Commission for
Communications Regulation

Response to Consultation and Draft Decision

Multi-Band Spectrum Release

Release of the 800 MHz, 900 MHz and 1800 MHz radio spectrum bands.

Document No:	**11/60**
Date:	**24 August 2011**

All responses to this consultation should be clearly marked:-
"Reference: Submission re ComReg 11/60" as indicated above, and sent by post or e-mail to arrive on or before 5pm on 30 September 2011 to:

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Please note ComReg will publish all respondents submissions with the Response to this Consultation, subject to the provisions of ComReg's guidelines on the treatment of confidential information – ComReg 05/24

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Chapter 1

Executive Summary

1.1 The Commission for Communications Regulation ("ComReg"), in its capacity as manager of Ireland's radio spectrum, has been considering how best to conduct the assignment of three critical spectrum bands that are becoming available: 900 MHz, 1800 MHz and 800 MHz. This document contains ComReg's refined and detailed proposals for assigning spectrum in these bands by means of a multi-band spectrum auction, which is expected to occur within the next 4-6 months. The proposed auction will determine spectrum assignments across these three critical bands from 2013 to 2030, enabling mobile network operators to make the investments and service developments needed to take mobile communications services to a new and higher level of performance in Ireland.

1.2 The first of these bands, 900 MHz (880 - 915 / 925 - 960 MHz), is the main band currently used for the provision of GSM or '2G' mobile services such as mobile voice and SMS text. The second band under consideration, 1800 MHz (1710 - 1785 / 1805 - 1880 MHz), is also used for GSM services, mainly to provide additional capacity in urban areas. By EU law both 900 MHz and 1800 MHz bands are being 'liberalised', meaning that they can be used in future for providing advanced mobile services such as mobile broadband data, utilising '3G' and '4G' technologies. The third band, 800 MHz (790 - 862 MHz), is currently used for the provision of analogue terrestrial television services. However, following the introduction of digital terrestrial television services and the switch-off of analogue services timed for the fourth quarter in 2012, this band will also be available for re-allocation to mobile services. In total therefore 140 MHz of prime sub-2 GHz spectrum will be available for use by the mobile industry, more than doubling the current assignments at 900 and 1800 MHz.

1.3 All three bands are universally regarded as highly suitable for mobile services by virtue of their propagation properties, enabling wide area coverage, reasonable bandwidth capacity and effective in-building penetration, and hence the ability to provide a high quality national mobile network coverage at reasonable cost. How these bands are assigned will therefore be critical to the development of mobile services in Ireland, affecting in general terms the attainable levels of efficiency, innovation and quality in these services, but also the competitive position of operators as well as the interests of all mobile users. In addition to this factor, there is a considerable element of technical complexity associated with planning for an award across different bands with licences held by the different operators for varying periods of time. One measure of this is the volume of material this process has generated - to date, over 1700 pages of external submissions and expert reports. ComReg has therefore approached this process with considerable care and attention, based on a very full and thorough examination of all relevant options, in the light of all the economic, legal and technical material available to it.

1.4 The market and legislative environment[1] has evolved considerably over the course of the last 3 years and ComReg has of necessity adopted a modular approach in the

[1] For further details see Annex 11 and Annex 1 of document 11/60a respectively.

six consultations[2] on this subject . It is of particular and positive significance that we have been able to expand the scope of the proposed award process from one originally covering just 35 MHz of paired spectrum at 900 MHz to one that can now include in addition 30 MHz of paired 800 MHz spectrum and a further 75 MHz of paired 1800 MHz spectrum. This increase in scope greatly improves the potential of this process to enhance competition, innovation and efficiency, which will be of great benefit to consumers and operators in the mobile industry. It has also taken us away from the concerns initially advanced at the outset of the process about the scope for consumer disruption caused by competing demands on 900 MHz spectrum, and alternatively the need to provide for new entry by reserving spectrum for this purpose. Over this period we have also seen great strides in mobile technology, including the launch of advanced mobile '4G' services such as LTE-Advanced (Long Term Evolution-Advanced). Services based on this technology are considered likely to be launched in Ireland within the next 3 years, using the liberalised spectrum bands we are now proposing to make available, thereby ushering in a new era of advanced wireless services including fast, high capacity mobile broadband.

1.5 The core proposition advanced in this document is to hold an open auction for the entire spectrum in the 800 MHz, 900 MHz and 1800 MHz bands. ComReg has listened attentively to all the views expressed by existing holders of spectrum in these bands as to why they should be allowed to retain some or all of their current holdings without facing full competition for these rights. Equally ComReg has considered carefully the arguments advanced by potential entrants to the band as to why they should be permitted to acquire new holdings without facing full competition for such rights. ComReg has, however, concluded that an open auction is preferable to administrative assignment or a limited auction. We have also considered whether other spectrum bands in addition to the 3 bands selected could usefully be added to the award process, and concluded they could not. The reasoning in support of these views is set out in Chapter 3 below and in Annex 3 and in the accompanying report from ComReg's expert advisers DotEcon[3], which is being published in tandem with this document.

1.6 Given the many complexities of a single award process across 3 spectrum bands, and the need to cater for a wide range of legislative and regulatory policy requirements, much work has been needed to devise the optimal auction format and conditions. The key features of the auction format that ComReg proposes to adopt are as follows:

[2] See ComReg Documents:
- 08/57 Consultation - Liberalising the Use of the 900 MHz and 1800 MHz Spectrum Bands;
- 09/14 Response to Consultation & Further Consultation - Liberalising the Future Use of the 900 MHz and 1800 MHz Spectrum Bands & Spectrum Release Options
- 09/99 Response to Consultation & Further Consultation - Liberalising the Future Use of the 900 MHz and 1800 MHz Spectrum Bands;
- 10/71 Consultation - 800 MHz, 900 MHz & 1800 MHz spectrum release;
- 10/105 Consultation - Inclusion of the 1800 MHz Band into the Proposed joint award of 800 MHz and 900 MHz Spectrum; and
- 11/11 Response to Consultation and Draft Decision - Interim Licences for the 900 MHz band.

[3] See document 11/58

- This will be a Combinatorial Clock Auction, meaning that it allows for packaged ('combinatorial') bids over multiple rounds within a prescribed timeframe;
- The winners of spectrum will be those who make the highest bids (consistent with the rules);
- The first phase of the auction determines who wins what amount of spectrum; the second phase determines at which location (within a spectrum band);
- To accommodate the current pattern of licence assignments, spectrum will be auctioned across two time periods ('slices'), applicable to each of the 3 bands being auctioned:
  - Temporal lot 1: 1 February 2013 - 12 July 2015
  - Temporal lot 2: 13 July 2015 - 12 July 2030
- To safeguard competition, there will be caps placed on the spectrum that bidders, either as a single entity or in combination with other bidders, can acquire:
  - 2× 20 MHz of sub-1 GHz
  - 2× 50 MHz of total spectrum
  - 2× 10 MHz of 900 MHz (Temporal lot 1 only)
- To safeguard competition and spectrum efficiency, minimum fees will apply, set at a conservative lower bound of an internationally benchmarked level, which is currently calculated as being €20M per 5 MHz band of paired sub-1 GHz spectrum, and €10M per 5 MHz band of paired 1800 MHz spectrum;
- The minimum fee will comprise two equal parts, being the upfront reserve element, and the value of Spectrum Usage Fees (SUFs) over the duration of the licence, appropriately adjusted for time value of money.

1.7 The precise workings of these design features and rules, and their rationale when considered in the light of ComReg's statutory responsibilities and the evidence from industry and other sources available to ComReg, are set out in Chapter 4 below and in several Annexes and in the aforementioned DotEcon report. The calculation of fees is further analysed and substantiated in a separate DotEcon report on benchmarking[4], also being published alongside this document.

1.8 There are a number of additional features of the proposed auction which have been considered in earlier consultations and are now put forward as firm proposals and incorporated alongside the features listed above within the draft decision:

- An 'Early Liberalisation' option affecting the 900 MHz and 1800 MHz licence-holders whose current rights have yet to expire[5];

[4] Document 11/59

[5] The GSM 900 and GSM 1800 licences of Meteor Mobile Communications Ltd both expire on 12 July 2015. The GSM 1800 licences of Telefónica O2 Communications (Ireland) Ltd and Vodafone Ireland Limited both expire on 31 December 2014.

- 'Preparatory Licences' to assist spectrum winners in preparing networks in advance of the spectrum being permitted for use;
- 'Transitional Issues', addressing arrangements for operators' moves to take up spectrum won in this award, at the start of the first time-slice, and in the transition between time-slices.
- 'Advanced Commencement' provisions, potentially allowing earlier use of the spectrum won in the award process, subject to certain conditions;

1.9 These useful elaborations on the core auction proposition are discussed in Chapters 4, 6 and 7 below and Annexes 6 and 7 and in the report by DotEcon[6] and an additional, technical report by Red-M and Vilicom[7].

1.10 The spectrum licences that are being made available in this process are subject to the new set of EU rules which set out what conditions can be stipulated in licences. The determination of the most appropriate licence conditions that should pertain to these bands, given the wider EU legislative Framework and ComReg's specific statutory objectives, is a further major work-stream in this project, summary results of which can be read in Chapter 5 below, with the detail in Annexes 8 and in the DotEcon report[8]. Here are some of the main licence conditions:

- Minimum quality of service conditions shall include network availability for all but 35 minutes per 6 month period;
- Call quality based on the existing GSM/3G licences;
- All licence holders must attain by specified dates a minimum coverage of 70% of the population (new entrants are to be given extra time to achieve this, along with an interim milestone);
- Licence holders may use multiple bands to achieve coverage targets, but at least 50% of the coverage requirement (i.e. 35% of the population) must be met using the 800 MHz, 900 MHz and/or 1800 MHz bands.

1.11 There are no conditions proposed for international roaming, as these are judged unnecessary in light of ordinary market requirements. Nor are there licence conditions in relation to emergency calls, as these are seen as already assured by Universal Service Regulations.

1.12 It is also noteworthy that by virtue of the latest set of EU-derived regulations on electronic communications[9], trading of spectrum will be permitted in designated bands, and ComReg expects this to apply in due course to the 3 bands covered in this document. ComReg will set out separately its modality on this matter in due course.

[6] See DotEcon Report, Document 11/58
[7] See Red M/Villicom Report, Document 11/57
[8] See DotEcon Report, Document 11/58, Section 13 in particular.
[9] European Communities (Electronic Communications Networks and Services) (Framework) Regulations 2011 – SI No. 333 of 2011; European Communities (Electronic Communications Networks and Services) (Access) Regulations 2011 – SI No. 334 of 2011; European Communities (Electronic Communication Networks and Services) (Authorisation) Regulations 2011 – SI No. 335 of 2011; European Communities (Electronic Communications Networks and Services) (Privacy and Electronic Communications) Regulations – SI No 336 of 2011; European Communities (Electronic Communication Networks and Services) (Universal Service and Users' Rights) Regulations 2011 – SI No. 337 of 2011.

1.13 Finally, as this consultation document brings together all the work to date to form a draft regulatory decision, this document of necessity also addresses the many other relevant points made to ComReg by respondents to its previous consultations. Some of these are of a technical nature (for instance, regarding Band Plans, and interference parameters), others of an economic or legal character (for instance, regarding competition analysis, also alleged property rights). These points are either addressed as they arise in the main chapters, annexes and reports already referenced, or are covered in Annex 10.

1.14 The period for comment will run until 5 pm on 30 September 2011, during which time ComReg welcomes written comments on any of the issues raised on this matter. When it has concluded its review of all of the submissions received, and other relevant material, ComReg's intention is to proceed to publish its final Decision on this matter.

1.15 ComReg will be publishing over the coming weeks a further consultation document, namely a Draft Information Memorandum setting out detailed rules for the proposed auction. It will also publish a Spectrum Strategy 2011-13, which will take account of the responses we received to the Draft Strategy Statement[10] published in April 2011.

[10] Document 11/28: Review of the Period 2008 – 2010 & Proposed Strategy for Managing the Radio Spectrum: 2011 – 2013. 12 April 2011

Chapter 2

Introduction and Background

Introduction

2.1 The purpose of this document is to set out ComReg's response to consultation and draft decision on its broader spectrum release proposals covering the 800 MHz, 900 MHz and 1800 MHz spectrum bands.

2.2 Two of these three spectrum bands (900 MHz and 1800 MHz) are used for providing the 2nd generation (2G) mobile phone services currently prevalent in the market (voice and SMS services); the third band (800 MHz) is currently used for broadcasting analogue terrestrial signals. All three bands are well suited to providing advanced wireless services including mobile broadband and this has been recognised by relevant European institutions. This publication contains ComReg's comprehensive proposals for making these spectrum bands available for the provision of such services in Ireland in the near future, on a competitive basis, based on a multi-band spectrum auction.

2.3 ComReg has consulted extensively on the release of these three bands, initially in Consultation 08/57[11] and Consultation 09/14[12] followed by Consultation 09/99[13] proposing the release and liberalisation of the 900 MHz band, Consultation 10/71[14] on the inclusion of the 800 MHz band in the 900 MHz award process and Consultation 10/105[15] on the inclusion of the 1800 MHz band in the same award process. In addition ComReg has published a number of expert reports alongside its Consultations and these are referenced in the consultations mentioned above.

