue	Blue	Blue	Red	White	Green	Green	Green
Region 4	Blue	Blue	Blue	Red	Red	Red	Green	Green	Green	Green

Step 2:

For each of the Assignment Bidder orderings identified in Step 1, the frequency plan that results from placing the Assignment Bidders in the band from left to right according to the ordering has a zero Aggregate Misalignment, so this becomes the Candidate Frequency Plan for the corresponding Assignment Bidder ordering.

Step 3:

The Assignment Options for each Assignment Bidder are those that the Assignment Bidder would receive in any of these Candidate Frequency Plans. Therefore, each Assignment Bidder has four Assignment Options.

Example 5: Procedure for creating Assignment Options

Annex 10: Determination of Winning Bids and Base Prices in the Main Stage

Winner Determination

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

Let L denote the set of all Lot Categories. Therefore,

$$L = \{A1, B1, A2, B2, A3, B3, A4, B4, A5, B5, A6, B6, A7, B7, A8, B8, A9, B9\}.$$

Let s_i denote the number of Lots available in Lot Category i . Therefore,

$$s_i = \begin{cases} 1 & \text{if } i \in \{A1, A2, A3, A4, A5, A6, A7, A8, A9\} \\ 65 & \text{if } i \in \{B1, B2, B3, B4, B5, B6, B7, B8, B9\} \end{cases}$$

We represent a package of Lots as a vector

$$q = (q_{A1}, q_{B1}, q_{A2}, q_{B2}, \dots, q_{A9}, q_{B9}),$$

where q_i is the number of Lots in Lot Category i . Therefore, $q_i \geq 0 \forall i \in L$.

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.

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 combination of Bids (across the all the Bids made by the 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 that is 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 combination of Bids x is a Feasible Combination of Bids if and only if it satisfies the following two conditions:

$$\sum_{j \in J} \sum_{k \in B^j} x^{j,k} q_i^{j,k} \leq s_i \quad \forall i \in L$$

$$\sum_{k=1}^{K^j} x^{j,k} \leq 1 \quad \forall j \in J$$

These conditions require that:

1. the number of Lots to be 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 Bid.

Let F denote the set of all Feasible Combinations of Bids.

Value of a Feasible Combination of Bids

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 unassigned 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

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.

The first tie-breaking rule requires that 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 Combinations of Bids in the set F^{**} , one of these will be selected at random as the winning assignment.

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.

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

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

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 .

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.

Base Prices must satisfy the (second) requirement that:

$$C(W') \leq \sum_{j \in W'} p^j \quad \forall W' \subseteq W$$

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^* .

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.