2.4 During this period ComReg also consulted on the issue of interim licences for the 900 MHz band in Consultation 10/71[16], Document 11/11[17] and Document 11/29[18]. As this matter is now closed no further consideration is given to interim licences in this publication.

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[11] Document 08/57 – Liberalising the use of the 900 MHz and 1800 MHz spectrum bands - published 17 July 2008.

[12] Document 09/14 – Liberalising the future use of the 900 MHz and 1800 MHz spectrum bands & spectrum release options - published 10 March 2009.

[13] Document 09/99 – Response to consultation and further consultation on liberalising the future use of the 900 MHz and 1800 MHz bands: response to Consultation 09/14 and further consultation - published 21 December 2009.

[14] Document 10/71 – Consultation paper on 800MHz, 900 MHz & 1800 MHz spectrum release - published 17 September 2010.

[15] Document 10/105 – Consultation paper on inclusion of the 1800 MHz band into the proposed joint award of 800 MHz and 900 MHz spectrum - published 15 December 2010.

[16] In particular see section 3 of Consultation 10/71 which included Questions 5, 6 & 7.

[17] Document 11/11 – Response to consultation and draft decision: Interim licences for the 900 MHz band - published 17 February 2011.

[18] Document 11/29 – Response to consultation and Decision: Interim licences for the 900 MHz band - published 13 April 2011.

2.5 ComReg's policy is to publish all non-confidential material received in relation to matters under consultation and it refers interested parties to the following ComReg publications:

- Document 11/50 – Publication of Interim Licences, MoU and non-confidential correspondence – Published 18 July 2011;
- Document 11/37 - GSM Liberalisation Project - Publication of Correspondence - Published 13 May 2011;
- Document 11/27 - Interim Licences for the 900 MHz band - Response to Consultation & Correspondence - published 6 April 2011;
- Document 11/10 - Inclusion of 1800MHz into Proposed Award of 800MHz & 900MHz - Responses to Consultation & Correspondence - published 9 February 2011;
- Document 10/103R - 800 MHz, 900 MHz & 1800 MHz spectrum release - Submissions received from respondents -published 7 January 2011;
- Document 10/79 - GSM Liberalisation Project - Publication of non-confidential submissions, correspondence and other material - published 30 September 2010;
- Document 10/21R - Submissions to Consultation 09/99 - Liberalising the Future Use of the 900 MHz and 1800 MHz Spectrum Bands - published 29 March 2010; and,
- Document 09/99s – Publication of non-confidential input and correspondence with interested parties - published 21 December 2009

2.6 All public documents related to this process are also referenced on a dedicated webpage: http://www.comreg.ie/radio_spectrum/gsm_band_liberalisation_and_800_mhz_spectrum.713.html

2.7 ComReg is grateful for all the submissions provided by respondents in response to this consultation process and has given careful consideration to all the material submitted by interested parties as well as to other available information before it, including the material contributed by the experts retained by it to advise and report in relation to matters of relevance to the process.

2.8 ComReg is publishing alongside this document a set of annexes (in document 11/60a) in which a detailed consideration and analysis of respondents' submissions is undertaken. This analysis takes account of all responses received to ComReg's questions as posed in Consultations 09/99, 10/71 and 10/105[19], other than those relevant to interim licence matters. The main text of this document is intended to present ComReg's draft Decision and draft Regulatory Impact Assessment ("RIA") regarding its broader spectrum-release proposals covering the 800 MHz, 900 MHz and 1800 MHz spectrum bands, to set out the proposed award process, and to set out the main points which have arisen for consideration in arriving at ComReg's draft Decision concerning spectrum-release in the relevant frequency bands, as detailed in the relevant annexes.

[19] This includes any relevant material published or received in relation to Consultations 08/57 and 09/14.

2.9 Throughout ComReg's consultation process, ComReg has been guided by its statutory functions, objectives and relevant duties in relation to Ireland's radio frequency spectrum (which are set out in Annex 1 of this document) and the preliminary findings of its RIA analysis. Whilst the use of RIA analytical framework has been formally utilised only in certain, appropriate circumstances, it should be apparent to readers that ComReg has, for the large number of issues it is required to consider and address as part of this consultation process, nevertheless, been informed by the potential impact of its proposed measures on different stakeholder groups and on competition.

2.10 This document is structured as follows:

- **Chapter 3**: sets out preliminary views on the proposed award process in addition to the supporting draft RIA and assessment against other statutory objectives;
- **Chapter 4**: outlines the particulars of the proposed award as detailed primarily but not exclusively in annexes 3, 5, 6, 9 and 10;
- **Chapter 5**: sets out the proposed licence conditions that will apply as detailed primarily but not exclusively in annex 8;
- **Chapter 6**: details how ComReg proposes to handle transitional issues as detailed in annex 7;
- **Chapter 7**: considers whether it would be possible to issue liberalised licences in any of the relevant bands earlier than this date and, if so, what form such a proposal should take;
- **Chapter 8:** sets out ComReg's draft Decision on the broader spectrum award;
- **Chapter 9**: sets out relevant next steps in relation to this broader spectrum release proposal and how to respond to this publication; and
- **Annexes (incorporating consideration and analysis of input received together with ComReg's detailed response to same):**

1. The legal framework, ComReg's statutory functions and objectives in relation to radio spectrum;
2. The merging of the issues of liberalisation and licence expiry;
3. ComReg's spectrum release proposal;
4. ComReg's position on expectations of renewal and property rights;
5. Proposed future spectrum bandplans;
6. Details of the proposed award including spectrum caps, auction format, temporal lots, full assignment round, interim licences at 1800 MHz, an option for early liberalisation and bidder eligibility;
7. Details of necessary transitional issues;
8. Details of proposed licence conditions including coverage, quality of service, technology neutrality and interference mitigation;
9. Details of proposed spectrum fees;

10. Analysis and response to other issues raised by respondents;
11. International update on relevant award processes covering the three bands under consideration in this document, in other countries;
12. Draft MoU under consideration with the UK; and
13. Glossary of terms

2.11 Within Chapters 3 to 7 each section provides a summary of the principal issues and sets out ComReg's preliminary conclusions on same. ComReg welcomes and appreciates the views that have been put forward by interested parties, noting that respondents' views reflect the evolving nature of the proposed award of liberalised rights of use to 800 MHz, 900 MHz and/or 1800 MHz spectrum bands. Non-confidential versions of respondents' submissions have been published on ComReg's website.

2.12 Readers are referred to the particular annexes to this Response to Consultation and Draft Decision document that relate to each chapter and section, as these include additional detail on:

- respondents' views;
- ComReg's analysis and assessment of interested parties' views;
- DotEcon's recommendations; and
- Red-M/Vilicom's recommendations.

2.13 Readers might also note that DotEcon's views and recommendations as they relate to and address respondent's views, are set out in Documents 11/58 and 11/59 issued alongside this Response to Consultation and Draft Decision.

2.14 For the avoidance of doubt, throughout this document ComReg refers to Hutchison 3G Ireland as 'H3GI', eircom or Meteor Mobile Communications Ltd as either 'eircom Group', 'eircom' ,'Meteor' or 'eircom/Meteor', Telefónica O2 Communications (Ireland) Ltd as 'O2' or 'Telefónica Ireland', 'Telefónica O2' and Vodafone Ireland Limited as 'Vodafone'.

Background

2.15 This chapter summarises the context for ComReg's liberalised spectrum release project. The chapter first sets out the current status of spectrum bands suitable for mobile electronic communications services and then outlines relevant legislative developments at the European level.

Current Status of Spectrum Bands Suitable for Public Mobile Communications

2.16 During this consultation process a number of spectrum bands have been put forward as suitable for the provision of mobile electronic communications services, including 2G and 3G mobile telephone services and the provision of broadband (fixed, mobile and nomadic). These spectrum bands are:

1. 800 MHz digital dividend band;
2. 900 MHz band;

3. 1800 MHz band;
4. 2.3 GHz band;
5. 2.6 GHz band;
6. GSM-R band (876 – 880 MHz paired with 921 – 925 MHz);
7. Unspecified spectrum between 300 MHz and 500 MHz; and,
8. Spectrum immediately above the GSM900 band (960 – 1164 MHz).

2.17 All eight bands have previously been considered for inclusion in the award of liberalised spectrum. The bands covered by numbers 6, 7 and 8 have been discounted – please see section 6.10 of Consultation 09/99. The bands covered by numbers 4 and 5 have also been set aside at this point – please see section 2.5.2 of Consultation 10/71 and section 2.3.2.1 of Consultation 10/105 and Annex 3.

Current Usage of the 800 MHz band

2.18 The 800 MHz band (790 – 862 MHz) is currently used for the provision of analogue terrestrial television services on a national basis.

2.19 In order for the 800 MHz band to be made available on a liberalised basis for the provision of electronic communications networks the current usage of this band needs to cease. This process is known as "analogue switch-off" ("ASO") and is provided for under Part 8 of the Broadcasting Act 2009. In August 2010, the Minister for Communications, Energy and Natural Resources ("DCENR") established a Digital Switch Over Steering Group, with additional working groups, to manage the switch from analogue to digital television.[20]

2.20 ComReg has reported on developments in ASO in Information Notice 10/59[21] and in Section 1 of Consultation 10/71. Since the publication of Consultation 10/71 the Minister for DCENR has, in May 2011, announced the launched of Saorview,[22] RTÉs national free to air digital terrestrial television[23] service. In doing so, the Minister noted that at least a quarter of a million Irish households are reliant on the analogue service and with the national launch of Saorview these households will have 18 months to move to digital TV before the analogue TV network is switched off. DCENR is currently advancing its plans to ensure that all households in Ireland receive adequate notice of this major development in Irish public service broadcasting.[24]

Current Usage of the 900 MHz band

[20] See http://www.digitaltelevision.ie/

[21] Document 10/59 - Update on the availability of Ireland's "digital dividend" and the 900 MHz band liberalisation process - published 29 July 2010.

[22] See www.saorview.ie

[23] See http://www.dcenr.gov.ie/Press+Releases/Minister+Rabbitte+Launches +National+ Free+to+ Air+Digital+Terrestrial+Television.htm – 26 May 2011

[24] In April 2010 the DCENR issued a tender for the provision of "Public Information and Awareness Services in Support of the Digital Switchover Programme in Ireland" to assist in ensuring ASO - see http://www.etenders.gov.ie/search/show/search_view.aspx?ID=APR217835

2.21 The 900 MHz band is comprised of the 880–915 MHz sub-band paired with the 925–960 MHz sub-band. The total amount of spectrum in the 900 MHz band is 2× 35 MHz. Currently there are three spectrum assignments of 2× 7.2 MHz each in the 900 MHz band. This means that 2× 13.4 MHz (including guard-bands) of spectrum is currently unassigned; including a contiguous unassigned block of 2× 12.7 MHz.

2.22 **Figure 1** illustrates the 900 MHz band, and the current spectrum assignments in the band. The various licence expiry dates are set out in

2.23 Table **1**.

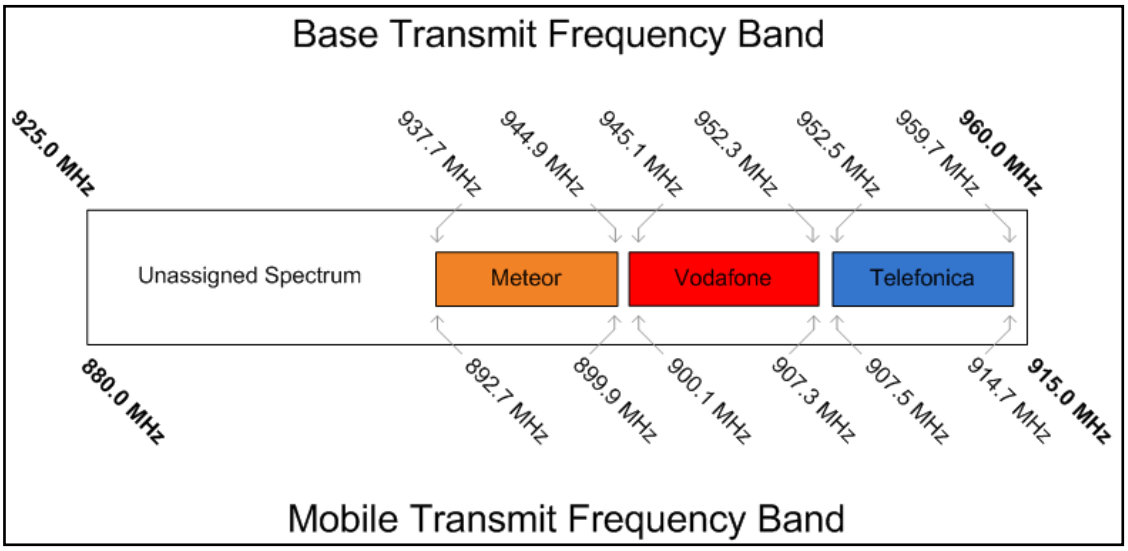

Figure 1: Current Spectrum Assignments in the 900 MHz band

Licensee	GSM 900 Licence Expiry Date
Meteor Mobile Communications Ltd	12 July 2015
Telefónica O2 Communications (Ireland) Ltd	31 January 2013
Vodafone Ireland Limited	31 January 2013

Table 1: Licence Expiry Dates of GSM900 Licensees

Current usage of the 1800 MHz band.

2.24 The 1800 MHz band is comprised of the 1710–1785 MHz sub-band paired with the 1805–1880 MHz sub-band. As shown in

2.25 **Figure 2** the total amount of spectrum in the 1800 MHz band is 2× 75 MHz. Currently there are three spectrum assignments of 2× 14.4 MHz each in this band. This means that 2× 31.8 MHz (including guard-bands) of spectrum is currently unassigned, including a contiguous unassigned block of 2× 26.3 MHz. The various licence expiry dates are set out in **Table 2**.

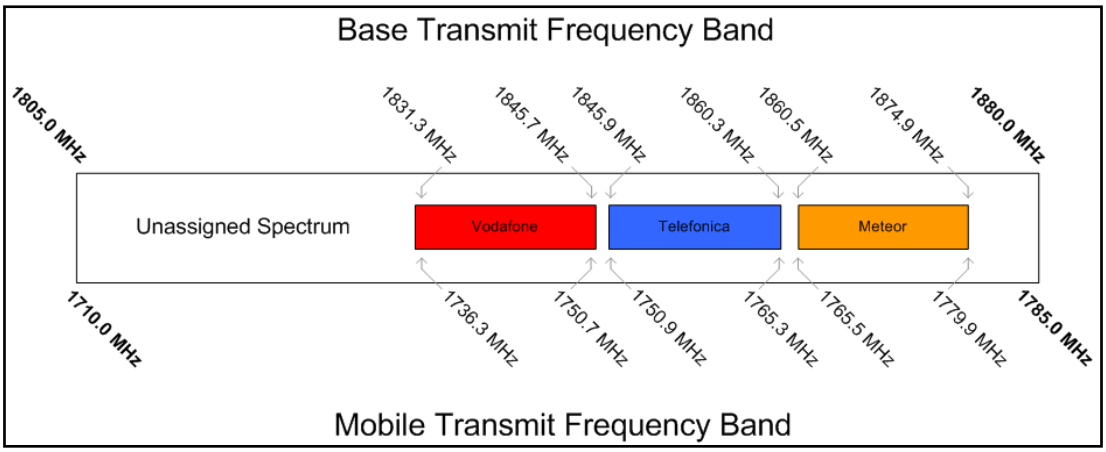

Figure 2: Current Spectrum Assignments in the 1800 MHz band

Licensee	GSM 1800 Licence Expiry Date
Meteor Mobile Communications Ltd	12 July 2015
Telefónica O2 Communications (Ireland) Ltd	31 December 2014
Vodafone Ireland Limited	31 December 2014

Table 2: Current Spectrum Assignments in the 1800 MHz band

Legislation – Liberalisation of the 900 MHz and 1800 MHz bands

2.26 Until the latter part of 2009, the 900 MHz band could only be used for the provision of GSM mobile telephony services – i.e. "2G" comprising traditional voice and text services and "2.5G" comprising limited data services. In the third quarter of 2009 two pieces of legislation were adopted at a European level which provided for "liberalisation" of the 900MHz band and harmonisation of the 900 and 1800 MHz frequency bands. As a result, it is now possible to introduce other terrestrial systems capable of providing electronic communications services that can co-exist with GSM systems in the 900 MHz and 1800 MHz bands. These pieces of legislation are:

- European Directive 2009/114/EC, adopted on 16 September 2009, which amends the existing GSM Directive and removes the exclusive reservation of the 900 MHz band for GSM services ("GSM Amendment Directive") [25]; and
- European Commission ("EC") Decision on the harmonisation of the 900 MHz and 1800 MHz frequency bands for terrestrial systems capable of providing pan-European electronic communications services in the Community (2009/766/EC), adopted on 16 October 2009, which sets out the technical harmonisation measures for the introduction of other terrestrial systems capable of providing electronic communications

[25] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:274:0025:0027:EN:PDF

services that can co-exist with GSM systems in the 900 MHz and 1800 MHz bands (the "EC Decision on the 900 and 1800 MHz bands").[26]

2.27 On 7 May 2010, the Minister for Communications, Energy and Natural Resources made the European Communities (Public Pan-European Cellular Digital Land-Based Mobile Communications) Regulations 2010 (the "GSM Amendment Regulations") which transposed Directive 2009/114 in Irish law.[27] The GSM Amendment Regulations transpose the GSM Amendment Directive into Irish Law.

2.28 The GSM Amendment Directive and the GSM Amendment Regulations make the 900 MHz band available for GSM and Universal Mobile Telecommunications Systems ("UMTS") systems, as well as for other terrestrial systems capable of providing electronic communications services that can co-exist with GSM systems. The GSM Amendment Regulations require ComReg to examine whether liberalisation of the existing licensed assignment of spectrum in the 900 MHz band (to current operators in the mobile sector in Ireland), may distort competition and, where justified and proportionate, ComReg must address any such distortions in accordance with Regulation 15 of the European Communities (Electronic Communications Networks and Services) (Authorisation) Regulations 2003, as amended.[28]

2.29 The European Conference of Postal and Telecommunications Administrations ("CEPT") has studied the technical coexistence parameters that could allow Long Term Evolution ("LTE") and other relevant technologies, such as Worldwide Interoperability for Microwave Access ("WiMAX"), to be added to the list of permitted technologies in the Annex of the EC Decision. This work was presented at the 34th EC Radio Spectrum Committee ("RSC") meeting of 8 and 9 December 2010 and was finalised on 18 April 2011 with the publication of an EC Decision[29] which amended Decision 2009/766/EC and permits these two additional technologies to be deployed in the 800 MHz and 900 MHz bands.

Legislation – The 800 MHz band

2.30 On 6 May 2010, the EC adopted a Decision which harmonises the technical conditions of use in the 800 MHz band, for terrestrial systems capable of providing electronic communications services in the European Union.[30] When an EU Member State designates or makes available the 800 MHz band for networks other than high-power broadcasting networks, the said Decision obliges that Member State to allow the 800 MHz band to be used for terrestrial systems capable of providing

[26] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:274:0032:0035:EN:PDF

[27] See Statutory Instrument 195 of 2010: http://www.irishstatutebook.ie/2010/en/si/0195.html

[28] Now Statutory Instrument 355 of 2011: http://www.irishstatutebook.ie/2011/en/si /0335.html. Note that S.I. 355 of 2011 repealed the European Communities (Electronic Communications Networks and Services) (Authorisation) Regulations 2003 (S.I. 306 of 2003) but that section 2(5) thereof provides that any reference to those regulations in any enactment is to be interpreted as a reference to S.I. 355 of 2011.

[29] 2011/251/EU - Commission Implementing Decision of 18 April 2011 amending Decision 2009/766/EC on the harmonisation of the 900 MHz and 1 800 MHz frequency bands for terrestrial systems capable of providing pan-European electronic communications services in the Community - see http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:106:0009: 0010:EN: PDF

[30] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32010D0267:EN:HTML

electronic communications services in compliance with the parameters set out in the Annex to the Decision. The Annex of the Decision sets out a number of technical conditions in the form of frequency arrangements and block-edge masks (BEMs).

Legislation – Legal Framework, ComReg's Objectives and Functions

2.31 The legal framework within which ComReg operates and ComReg's functions and objectives in relation to Radio Spectrum is set out in detail in Annex 1 of this document.

Chapter 3

Draft RIA and Assessment against Statutory Objectives

Introduction

3.1 There are two important frameworks which have informed the analysis contained in this chapter. The first are ComReg's Regulatory Impact Assessment ("RIA") Guidelines and the second is an assessment against ComReg's statutory objectives, as set out in Annex 1.

3.2 There is a significant degree of overlap between the RIA framework and the assessment of compliance with ComReg's statutory provisions and so the RIA itself is an appropriate tool for assessing and ensuring compliance of the preferred option with many of those principles and provisions, and importantly, with those core provisions which relate to the efficient use and effective management of Ireland's radio frequency spectrum and the promotion of competition.

3.3 A short explanation is provided of the RIA framework. Using the RIA framework, and based on the analysis of issues contained in Annex 3.1 and 3.2, ComReg sets out the policy issues to be addressed and relevant objectives (Step 1). This leads to the identification of two fundamental policy issues. ComReg then considers these two policy issues separately using the four remaining steps in the RIA process. The outcome of the draft RIAs is followed by an assessment against ComReg's statutory objectives.

RIA Framework

3.4 In general terms, a RIA is an analysis of the likely effect of a proposed new regulation or regulatory change, and, indeed, of whether regulation is necessary at all. A RIA should help identify the most effective and least burdensome regulatory option and should seek to establish whether a proposed regulation is likely to achieve the desired objectives, having considered relevant alternatives, and the impacts on stakeholders. In conducting a RIA, the aim is to ensure that all proposed measures are appropriate, effective, proportionate and justified.

3.5 ComReg was issued with a Policy Direction on 21 February 2003 by the Minister for Communications, Marine and Natural Resources under Section 13 of the 2002 Act requiring ComReg to conduct a RIA in accordance with best practice. Subsequently, ComReg published its own RIA Guidelines.[31]

Use of RIA in this document

3.6 ComReg's RIA Guidelines set out, amongst other things, the circumstances in which ComReg considered that a RIA might be appropriate. In general, ComReg conducts a RIA in any process that might result in the imposition of a regulatory obligation (or the amendment of an existing regulatory obligation to a significant degree), or which might otherwise significantly impact on any relevant market or on

[31] See document 07/56a - Guidelines on ComReg's approach to Regulatory Impact Assessment - August 2007

any stakeholders or consumers. This is in line with the Policy Direction of 21 February 2003 on Regulatory Impact Assessment referred to above.

3.7 Given that the outcome of this overall project would significantly impact on the electronic communications sector in Ireland, and in the interests of continuing to ensure openness and transparency, in this current document ComReg has conducted a number of specific draft RIAs. These have been prepared in accordance with ComReg's RIA Guidelines, and with regard to the RIA Guidelines issued by the Department of An Taoiseach in June 2009 ("the Department's RIA Guidelines") and the above mentioned Policy Direction of 21 February 2003.

3.8 This Chapter sets out a draft RIA on two fundamental policy issues: first, what, if any, additional bands should be included with the award of the 900 MHz band and, second, what type of assignment process should be used.

3.9 Separately ComReg also conducted draft RIAs with regard to its proposed licence conditions for coverage and quality of service (see Annex 8).

3.10 Alongside comments on this entire document, ComReg invites interested parties to review the draft RIAs contained in this document and to submit any comments or information which they believe ComReg has not considered and should consider in finalising its decision on its broader spectrum release proposals. Subject to respondents' views, the draft RIAs will be finalised in ComReg's forthcoming Decision.

Structure of a RIA

3.11 As set out in ComReg's RIA Guidelines, there are five steps in a RIA. These are:

- Step 1: Identify the policy issue and identify the objectives;
- Step 2: Identify and describe the regulatory options;
- Step 3: Determine the impacts on stakeholders;
- Step 4: Determine the impacts on competition; and
- Step 5: Assess the impacts and choose the best option.

3.12 The focus of Step 3 is to assess the impact of the proposed regulatory options available to ComReg on stakeholders. Stakeholders consist of two main groups:

(i) Consumers, and

(ii) Industry stakeholders. There are a number of different industry stakeholders:

a. One group of stakeholders are the companies that are currently active in the mobile electronic communications sector. These, in turn, can be differentiated into those with existing rights of use in the 900 MHz and 1800 MHz bands for the purposes of delivering 2G services (i.e. Vodafone, O2 and Meteor) and those without any such rights.

b. In this particular case, another group of stakeholders are potential new entrants that may be considering entry into the mobile electronic communications sector in the State. This may include companies that are otherwise engaged in the electronic communications sector in the State, in other Member States or further afield.

3.13 The focus of Step 4 is to assess the impact of the proposed regulatory options available to ComReg on competition. In this particular case, this requires an assessment of competition at two levels – competition 'for' the market, that is competition in the award process, and competition 'in' the downstream, retail market.

3.14 Of themselves, the various RIA guidelines and the RIA Policy Direction provide little guidance on how much weight should be given to the positions and views of each stakeholder group (Step 3), or the impact on competition (Step 4). Accordingly, ComReg has been guided by its statutory objectives which it is obliged to seek to achieve when exercising its functions. ComReg's objectives in managing the radio frequency spectrum, as set out in Annex 1, include:

- the promotion of competition;
- contributing to the development of the internal market; and
- the promotion of the interests of EU citizens.

3.15 In this document, ComReg has adopted the following structure in relation to Step 3 and Step 4 – the impact on industry stakeholders is considered first, followed by the impact on competition, followed by the impact on consumers. The order of this assessment has no bearing on their respective importance but rather reflects a logical progression. For example, a measure which safeguards and promotes competition should also, in turn, impact positively on consumers. In that regard, the assessment of the impact on consumers draws substantially upon the assessment carried out in respect of the impact on competition.

Draft RIA: Policy issues to be addressed and relevant objectives (Step 1)

Policy Issues

3.16 In summary, Directive 87/372/EEC reserved the 900 MHz band exclusively for a public pan-European cellular digital mobile communications service to be provided in each Member State in accordance with a common specification, known as GSM. Since 1987, new digital radio technologies capable of providing innovative pan-European electronic communications have been developed, which can coexist with GSM in the 900 MHz band in a more technologically neutral regulatory context than before. The 900 MHz band has good propagation characteristics, covering greater distances than higher frequency bands, and allows modern voice, data and multimedia services to be extended to less populated and rural areas.

3.17 In order to contribute to the objectives of the internal market and of the Commission Communication of 1 June 2005 entitled 'i2010 initiative — A European Information Society for growth and employment', while maintaining the availability of GSM for users throughout Europe, and to maximise competition by offering users a wide choice of services and technologies, Directive 2009/114/EC was

adopted. Directive 2009/114/EC (the "GSM Amendment Directive"), which amends Directive 87/372/EEC, requires Member States to make the 900 MHz spectrum band available for both GSM systems and 3G/UMTS systems as well as for other terrestrial systems capable of providing electronic communications services that can co-exist with GSM systems.

3.18 In anticipation of the transposition into national law of the GSM Amendment Directive[32], ComReg set out on this consultation process with the aim of liberalising rights of use in the 900 MHz band (and possibly the 1800 MHz band) as soon as possible in order to maximise the potential of this spectrum. ComReg's spectrum liberalisation consultation process commenced by examining the following two primary policy issues:

- how best to implement the requirements of the GSM Amendment Directive so as to achieve liberalisation of the 900 MHz and 1800 MHz bands; and
- how best to release spectrum in the 900 MHz band, including how best to address the expiry of existing rights of use in the 900 MHz band.

3.19 In relation to the 1800 MHz band, ComReg initially considered that, due to uncertainty over equipment availability, it would be appropriate to delay liberalisation of this band and not include it with the 900 MHz band in a single award process.[33] However, the recent greater availability of equipment for the 1800 MHz band has caused ComReg to re-examine its previous proposal to address liberalisation of the 1800 MHz band separately in a subsequent assignment process.[34] During the course of ComReg's consultation process, it also became clear that access to the "digital dividend" spectrum in the 800 MHz band (which has very similar propagation properties to the 900 MHz band) would become available for ECN/ECS use several years earlier than expected.[35] In light of these important developments, ComReg is faced with the choice of whether or not to combine what would otherwise have involved up to three separate assignment processes for the 900 MHz, 800 MHz and 1800 MHz bands.

3.20 In the meantime, and to facilitate consideration of these issues, the expiry of Vodafone and O2's existing GSM rights of use in the 900 MHz band on 15 May 2011 has also been temporarily addressed through the assignment of interim rights of use pending the outcome of the assignment process and release of spectrum in that band.[36]

3.21 Following the analysis contained in Annex 3.1 and 3.2, ComReg is of the view that there are two primary policy issues[37] to be considered in relation to the assignment of liberalised rights of use in the 900 MHz band:

a) Whether to include the 800 MHz and/or 1800 MHz bands in the 900 MHz spectrum-use-rights assignment process, and

[32] Now transposed in Ireland by the European Communities (Public Pan-European Cellular Digital Land-Based Mobile Communications) Regulations 2010 (S.I. No. 195 of 2010).
[33] See Section 9 of Consultation 08/57.
[34] See Section 2 of Consultation 10/105.
[35] See Information Notice 10/59 and Consultation 10/71.
[36] See ComReg Response to Consultation and Decision (Document 11/29).
[37] Other relevant policy issues are subject to separate analysis contained in the annexes.

b) In light of the response to the above question, how best to assign rights of use in those band(s).

3.22 ComReg has taken the view that these two important issues, while related, are sequential in nature and can therefore be considered separately. This approach should enhance the efficacy of the draft RIA by increasing transparency within the decision making process and ensuring that full consideration is given to each issue. This approach brings important clarity and objectivity to the key decisions that must be made by ComReg in bringing forward its proposals in relation to this matter and should assist interested parties in considering and responding to ComReg's draft decision set out in Chapter 8 of this paper.

3.23 In relation to the first policy issue, due to matters relevant to digital switch-over in Ireland becoming clearer, along with several technological developments, it has become evident since the commencement of this consultation process that other spectrum bands should be considered for inclusion in the proposed assignment process with the 900 MHz band. The options set out below reflect these developments and the policy issues before ComReg in this regard.

3.24 In considering the inclusion of other bands in the award of the 900 MHz spectrum band it is worthwhile noting the differing circumstances surrounding these bands:

i. the 800 MHz band would be considered as 'greenfield' spectrum by the mobile industry (i.e. after the completion of ASO the 800 MHz will be unoccupied/unencumbered by existing licensees in the band), and
ii. the GSM bands would be considered as 'brownfield' spectrum because these bands are currently occupied by existing licensees who are providing GSM services to a large number of customers.

3.25 In relation to the second policy issue, a range of possible assignment procedures are available to ComReg in determining how best to assign rights of use in these band(s), e.g. competitive auction, administrative assignment, etc. These policy issues before ComReg are also reflected in the relevant options set out below.

Objectives

3.26 The focus of this draft RIA is to assess the impact of the proposed measure(s) on stakeholders, and on competition. In that way it will allow ComReg to identify and implement the most appropriate and effective means to assign spectrum usage rights, while still allowing ComReg to achieve its objectives.

3.27 As noted above, ComReg's immediate objective is to assign liberalised rights of use in the 900 MHz and 1800 MHz spectrum bands as soon as possible, in line with the EC Decision, and, where appropriate, to include additional spectrum bands in that assignment process. ComReg also aims to design and carry out this assignment process in accordance with its broader statutory objectives (set out in Annex 1), including, but not limited to, the promotion of competition in the electronic communications sector. A further key objective in designing and carrying out this assignment process is to seek to encourage the efficient use and ensure the effective management of the radio frequency spectrum. ComReg's other overarching objectives are to contribute to the development of the internal market and to protect EU citizens. ComReg also notes that, in achieving its objectives, its ultimate aim is

to choose regulatory measures which maximise the benefits for consumers in terms of price, choice and quality.

3.28 A RIA is an appropriate tool for assessing and ensuring compliance with many of ComReg's objectives. Following the draft RIA in this chapter, a further analysis is also undertaken to consider the extent to which the preferred option and certain alternatives comply with other principles and statutory provisions relevant to the management and use of Ireland's radio frequency spectrum.

3.29 Having identified the above policy issues and objectives, the remainder of the draft RIA is divided between the two stand-alone primary policy issues identified above. Consideration of these policy issues is set out below with a separate assessment of the four remaining steps in the RIA process. They are referred to as the **draft 'Spectrum for Award' RIA** and the **draft 'Assignment Process' RIA**, respectively.

The Draft 'Spectrum for Award' RIA: Regulatory Options (Step 2)

3.30 On the basis of its analysis in Annex 3 of this document, ComReg considers the following to be the spectrum band award options available to achieve the objectives identified earlier:

- Option 1 – Assign rights of use in the 900 MHz band in a stand-alone assignment process. Assign rights of use in the 800 MHz and 1800 MHz bands in a separate later assignment process, or in later processes, which might, or might not, include the award of rights of use in related bands, such as the 2.6 GHz band, when this becomes available[38];

- Option 2 – Combine the 900 MHz and the 800 MHz bands into a single assignment process, with or without synchronisation of the timing of the release of these bands.[39] Rights of use in the 1800 MHz band might be assigned as part of a separate, later assignment that might, or might not, include the assignment of rights of use in other similar bands; and

- Option 3 – Combine the 900 MHz, 800 MHz and 1800 MHz bands into a single assignment process, with or without the timing of the release of these bands being synchronised.[40]

The Draft 'Spectrum for Award' RIA: Impact on Stakeholders and Competition (Steps 3 and 4)

3.31 The focus of this section of the draft RIA is to assess the impact of the aforementioned regulatory options on:

(i) industry stakeholders (being existing operators and potential new entrants),
(ii) competition, and

[38] The 2.6 GHz band is currently licensed for MMDS services in Ireland. Current licences expire in 2012 and 2014. Regulation 8 of Statutory Instrument Number 529 of 2003 (S.I. No 529/2003) provides for a licence extension of up to 5 years. See also Annex 3 for further discussion on the 2.6 GHz band.
[39] In this regard, see Chapter 7 on Advanced Commencement for 900 MHz.
[40] In this regard, see Chapter 7 on Advanced Commencement for 900 MHz.

(iii) consumers.

3.32 Prior to carrying out the comparative analysis for this draft RIA, ComReg first provides some useful background information concerning the characteristics of, and developments in, the demand for the spectrum bands under consideration.

Background

3.33 Consumer interest and willingness to pay for mobile broadband has increased substantially in recent years. According to survey data, nearly 40% of handsets in the Irish market are smart phones capable of delivering advanced mobile 3G services. Therefore just over 60% of consumers do not, as yet, have equipment that can fully exploit the advantages of advanced mobile 3G services.[41]

3.34 The three spectrum bands under consideration in this draft RIA are all suitable for the provision of mobile broadband. Equipment availability differs across these bands:

- The 900 MHz band is currently being used in Ireland for GSM services only. UMTS technology equipment is available for this band;
- The 1800 MHz band is also being used for GSM services, with the exception of some prototype LTE-specific dongles.[42]
- There is currently no mobile equipment of any type (infrastructure or devices) in Ireland that actively operates in the 800 MHz band.

3.35 The technological roadmaps of equipment manufacturers envisage the availability of LTE equipment, including multimode handsets, in these bands, and such equipment is already becoming available. LTE is expected to greatly enhance the consumer experience of mobile broadband in terms of download and upload speeds (and thus making available different types of services – for example data-intensive services including video and music streaming, IPTV, video-conferencing etc). Commercialisation of LTE-Advanced systems is expected in the 2013-2015 timeframe.[43] Handset manufacturers are already launching devices that would enable consumers to access the internet at broadband speeds whilst they are on the move. According to the Global mobile Suppliers Association ("GSA"), there are over 200 operators worldwide investing in LTE and 24 commercial LTE networks have been launched to date.[44]

3.36 Timely access to sufficient spectrum in the sub-1 GHz spectrum bands is very important to reap the benefits associated with this spectrum. The propagation characteristics of the sub-1 GHz spectrum bands make this spectrum ideal for the provision of wireless ECS, including mobile voice and messaging services and advanced wireless services such as advanced mobile broadband. These spectrum bands are well suited to providing wide-area coverage and in building penetration and, of particular importance in the Irish context, its long distance propagation characteristics are ideal for covering sparsely populated areas. Networks based on

[41] *Smart Report* by Amarach (May 2011), available at http://www.amarach.com/assets/files/The%20Smart%20Future.pdf . This data is based on an online survey of 844 mobile phone users who were asked *Is your mobile phone a smart phone, i.e. one you can use to surf the internet, download apps etc.*

[42] See Section 2.3 of Red-M/Vilicom Report (Document 10/105b).

[43] See Global Mobile Suppliers Association ("GSM") - GSM / 3G Market / Technology Update, March 2011.

[44] www.gsacom.com/news/gsa_334.php4

sub-1 GHz spectrum bands have substantially lower Capex and Opex relative to networks built using spectrum bands that reside above 1 GHz. For example, in their report (Document 09/14a), Red-M/Vilicom estimated that the overall deployment costs (CapEx) for UMTS 1800 MHz and UMTS 900 MHz were 88.5% and 65.6% respectively of the total cost of a UMTS 2100 MHz network. In terms of OpEx, the largest quantity is consumed in proportion to the number of sites in the network, i.e. the denser the network, the greater the number of prospective truck-rolls needed for maintenance purposes. Also, the electrical power costs increase in direct proportion with network density. A reasonable estimate can therefore be made by indexing the proportion of the costs to the UMTS 2100 MHz network. It is estimated that, in terms of OpEx, UMTS 1800 MHz and 900 MHz would consume 84% and 51% respectively of UMTS 2100 MHz.[45]

3.37 Spectrum in the bands over 1 GHz are often seen as capacity bands, though some MNOs have also used this type of spectrum successfully up to now as coverage bands for GSM services when they do not hold spectrum usage rights in sub-1 GHz bands.[46]

3.38 Optimal network configuration often involves a mix of both coverage and capacity bands.

3.39 Given the nature of mobile broadband demand (and its likely evolution) it is expected that individual mobile operators will require significantly more sub-1 GHz spectrum than they did previously to provide the services that consumers will demand in the future. Spectrum in contiguous blocks will continue to have a particular utility to MNOs.

3.40 In the medium term, it is likely that undertakings will consider spectrum in the 800 MHz and 900 MHz bands to be close substitutes. However, the substitutability of these bands may be somewhat limited in the short term. This is due to differences in the speed of technological development and deployment, continued legacy GSM operation in the 900 MHz band and the availability of equipment for the two bands, as well as in terms of the amount of bandwidth available.[47] Accordingly, it is recognised that MNOs which have a significant legacy 2G customer base may only see the 800 MHz and 900 MHz bands as equally good substitutes after they have acquired sufficient 900 MHz spectrum to continue to serve these legacy customers, or migrate these customers off 2G.

3.41 In light of the above characteristics of, and developments in, the demand for radio frequency spectrum in Ireland, ComReg sets out below a comparative analysis of the three spectrum band award options outlined above, in terms of their impact on stakeholders and competition.

3.42 It is important to note that the following assessment is carried out under the assumption that a reasonable assignment process is identified in the draft 'Assignment Process' RIA.

[45] See Vilicom Report (Document 09/14a) UMTS Network Design & Cost Estimation for National UMTS900, UMTS1800 & UMTS2100 Networks

[46] For example, the Everything Everywhere joint venture (a merger of T-Mobile UK and Orange UK) forming the biggest network in the UK has no sub-1 GHz spectrum.

[47] See *RSPG* BEREC Report on Competition: Transitional Issues in the Mobile Sector in Europe, paragraph 26, published February 2011.

Impact on industry stakeholders

3.43 As noted above, industry stakeholders can be split between those operators that are currently active in the mobile electronic communications sector and potential new entrants that may be considering entry into the mobile electronic communications sector in the State.

Option 1 (900MHz only) vs. Option 2 (900 MHz + 800 MHz)

3.44 Generally speaking, given the benefits of sub-1 GHz spectrum in terms of reduced costs and greater efficiency compared to higher frequency spectrum, mobile operators, whether an existing operator or a new entrant, would prefer to have more sub-1 GHz spectrum than less, all other things being equal. Consumer demand for high bandwidth data services require the deployment of advanced networks that require larger quantities of sub-1 GHz spectrum than required to provide GSM services. As noted above, the use of sub 1-GHz spectrum rather than higher frequency spectrum allows mobile networks to be more efficient and cost effective, particularly in rural areas, due to enhanced propagation characteristics. Also it enables network operators to deliver a better service within each network cell on the basis of having additional capacity available at each base station.

3.45 Assigning all the sub-1 GHz blocks that are likely to come available in the coming years in a single process would likely be preferred by most, if not all, industry stakeholders. This preference is evident in the submissions received by ComReg (as set out in Annex 3). A combined award of the sub-1 GHz bands would ensure that operators would know their long-term spectrum allocations within these bands thereby eliminating the risks attaching to sequential processes and enabling operators a better chance of obtaining their preferred mix of spectrum, by virtue of their being a larger quantity of spectrum to be divided out. The desired mix of spectrum would likely vary from incumbent to new entrant and also within each class of participant. Each participant knows best what its desired mix would be so would prefer to be provided with the necessary flexibility to determine that mix.

3.46 Some operators may wish to obtain liberalised spectrum usage rights in the 900 MHz band at an earlier date than the 800 MHz band is available from. However, no operator has expressed a preference that the processes are split to achieve this as, presumably; they would then be left with the risks associated with sequential processes as outlined above. Such operators have instead expressed a preference that the sub-1 GHz bands were instead assigned in the same process but that the 900 MHz band, or components thereof, were made available as soon as possible thereafter.[48]

3.47 If a competitive assignment process (e.g. an auction) was used to award all of this spectrum (see draft 'Assignment Process' RIA for further discussion of this matter), as DotEcon noted, in both Document 10/71a and in their most recent report (Document 11/58), the award or grant of multiple spectrum bands at the same time would allow operators to consider the full mix of possible holdings in different bands and select possible holding options on the basis of price. This would reduce risk for operators and promote efficient allocation. This view has also largely been echoed by respondents to the consultation process, some of which have advocated a

[48] As set out in Annex 3, both Vodafone and H3GI have expressed these views in their various submissions.

holistic approach to identifying spectrum bands for inclusion in the assignment process. In contrast, running sequential processes to award spectrum would result in bidders in earlier award processes not knowing what price spectrum usage rights in later processes might be sold for, or whether they would be likely to win any such rights in any later processes. Further, once spectrum usage rights have been won or granted in one process, it would not then possible to alter this outcome in the course of bidding in a later process. Therefore, sequential processes are unable to explore the full range of options and are highly dependent on bidders' expectations about what might happen in later awards. As a result an efficient allocation is unlikely to occur.[49] Operators would prefer to determine all at once what their long-term spectrum holding rights in the critical sub-1 GHz bands. In the absence of this knowledge, investment commitments would likely be curtailed or withheld. This applies equally to both incumbents and potential new entrants.

3.48 Having regard to the foregoing, ComReg is of the view that Option 2 would likely be preferred by all industry stakeholders over Option 1.

Option 2 (900 MHz + 800 MHz) vs Option 3 (900 MHz + 800 MHz + 1800 MHz)

3.49 Looking first at incumbent operators, as explained in more detail below, it is evident that their preferences as between Option 2 and Option 3 could be indifferent, whilst some may have a preference for Option 2, with others preferring Option 3.

3.50 An incumbent MNO that has existing rights in bands that they currently use for capacity purposes may not require that rights of use in substitutable capacity bands, such as the 1800 MHz band, be awarded/granted in the same assignment process as the 900 MHz band. As such, these operators may be indifferent as to whether bands they perceive as capacity bands are awarded alongside the 900 MHz band or in a subsequent spectrum award process. ComReg notes that O2 has previously suggested that the auction of the 1800 MHz band maybe due to their concerns of a potential delay to the proposed issue of interim licences in the 900 MHz band and until clarity could be provided on the availability of the 2.6 GHz band. In relation to the former, the issue of interim licences was finalised in Document 11/29 (Decision 03/11). In relation to the latter, ComReg notes and agrees with the Red-M /Vilicom view (11/57) that justifying the timing and structuring of an auction of spectrum-use rights solely on the basis of propagation characteristics of the spectrum being auctioned appears tenuous and ignores other factors that are significant.[50]

3.51 Some incumbents may prefer Option 2 to Option 3 as Option 3 may increase the likelihood of new entry (as described in more detail below). Incumbent MNOs would likely see the emergence of new entrants wishing to participate in the assignment process in a negative light, as this would represent an increase in demand for spectrum. This would, in turn, make it more difficult for incumbents to

[49] Trading may help to overcome these inefficiencies in the longer term, but trades between competitors for key bands such as these may not occur as often as might be required or predicted. DotEcon also noted in their report (Document 10/71a) that where spectrum has been awarded in a sequence of auctions, such as with Swiss WLL licences in 2001, often very different prices are seen for closely similar lots. This is strong evidence of the inefficiency of the outcome, as similar lots should sell for similar prices. Dissimilar prices show that substitution on the basis of price has been largely impossible in a sequential award process.

[50] See Section 3.2.2 of Vilicom Report (Document 11/57).

acquire spectrum, all else being equal. For that reason, an incumbent MNO may prefer that the 1800 MHz spectrum not be included in the assignment process of 900 MHz spectrum, in the belief that this would increase the likelihood of acquiring their desired amount of sub-1 GHz spectrum. Furthermore, incumbents would have the opportunity to acquire any 1800 MHz rights of use they desired at a later stage. In addition, the exclusion of 1800 MHz spectrum might also be seen by incumbents as reducing the likelihood of new entry and any resultant increase in competitive tension in the mobile market and might be preferred by incumbents for that reason.

3.52 On the other hand, some incumbents may prefer Option 3 to Option 2. This is because 1800 MHz spectrum, while not purely substitutable with sub-1 GHz spectrum, is regarded as strategically complementary to sub-1 GHz spectrum. It is generally thought that an optimum and efficient mobile network comprises sub-1 GHz spectrum coupled with supporting 1800 MHz spectrum. Therefore, an incumbent with a dense network of towers in urban areas may deem additional 1800 MHz, or higher frequency, spectrum as a good substitute, or at least complementary, to sub-1 GHz spectrum. In this regard, incumbents would also benefit from an assignment process that included 1800 MHz spectrum. In addition, including 1800 MHz spectrum would also provide incumbents, at the very least, with the opportunity of early liberalisation of current rights of use in the 1800 MHz band. So while incumbents might not increase their existing rights (apart from increasing from 2 × 14.4 MHz to 2 × 15 MHz) they might value having rights of use on a liberalised basis. Furthermore, incumbents are likely to value the regulatory certainty associated with Option 3 regarding the availability of the 1800 MHz band on a liberalised basis.

3.53 Now turning to the case of potential new entrants it is evident, as explained in more detail below, that they would strongly favour Option 3 over Option 2.

3.54 Potential new entrants (including operators that are already active in the Irish electronic communications sector but have no existing rights in capacity bands) would likely have a strong preference for acquiring an optimal mix of coverage and capacity-suitable spectrum and/or enter on the basis of access to coverage-suitable bands only (as has happened elsewhere). An assignment process that included both the 1800 MHz band and the available sub-1 GHz bands would therefore provide new entrants with the opportunity to acquire a broader portfolio of spectrum usage rights to enable them to compete on a level footing with existing operators. Such a broad assignment process would also encourage new entrants to participate in the assignment process itself.

3.55 Finally, it is worthwhile considering the preferences of all operators. The award/grant of the available sub-1 GHz spectrum bands and the 1800 MHz band in a single process would provide an opportunity for all operators to acquire spectrum in the various bands and so acquire a portfolio of spectrum rights that would enable them to optimise their network. The discussion above made in the context of a joint award of the two sub-1 GHz bands is also equally relevant in considering the inclusion or not of the 1800 MHz band, and is therefore worth repeating here. As noted by DotEcon in their report (Document 10/71a), the award of multiple spectrum bands at the same time would provide more spectrum for operators in different bands. This would reduce risks for operators and promote efficient allocation. This view has also largely been echoed by respondents to the

consultation process, some of which have advocated a holistic approach to identifying spectrum bands for inclusion in the assignment process. In contrast, staggered or sequential assignment of liberalised spectrum bands would add a layer of inefficiency, as decisions made in an initial award process could only be based on an expectation of the outcomes in subsequent awards. Where these expectations about subsequent awards were not fulfilled, undertakings could well regret their earlier decisions. This would tend to influence the decision making processes of participants or potential participants in the current assignment process which could lead to regulatory uncertainty and an inefficient outcome to the award.

3.56 On the basis of the above assessment, ComReg is of the view that, although the inclusion of the 1800 MHz band may increase the likelihood of entry and, as such, it is possible that some incumbents might not be in favour of its inclusion in the award, there are many reasons why incumbents would support its inclusion. As noted above, new entrants would likely be strongly in favour of its inclusion. Therefore there would appear to be a convergence of views amongst industry stakeholders. ComReg notes again that such preferences have been echoed by respondents to the consultation process.

3.57 In light of the foregoing, ComReg is of the view that Option 3 would likely be preferred by over Option 2 by new entrants, and most, if not all, of the incumbent operators.

Impact on competition

3.58 Before considering the comparison of the options in terms of their respective impact on competition, it is worthwhile setting out some general points relating to the analysis of the impact on competition.

3.59 The inclusion or exclusion of the proposed spectrum bands in the assignment process could impact on competition in the electronic communications sector at two different levels.

3.60 First, there is the potential competition within the award process for spectrum-usage rights. This can be referred to as competition 'for' the market. The level of competition 'for' the market can reasonably be assessed by reference to the number of independent undertakings that are willing to participate, or are permitted to participate, in the award process. The higher the number of participants the greater the competition for each spectrum lot (assuming each has sufficient resources and commitment).

3.61 Second, there is competition in the downstream retail market. This can be referred to as competition 'in' the market. The award process used, and the level of competition within that award process, will have a significant impact on the level of competition downstream. At a general level, the more intense the competition in the assignment process (the greater the level of participation), the higher the probability that the spectrum usage rights will be awarded to those operators that value it the most, and who will use the spectrum most efficiently and compete most vigorously in the downstream retail market.

3.62 The inclusion or exclusion of other spectrum bands alongside the 900 MHz band is likely to impact on the number of undertakings willing to participate, or are

permitted to participate, in the award process. This in turn will impact on competition in the downstream market. As such, an option that encourages participation in the award process, and thereby promotes entry will in turn, have a more positive impact on competition 'in' the market than an option that deters entry.

Option 1 (900 MHz only) vs. Option 2 (900 MHz + 800 MHz)

3.63 Based on the earlier comparative analysis of the options, from the perspective of existing operators and potential new entrants, it is evident that excluding the 800 MHz spectrum band from the award of the 900 MHz band and adopting a sequential process/processes for the two spectrum bands, i.e. under Option 1, would reduce flexibility for all operators in terms of different potential mixes of spectrum available at the same time. This would reduce the opportunities for new entry into the market and thereby reduce likely participation in the award process. Both competition 'for' the market and, in turn, competition 'in' the market would be negatively impacted.

3.64 On the other hand, Option 2, a combined process involving both 900 MHz and 800 MHz spectrum, would increase the flexibility for operators in terms of different potential mixes of spectrum across the two sub-1 GHz bands. This would increase the opportunities for new entry compared to Option 1 thereby having a more positive impact on competition 'for' the market and, by extension, competition 'in' the market, compared to Option 1.

3.65 Excluding the 800 MHz spectrum band from the award of the 900 MHz band, Option 1, does not appear to offer any obvious benefits in terms of competition 'for' the market over Option 2.

3.66 In light of the foregoing, ComReg is of the view that Option 2 would have a greater positive impact on competition than Option 1.

Option 2 (900 MHz + 800 MHz) vs. Option 3 (900 MHz + 800 MHz + 1800 MHz)

3.67 The comparison between Option 2 and Option 3 addresses the same issues. Compared to Option 2, Option 3 would *further* increase the flexibility for operators in terms of different mixes of spectrum across different spectrum bands available at the same time. In particular, Option 3 would increase flexibility by enabling operators to access both low and high frequency spectrum at the same time, and thereby meet both their coverage and capacity requirements. This is likely to increase participation in the award process compared to Option 2.

3.68 As set out above, Option 3, with the inclusion of the 1800MHz band in a joint award of the 800 MHz and 900 MHz spectrum bands, would likely to be strongly favoured by new entrants over Option 2. Undertakings contemplating entry (or undertakings that view the 1800 MHz band as suitable for coverage and/or capacity) would likely have a strong preference for an assignment process that included the 1800 MHz band. This is because an entrant with no existing mobile spectrum has two problems:

- First, it needs sufficient spectrum to offer services comparable with incumbent competitors and it may find low frequency spectrum relatively

more costly to obtain due to its greater scarcity and high value to incumbents.

- Second, it may benefit from a mix of high and low frequency spectrum to be able to both provide wide-area coverage and also provide capacity in urban areas.

3.69 Therefore, an entrant might treat high and low frequency spectrum as complements (i.e. it benefits from a mix) but also substitutes at the margin (i.e. it might make do with more high frequency spectrum even if it ideally would prefer low frequency spectrum). Thus, in terms of the impact on competition 'for' the market, the inclusion of 1800 MHz would make Option 3 even more attractive to new entrants than Option 2. This would result in even greater likelihood of more participation in the award process than Option 2 and therefore result in greater competition for spectrum in any assignment process. This, in turn, would enhance competition in downstream retail markets with users deriving maximum benefit in terms of choice, price and quality.

3.70 As DotEcon noted in their report (Document 10/71a), maximising opportunities for entrants does not necessarily mean that entry will occur. However, even if entry does not occur, it is still beneficial on competition grounds to make it desirable for entrants to participate.[51] Furthermore, there would be little prejudice to stakeholders of including the 1800 MHz band in the award of the sub 1 GHz spectrum. If some or all of the 1800 MHz spectrum band were not to be successfully awarded in a combined process now, it could still be combined with other spectrum in a subsequent spectrum-use rights assignment process. In that case, it would be clear that no alternative better option would have been passed up.

3.71 Excluding the 1800 MHz spectrum band from the joint award of the 800 MHz and 900 MHz bands, i.e. Option 2, does not appear to offer any obvious benefits in terms of competition 'for' the market over Option 3 as it may deter entry which would otherwise occur were Option 3 pursued.

3.72 In light of the foregoing, ComReg is of the view that Option 3 would have a greater positive impact on competition than Option 2.

Impact on consumers

3.73 In terms of consumer preferences, it can be stated that:

- the interests of consumers would be enhanced through the promotion of competition in terms of price, quality and choice of services (including offering new and innovative services);
- consumers would prefer that advanced mobile services were made available sooner rather than later. Consumers may be willing to trade-off earlier delivery of such services against having even more advanced services delivered later if there is a sufficient improvement in quality to be obtained from waiting. This is an important consideration in the context of an award process that could facilitate an early leap to new technologies and services (e.g. LTE). This would be desirable from a

[51] For example, were an auction process to be used, even the threat of competition from entrants is likely to undermine gaming behaviour such as tacit collusion and strategic demand reduction and therefore ensure a more competitive award process.

consumer's point of view due to the large increase in download and upload rates[52] that such a process could bring.

Option 1 (900 MHz only) vs. Option 2 (900 MHz + 800 MHz)

3.74 In light of the above general consumer preferences, ComReg considers that Option 2, a process which combines both sub-1 GHz bands, would be preferred by consumers over Option 1.

- Option 2 would facilitate greater competition 'for' the market and therefore, by extension, increase competition in downstream retail markets to the benefit of consumers in terms of price, choice and quality.
- Option 2 would likely result in the earlier deployment of advanced services, such as LTE, compared to Option 1. Consumers would receive improved data transfer rates on their mobile devices, which would enable them to more effectively exploit the advantages of smart phones and other such devices, earlier than would be the case under Option 1.
- With a greater supply of sub-1GHz spectrum available at one time compared to Option 1, Option 2 would put undertakings which are assigned spectrum usage rights in a better position to drive broadband coverage into areas that may not be so well served by other broadband networks as yet.

3.75 Furthermore, Option 2 would entail, at worst, only a relatively short delay in obtaining the benefits of liberalisation of the 900 MHz band, and ComReg has, in any case, left open the possibility of advanced commencement of 900 MHz spectrum.[53]

3.76 Therefore Option 1, excluding the 800 MHz spectrum band from the proposed spectrum assignment process, would have no obvious benefits in terms of consumer welfare.

3.77 As such, ComReg is of the view that consumers would prefer Option 2 over Option 1.

Option 2 (900 MHz + 800 MHz) vs. Option 3 (900 MHz + 800 MHz + 1800 MHz)

3.78 On top of the benefits associated with Option 2 for consumers, Option 3 would deliver further benefits. Option 3, a process including the 1800 MHz spectrum band in an assignment process with the 900 MHz and 800 MHz bands, would better enable participants in the assignment process to obtain their optimal portfolio of spectrum usage rights which would enable them to make more efficient investments in new networks, compared to Option 2. A sequential process for awarding spectrum in these bands would constrain operators in their options and potentially prevent them from making investment decisions until they have full certainty regarding all the substitutable or complementary bands under discussion in this draft RIA. Thus, a sequential assignment process could lead to a delay in the roll out of advanced services, contrary to the interests of consumers. This point applies equally to the inclusion of the 800 MHz band. For this reason, the award of more

[52] ComReg notes that upload rates are increasingly promoted by operators when it comes to selling smart phones. Upload rates are particularly relevant in terms of uploading to online social networks which some commentators have suggested are now even more popular than email.

[53] See Chapter 7 on Advanced Commencement.

spectrum bands in the same process would be preferable from a consumer's viewpoint.

3.79 Excluding the 1800 MHz spectrum band from the proposed spectrum assignment process has no obvious benefits in terms of consumer welfare. To the extent that liberalised 1800 MHz can be used to alleviate network congestion in urban areas, or to promote new entry, it offers potential benefits to consumers.

3.80 As such, ComReg is of the view that consumers would prefer Option 3 over Option 2.

The Draft 'Spectrum for Award' RIA: Assessment and the Preferred Option (Step 5)

3.81 The above assessment has considered the impact of the various options from the perspective of industry stakeholders, as well as the impact on competition and consumers.

3.82 It would seem that all stakeholders would prefer Option 2 over Option 1, such that there would be a joint award of the 800 MHz and 900 MHz bands. In relation to the 1800 MHz band, whilst some incumbent operators may prefer to delay the assignment of rights of use in the 1800 MHz bands, and not award it at the same time as the sub-1 GHz spectrum, ComReg is of the view that the only rational basis for this preference would be on the grounds of limiting the potential for new entry. As detailed in the analysis above, the exclusion of the 1800 MHz band would therefore have a negative impact on competition both 'for' and 'in' the market by potentially deterring new entry (such as those potential entrants seeking to obtain an ideal mix of coverage and capacity spectrum and/or seeking to enter using solely or predominantly capacity spectrum[54]). On the other hand, the analysis has shown that there would be little prejudice to stakeholders of including the 1800 MHz bands in the current assignment process, and that this would lead to greater competition and therefore a better outcome for consumers compared to Option 2.

3.83 Option 3, an award process that encompasses the 900 MHz, 800 MHz and the 1800 MHz bands, appears to be the best means to promote competition for spectrum usage rights (and hence promote new entry) and, in turn, competition in the related downstream retail market. Compared to the other options, it would also better promote efficient investment and drive innovation in new and enhanced mobile networks as assigning rights in the three bands at the same time would enable undertakings to access the mix of spectrum that best suits their needs. The analysis would suggest a strong preference for consumers for Option 3 over Option 2 and Option 2 over Option 1. ComReg has no information before it to suggest that Option 3 should not therefore be preferred to Option 1.

3.84 For the reasons outlined above, Option 3, involving a combined award process of the 900 MHz, 800 MHz and 1800 MHz bands, is the preferred option identified under the 'Spectrum for Award' draft RIA.

[54] For example, the Everything Everywhere joint venture (a merger of T-Mobile UK and Orange UK) and new LTE networks have been deployed using 1800 MHz spectrum in countries such as Germany, Lithuania and Poland. See Annex 3 for further details.

The Draft 'Assignment Process' RIA: Regulatory Options (Step 2)

Background Information

3.85 As noted at the outset of this chapter, Step 1 of the draft RIA (Policy Issues and Objectives) is common to both the draft 'Spectrum for Award' RIA and the draft 'Assignment Process' RIA.

3.86 Before setting out the specific options under review in the draft 'Assignment Process' RIA, it is useful to provide some background information regarding the different ways in which spectrum can be assigned and the various proposals which are associated with these different assignment mechanisms.

3.87 There are two main methods used to assign rights of use of spectrum:

a) **Auction** whereby, subject to objective and transparent constraints set *ex ante* by the regulator, the market determines who gets what spectrum and how much, or
b) **Administrative assignment**, whereby the regulator determines who gets what spectrum and how much. Assigning spectrum usage rights using an administrative process can take different forms and can be used to address specific concerns.

3.88 Each of the two main methods is discussed in more detail below As proposed by a number of respondents, and as considered by ComReg below, the assignment of rights of use might also involve a combination of the above two methods.

Auctions

3.89 Auctions by their nature involve a competitive process to determine the winner(s) and are used in a variety of different contexts. Spectrum auctions are now much more common than in the past[55], and have become highly sophisticated in their design and execution.[56] They have a number of benefits as a spectrum assignment mechanism. By ensuring that those bidders who value the spectrum the most obtain the rights to the spectrum, auctions result in an efficient outcome in terms of assignment (i.e. competition 'for' the market).[57] This in turn tends to promote competition in the downstream retail market, to the benefit of consumers. Using an auction to assign spectrum usage rights removes much of the risk of the regulator making incorrect decisions, as a result of not having access to all relevant information, which could have long standing negative effects on the market.

3.90 Auctions avoid the need to use administrative assessment processes in relation to:

- the licence holder - which operators should be awarded spectrum. In making this decision the regulator could potentially assign spectrum to the 'wrong' operator, that is a spectrum user which is not the best user of

[55] In the current (Annex 11) and in previous documents ComReg has provided updates on international developments.
[56] There are many different types of competitive auctions (e.g. a Simultaneous multiple round ascending auction or a Combinatorial Clock Auction). See section 6 of DotEcon's Report (Document 09/99c).
[57] See also Section 3 of DotEcon's Report (Document 11/58).

the spectrum for a period of time and/or incentivised to make best use of that spectrum;

- the quantum and price of spectrum assignments - how much spectrum should operators be assigned, the associated fee, and should all operators be assigned an equal amount. In making these decisions the regulator could distort competition in the market by granting too much spectrum to certain operators or by selecting incorrect prices.

ComReg's Proposal

3.91 In the course of the consultation process ComReg has considered a number of different types of competitive auction as candidates for the award of rights of use in respect of the spectrum bands being considered for release, each aimed at achieving the objectives set out at the outset, in Step 1 above. Of the various auction formats considered, including the previously suggested single round combinatorial auction, ComReg is now proposing that a Combinatorial Clock Auction ("CCA") would be the most appropriate auction format for this particular award (see Annex 6.2). Some of the reasons for this are explored in the following section. A similar type of CCA has been used/proposed to be used in other countries (see Annex 11). ComReg's auction proposal is set out as Option 1 below.

Administrative Assignment Process

3.92 Assigning spectrum usage rights using an administrative process can take different forms and can be used to address specific concerns. For example, a "beauty contest" could be used if there is a particular objective in mind whereby the regulator selects the licence holder(s) based on a number of pre-defined criteria (e.g. extent of network roll-out). An administrative process could also take the form of an extension/renewal of an existing licence, or an administrative assignment of spectrum usage rights to particular operators, for a particular period of time. An administrative process could be used for all or part of the spectrum being awarded, or relate to particular locations within a band.

3.93 Administrative processes were commonplace in the past to award spectrum usage rights but are now less common particularly in cases where spectrum is to be released to commercial operators. For example, such an approach may have been used so as to secure wide area coverage as an overarching goal. There is now a general consensus that the use of administrative processes to assign spectrum rights of use is likely to lead to an inefficient outcome compared to a competitive process, and in a number of cases where administrative processes have been used, this has resulted in litigation and associated delays.[58]

Proposals made by respondents

3.94 As set out in Annex 3, a range of proposals have been put forward by respondents at various stages of this consultation process which incorporate administrative processes in various forms. Some of these proposals were made in the context of a 900 MHz-only award, while more recent proposals have been made in the context

[58] See for instance *Orange Communications Ltd v Director of Telecommunications and Anor.* [1999] 2 I.L.R.M. 81 where Orange Communications unsuccessfully challenged the ODTR's decision to award Meteor a GSM licence following a beauty contest but as a result Meteor's entry to the market was significantly delayed.

of a multi-band award.[59] The main reasons put forward for these respondents' proposals[60] can be summarised as follows:

- To ensure business continuity and avoid significant consumer disruption; and/or
- To promote new entry or avoid competitive distortion.

3.95 Each of these reasons is considered in more detail below.

3.96 During the consultation process, a number of respondents called for the administrative assignment of spectrum in the 900 MHz band to the existing GSM operators. The principal reason offered in support of these proposals was that because this spectrum is currently being used to provide GSM services to a large number of customers, using an auction to assign new licences in the band raises the potential for significant consumer disruption (due to uncertainty about the value of business continuity) to occur if an existing operator were to no longer have spectrum usage rights in the band following the conclusion of the auction and the expiry of their current GSM licences. Respondents asserted that using a single round auction would create a risk that an incumbent GSM operator could (due to strategic or mistaken beliefs underpinning their bidding) fail to win any 900 MHz spectrum, and this could result in large scale consumer disruption to GSM services. For this reason, respondents argued for various amounts of spectrum to be administratively assigned to them (e.g. 2×5 MHz each, or 2×10 MHz each) for various periods of time (e.g. ranging from licence periods up to 2015 to indefinite licences). Following on from these proposals that ComReg should grant administrative assignments to the GSM operators, there were also various proposals for an administrative assignment of 2 × 5 MHz of 900 MHz spectrum to H3GI also, in order to avoid a competitive distortion between the existing GSM mobile operators and H3GI.

3.97 Despite incentives for respondents to overstate their concerns regarding business continuity and consumer disruption were an auction to be used to award new liberalised licences in the 900 MHz band, ComReg took on board all respondents' submissions in this regard and, as a result, ComReg's proposed auction format has developed over the course of this consultation process (as set out in Annex 3 and discussed in more detail in Annex 6.2). In particular, ComReg has made a number of key amendments to the proposed auction design to deal with the major concern raised by respondents, i.e. their concern regarding putting a value on business continuity. As noted in Annex 3, in order address respondents' concerns regarding valuing business continuity, ComReg shifted from its original proposal to use a sealed bid combinatorial ("SBC") auction to a CCA. The CCA, as proposed, would ensure that a bidder could adopt a simple strategy in the supplementary bids round such that their position in the final primary bid round would be protected.[61] ComReg is of the view that this would provide adequate means to avoid significant consumer

[59] A number of other proposals were made by respondents which do not fall within these categories. These have been addressed in Annex 3 and are not considered in the draft 'Assignment Process' RIA.

[60] Clearly the proposals may also in some cases have been primarily motivated by commercial interest, such as a desire to retain or acquire as much spectrum as possible for the least possible price. While recognising the likelihood of such considerations affecting the submissions made by interested parties, ComReg has nevertheless evaluated all proposals and supporting arguments on their own merits.

[61] This is referred to as the 'relative activity rule'. See Section 7 of DotEcon's Report (Document 11/58).

disruption on the assumption that incumbent operators are willing to pay the price determined by the auction for the relevant spectrum. Under ComReg's proposed auction design, a bidder in the auction would know by how much they would need to outbid other bidders in order to guarantee winning spectrum.

3.98 As set out in Annex 3, these important amendments to the auction design appear to have adequately addressed the concerns raised by respondents and it has resulted in a number of incumbent operators who were originally in favour of an administrative assignment of spectrum to incumbent operators, now supporting ComReg's proposed auction design (e.g. Vodafone and H3GI[62]).

3.99 However, as noted in Annex 3, despite these important changes to the auction design, there are a number of respondents who maintain their opposition to the proposed CCA although they have not put forward any further reasoning as to why incumbent operators should be granted an administrative assignment of spectrum in the 900 MHz band. ComReg must therefore assume that those respondents who continue to argue for administrative assignment of spectrum for incumbent operators are doing so purely in their own commercial interest rather than on the basis of avoiding consumer disruption. However in the interests of ensuring that ComReg's proposal is subject to a meaningful impact assessment, ComReg has incorporated proposals that involve administrative assignment of spectrum to incumbent operators into the impact assessment that follows.

3.100 In relation to the second reason for administrative assignment, to promote new entry or avoid competitive distortions, a number of respondents have also expressed support for an auction in which a certain amount of spectrum would be reserved for new entrants to the market. Arguments made in favour of this proposal centred on promoting competition, attracting new entry and benefiting consumers. Reserving spectrum for new entrants would be a form of administrative assignment as it would limit the winner(s) of certain spectrum to an operator who was not an existing player in the market, thereby raising similar issues to those identified above and in Section 3 of DotEcon's Report (Document 11/58). ComReg has considered the possible effects of these proposals in the impact assessment below.

Setting out the options

3.101 These options should be read in light of the considerations and conclusions contained in Annex 3 and are set out in the context of a multi band award of the 800, 900 and 1800 MHz spectrum bands, the preferred option of the draft 'Spectrum for Award' RIA above.

Option 1: Assignment of all available spectrum in the three bands using a fully competitive, open, transparent Combinatorial Clock Auction ("CCA").

3.102 This option is ComReg's proposal which has been developed over time in light of market developments, expert advice, and also in response to submissions made and concerns raised by respondents over the course of this consultation process. Option 1 would involve a CCA with the following main features:

[62] Although H3GI has concerns about certain aspects of the proposed auction, as set out in its consultation responses, it supports the use of an auction to award all spectrum in the 800 MHz and 900 MHz bands.

- Spectrum caps set to ensure that, at a minimum, the current number of competitors in the market is maintained by guaranteeing an outcome of at least four operators (including four operators in the 900 MHz band in the period up until 2015);
- With multiple bidding rounds the auction process itself would generate important information for bidders particularly with regard to the value of business continuity;
- A 'relative cap activity' rule allowing bidders to adopt a simple strategy in the supplementary bids round such that their position in the final primary bid round is protected. This would ensure that any operator which requires spectrum to serve existing GSM consumers has the opportunity to be successful in the auction, while reducing the incentives for bidders to engage in strategic shading of bids, by giving them better information on the value of business continuity;
- Licence conditions relating to minimum levels of coverage and minimum levels of quality of service;
- Spectrum fees whereby the price paid would be determined by the outcome of the auction subject to a minimum price which would be based on a benchmark analysis (as set out in Annex 9) set at a conservative lower bound estimate for spectrum in each band. This would allow bidders to choose amongst spectrum bands on the basis of price information generated during the course of the auction;
- Limited transparency to bidders in the course of the auction, to reduce the risk of tacit collusion amongst bidders; and
- A two stage auction process whereby bidders bid for particular quantities of spectrum in the first stage, and particular frequency locations in the second stage.

Option 2: A CCA (with features as set out in Option 1 above) with a restriction on outcomes as a result of an administrative assignment process.

3.103 Option 2 is an option reflecting the range of proposals that have been put forward by respondents to this consultation process, as set out in detail in Annex 3. The administrative assignment process under Option 2 could take many forms, e.g. the administrative grant of spectrum to particular operators (such as incumbents) followed by a CCA for the remaining spectrum, or the reservation of spectrum to particular bidders (such as new entrants) with the remainder of the spectrum being awarded in the 'main' auction and open to all bidders, or even a mixture of these two approaches. While each of the proposals put forward by respondents would involve an auction of some amount of spectrum, there is a key difference between Option 1 and Option 2. Under Option 2, as a result of an administrative assignment process, there would be a restricted number of possible outcomes in the auction, compared to Option 1. The administrative process could thereby be used to favour particular types of operators. The more expansive the administrative assignment process, the larger the number of possible outcomes that would be precluded as a result.

3.104 In this draft 'Assignment Process' RIA, ComReg assesses Option 2 against Option 1. As noted above, the administrative assignment process under Option 2 could take many forms. However, it is possible to group the proposals put forward by respondents into two main categories aimed at addressing particular objectives, as

noted above. Therefore, for illustrative purposes and for the purpose of ensuring that the impact of each key variant of Option 2 is assessed, it is appropriate to consider those two main categories of administrative process identified by respondents. It is not practical to set out fully developed distinct options given the wide range of issues that would have to be considered and as referred to briefly below. For this reason, ComReg will assess Option 2 as a whole, and where relevant and appropriate, specific reference will be made to Option 2A or Option 2B (as set out below).

Option 2A: Reserve spectrum for new entrants to promote competition

3.105 One version of Option 2, referred to as Option 2A, would involve the reservation of a certain amount of sub 1 GHz spectrum specifically for new entrants to the Irish mobile market, or to the 900 MHz and 1800 MHz bands. Only new entrants would be permitted to bid and win this reserved spectrum. New entrants would compete against one another for this reserved spectrum but, if only one new entrant participated in the auction, it would automatically win the reserved spectrum.

3.106 Within Option 2A, there are a variety of issues which would have to be considered prior to implementation of this option, for example:

- *Definition of new entrant?* Would this mean new entry to the Irish mobile market, or a new entrant to the 900 MHz and 1800 MHz bands;
- *How much spectrum?* The quantity of spectrum reserved for new entrants (e.g. one or more blocks).
- *What type of spectrum?* Spectrum could be reserved for new entrants in the 900 MHz band, the 800 MHz band, the 1800 MHz band or some combination of these bands;
- *How would spectrum fees be set?* The minimum licence fee for the successful new entrant(s) could be set in a number of ways. For example the spectrum reserved for new entrants could be subject to the same minimum price as the rest of the spectrum (i.e. based on the same benchmarking approach that would be used under Option 1, set out in Annex 9), or new entrants could be granted a discount on this benchmarked minimum price.

Option 2B: Grant licences to incumbents in advance of the auction to ensure business continuity and minimise the risk of consumer disruption

3.107 Another version of Option 2, referred to here as Option 2B, would involve the administrative assignment of a certain amount of spectrum in the 900 MHz band to incumbent operators for a particular period of time followed by the assignment of the remaining spectrum in the 900 MHz band using an auction.

3.108 Within Option 2B, there are a variety of issues which would have to be considered prior to implementation of this option, for example:

- *Who should be awarded an administrative assignment?* Spectrum could be administratively assigned to the 3 GSM operators for GSM use only (on the grounds of ensuring no disruption to GSM services as suggested by a number of respondents), or to the 4 existing MNOs, i.e. including H3GI (on the grounds of ensuring no competitive distortion between the existing MNOs, as put forward by a number of respondents).

- *How long should the administrative assignment last?* The licence awarded to each incumbent operator could range from a short period of time (e.g. until demand for GSM fell to a specified level), for the full licence duration (to 2030) or even an indefinite licence, as proposed by some respondents.
- *How much spectrum?* The quantity of administratively assigned spectrum could be linked in some way to the amount of spectrum required for continued GSM use, and reduced over time as demand for GSM declines, or it could be administratively set at 2×5 MHz or 2×10 MHz per operator. The quantity of spectrum administratively assigned could differ between operators.
- *How would spectrum fees be set?* Spectrum fees for the administratively assigned spectrum could be set prior to the auction of the remaining spectrum or could be based on the prices determined in the auction for the remaining spectrum. However, neither of these approaches are likely to reflect the correct market price for the administratively assigned spectrum which would be achieved if this spectrum formed part of an overall auction.

3.109 It is also possible to consider the impacts of both of these categories of options (Option 2A+2B) together, and again where relevant, specific reference will be made to this combined option in the impact assessment that follows.

3.110 On a general note and prior to setting out the next steps of this draft 'Assignment Process' RIA, it is worth noting that the more intrusive is the impact of an administrative assignment process, the higher the likelihood that the actual optimal allocation of spectrum would not be achieved. This is an important factor in the assessment of the impact of the various options and is considered in greater detail below and in Section 3 of DotEcon's Report (Document 11/58).

The Draft 'Assignment Process' RIA: Impact on Stakeholders and Competition (Step 3 and 4)

3.111 This section considers the impact of the possible options on:

- Existing operators in the mobile market in Ireland (i.e. the three existing GSM MNOs (Vodafone, O2 and Meteor), and H3GI);
- Potential new entrants to this market;
- Competition; and
- Consumers.

3.112 As noted in the draft 'Spectrum for Award' RIA above, consumers, as a stakeholder group, are discussed after the impacts on competition are outlined.

Background Information

3.113 Before considering the potential impact of the options on the particular stakeholder groups and on competition, a number of general comments can be made regarding the options in terms of impacts on stakeholders.

3.114 Option 1 differs from Option 2 in that under Option 1, although bidders may be in different positions entering into the auction in terms of existing spectrum allocations, within the auction all bidders would be treated equally and given equal

opportunity to access spectrum for the proposed licence periods. There would be no special conditions attached to any spectrum block and all spectrum blocks within each band would be homogeneous. Each bidder would be treated in exactly the same manner regardless of whether the bidder was an existing MNO in the Irish market or a new entrant.

3.115 Under Option 1, although all bidders would be treated equally (and all spectrum blocks would be packaged equally in the CCA), all bidders would be unlikely to act in the same way in an auction. This is because each bidder would be in a different *ex ante* situation and this would impact on its bidding strategy. The CCA would allow different bidders to distinguish themselves on the basis of their respective demands for spectrum. This is particularly important as the award of more than one spectrum band in the same process would enable all bidders to substitute between bands in line with their individual preferences.

3.116 Option 2, with the use of an administrative assignment process, would introduce restrictions to the possible outcomes of the CCA with differing implications for different operators as discussed below. Option 2 would restrict the amount of spectrum in the 900 MHz band available for auction as a result of the administrative assignment of spectrum in that band to incumbents and/or introduce a restriction on who could bid for some of the sub-1GHz spectrum by setting aside spectrum for new entrants.

3.117 The preference of an individual operator for either Option 1 or Option 2 would depend on their particular circumstances and whether or not an option would put them at a competitive disadvantage vis-à-vis other operators in the downstream retail market. The impact on existing operators is considered first, followed by the impact on new entrants.

Existing Operators

3.118 On first impressions, given that each of the existing operators would be granted an administrative assignment of 900 MHz spectrum under Option 2B, they are likely to have a general preference for Option 2B over either Option 1, Option 2A or a combined Option 2A+2B. Therefore Option 2B is used as the reference point when comparing the options, from the point of view of existing operators.

3.119 For existing operators, none of the options under consideration would result in an existing operator facing an uncontrollable risk of not winning liberalised spectrum in the 900 MHz band (due to the CCA auction design and their final bid in this auction), unless a very large amount of 900 MHz spectrum were to be reserved for new entrants under Option 2A. Of all of the options, Option 2A would be the least attractive option for incumbents as it would result in a reduction in the amount of spectrum available for incumbents to bid on.

3.120 Option 2B has some unique benefits for existing operators that would not exist under Option 1 or Option 2A. Option 2B would clearly operate to the advantage of incumbents more so than either Option 1 or Option 2A, and to the disadvantage of new entrants, as explained below.

3.121 **Less 900 MHz spectrum available for new entrants:** The direct effect of the administrative grant of spectrum to each of the incumbent operators in the 900 MHz

band would be a reduction in the amount of 900 MHz spectrum available in the auction for new entrants. Assuming that each of the 3 GSM operators were granted one block of 900 MHz spectrum each this would mean that instead of 7 blocks of 900 MHz spectrum there would only be 4 available, and if one block was granted to each of the four incumbent MNOs, this would leave only 3 blocks available for new entrants to bid on. New entrants would have *ex ante* far fewer options to win spectrum in the 900 MHz band.

3.122 **Perception of Regulator favouring incumbents over new entrants:** In addition to this direct effect, a new entrant who participated in the auction under Option 2B would be competing for spectrum against incumbents who each had a guarantee of a minimum spectrum holding in the 900 MHz band, regardless of the outcome of the auction. This guarantee could be either short-term or long-term, depending on the duration of the administratively assigned spectrum. [63] Incumbents would only have to bid for additional spectrum. New entrants, on the other hand, would have to participate in the auction without any guarantee of a minimum spectrum holding in the 900 MHz band.

3.123 It could be argued that if incumbent operators were granted an administrative assignment of say one block of 900 MHz this may not be enough sub 1 GHz spectrum to ensure that an incumbent would be a successful competitor in the new liberalised world. Nonetheless, having one guaranteed block of 900 MHz spectrum 'in the bank' before the rest of the spectrum is auctioned would put each of the incumbents at an advantage over new entrants in terms of bidding strategies. This act of administratively granting spectrum to incumbents could also send a signal to potential new entrants that ComReg's preferred outcome was one in which each of the incumbent operators had a guaranteed ongoing position in the market, regardless of the consequences on competition/consumers. It could be seen that incumbents were being assigned spectrum purely by virtue of their current operations.

3.124 The combination of these direct and potential indirect effects could therefore make entry less attractive for potential new entrants. The result could be less or no participation by potential new entrants in the auction. This would clearly benefit incumbents by making it easier for each of them to win additional spectrum in the auction.

3.125 Option 2B could significantly benefit incumbents if it ultimately led to complete entry deterrence – few or no new potential entrants participating in the auction. Although the administrative assignment of a total of say four blocks of 900 MHz to the four incumbents could be seen as being relatively small in relation to the 13 blocks of sub 1 GHz spectrum available in the award, nonetheless it could be enough to deter potential new entrants, given the relative importance of 900 MHz in the short term. Therefore even though the combination of three spectrum bands was considered the preferred option in terms of its impact on competition, the assignment process under Option 2B could nevertheless significantly deter entry to the benefit of existing operators.

3.126 In summary, Option 2B is likely to be preferred by incumbents over Option 1 or Option 2A because it would:

[63] In addition, each of the 4 incumbent MNOs would have 3G spectrum in the 2.1 GHz band up to 2021, regardless of the auction outcome.

- guarantee 900 MHz spectrum for each of the incumbents and therefore their 'place' in the market,
- could have the added bonus for incumbents of reducing competitive pressures in the auction for the remaining spectrum and make it easier for incumbents to get more spectrum (particularly if no potential new entrant participates in the auction) compared to a situation where the incumbents had to compete on the merits for all spectrum (and a new entrant considering participation would not be at an immediate disadvantage). Option 2B could therefore positively impact on the auction outcome in favour of incumbents; and
- Reduce competitive pressure at the retail level.

3.127 Turning now to Option 1 and Option 2A, it is clear that these unique advantages to incumbents of Option 2B do not exist. Under both Option 1 and Option 2A, no incumbent would be given a straight guarantee of 900 MHz spectrum. Each incumbent would have to participate in the auction for the quantity and location of spectrum (in the case of Option 2A, new entrants would have an advantage, as discussed in the next section). Incumbents would not be granted any special treatment by virtue of the fact that they are currently using the spectrum in the 900 and 1800 MHz bands for which new liberalised licences are being granted.

3.128 Looking at Option 2A in particular, there are a number of specific reasons as to why incumbents would have a clear preference for Option 2B over Option 2A:

- Under Option 2A the amount of sub 1 GHz spectrum available for incumbent operators would be reduced. As noted above, 'new entrant reserved spectrum' could be in the 900 MHz band or in the 800 MHz band. Incumbent operators would be particularly opposed to the reservation of spectrum in the 900 MHz band given the preferences expressed by incumbent operators for 900 MHz spectrum (linked to continued GSM provision);
- Whilst Option 2B would reduce the likelihood of new entry (thereby benefitting incumbents), Option 2A would increase the likelihood of new entr; and,
- Were spectrum to be reserved for new entrants in the 900 MHz band, Option 2A might impact on the incumbent operators' ability and incentives to remain in the market, compete and secure investment in future network upgrades due to a perception in relation to regulatory bias towards achieving new entry.

3.129 In the case of a combined Option 2A+2B, existing operators may prefer a combined Option 2A+2B over Option 1 if the new entrant-reserved spectrum was in the 800 MHz band. However, if under Option 2A spectrum was reserved for a new entrant in the 900 MHz band, incumbents are unlikely to find a combined Option 2A+2B attractive, given their strong preferences for spectrum in the 900 MHz band (see Annex 3b). Reducing the amount of 900 MHz spectrum available would not be in their interest.

3.130 Based on the preceding discussion, it is evident that Option 2B would offer a number of unique advantages for existing operators. However, although there are clear benefits associated with Option 2B for incumbents, when the issue of spectrum fees for the administratively assigned spectrum is factored into the

equation, Option 2B may not be so attractive depending on the pricing mechanism used. As noted above, there are a number of ways in which the price for the administratively assigned spectrum could be determined. If it is determined based on the outcome of the auction, a situation could arise whereby an incumbent operator may find that it regrets the spectrum it has been administratively assigned (say for arguments sake this is in the 900 MHz band), and would instead prefer less expensive spectrum in the 800 MHz band etc. It would only be by chance that any fee set on the basis of the outcome of the auction for the remaining blocks would correspond to the firm's valuation of the administratively assigned block[64].

3.131 In summary, from the perspective of existing operators, Option 2A would be their least preferred option particularly if spectrum was reserved for new entrants in the 900 MHz band. Incumbents are likely to favour Option 2B as it would mean guaranteed 900 MHz spectrum, it would reduce the chance of new entry, and possibly increase the chance of successfully bidding for more spectrum. However how the fees are set for the administratively assigned spectrum could be of concern to incumbents and could make this option a less attractive option. It is highly unlikely that the fees set for the administratively assigned spectrum are likely to reflect the correct market price for this spectrum which would be achieved if this spectrum formed part of an overall auction.

Potential New entrants

3.132 The preceding discussion has already outlined how potential new entrants could be impacted by the various options and it is not necessary to repeat these points again here. It is evident from the preceding discussion on existing operators that new entrants would not be left in a favourable position under Option 2B (unless perhaps it was combined with Option 2A). Under Option 2B there would be a reduction in the amount of spectrum available to new entrants placing them at a disadvantage and the knock-on impact for new entrants could be particularly severe. Option 2B would likely place incumbents at a significant advantage in the auction compared to potential new entrants as set out above. Therefore Option 2B would be the worst option from the perspective of new entrants. Compared to Option 2B, Option 1 and Option 2A would be preferred by new entrants and both of these options are considered below from the perspective of new entrants.

3.133 It is likely that Option 2A, which would involve the reservation of sub 1GHz spectrum specifically for new entrants, would be preferred by new entrants over Option 1 as it appears to offer particular benefits/advantages for new entrants, which would not be the case under Option 1. Option 2A increases the chance for a new entrant(s) to win sub 1 GHz spectrum compared to Option 1 as a new entrant would only face competition for the 'reserved spectrum' from other potential new entrants and not from any of the incumbent operators who would be precluded from bidding on it. Also, if there was only one new entrant it would automatically be the winner of the reserved spectrum.

[64] In order to be correct, the regulator would have to know in advance what the price of the spectrum will be (which it cannot do and this is why an auction is used). Alternatively the regulator would need to be able to look back at the counterfactual and determine what the efficient price should be – this would likely be contentious.

3.134 Considering Option 2A+2B, new entrants are unlikely to favour any option which would involve an administrative grant of spectrum to all incumbent operators (i.e. Option 2B). As a new entrant would still potentially have to compete with other new entrants for the 'reserved new entrant' spectrum they would still be at a disadvantage vis-à-vis the incumbents who would have guaranteed 900 MHz spectrum going into the auction. Hence, it is unlikely that new entrants would prefer a combined Option 2A+2B over Option 2A on its own (their preferred option).

3.135 For new entrants, Option 1 is therefore likely to be preferable to Option 2A+2B, as Option 1 (with its associated spectrum caps) only guarantees that there will be at least four operators in these bands (be they incumbents or new entrants) after the auction whereas, depending on the options taken and the interest from potential new entrants, Option 2A+2B is aimed at guaranteeing five or more operators in the market (albeit with 4 blocks assigned to existing operators).

3.136 However, although Option 2A would appear to offer some particular advantages over Option 1, the manner in which the licence fee is determined for the reserved spectrum would influence the preference of new entrants. It would only be by accident that the prices chosen would be the correct one.

3.137 In summary, from the perspective of new entrants, Option 2B would be their least preferred option. New entrants are likely to have an overall preference for Option 2A, however, how fees are set for the reserved spectrum could affect their preferences between Option 2A and Option 1.

3.138 Summary of Impacts on Operators (existing and prospective)

3.139 Overall, operator preferences between the options will depend on which outcome serves their interests best – in terms of accessing as much spectrum as possible, at as low a cost as possible.

3.140 Incumbents are likely to favour the administrative grant of as much spectrum as possible, for as long as possible. This could also act to deter new entry. Therefore it would appear that incumbents would favour Option 2B. However this would depend on how spectrum fees were set under Option 2B for the administratively assigned spectrum.

3.141 New entrants are likely to prefer a set aside of as much spectrum as possible for which incumbent operators would be prohibited from bidding. Therefore it would appear that new entrants would favour Option 2A. However again this would depend on how spectrum fees were set under Option 2A for reserved spectrum.

3.142 It is evident from this analysis and the preferences of stakeholders expressed in the consultation process that none of the three options would deliver the preferences of all stakeholders.

Impact on Competition

Background

3.143 Before proceeding to the analysis of competition, it is worth pointing out a number of connections between the various sections in this draft 'Assignment Process' RIA. The references to new entrants in the section above on stakeholders are highly

relevant for the analysis of the impact on competition that follows, which in turn is also intrinsically linked to the impact on consumers (see next section). The option which would deliver the most positive impact on competition would also be likely to deliver the best outcome for consumers.

3.144 As set out in previous consultations, the three spectrum bands under consideration, in particular the sub 1 GHz bands, are highly important for the mobile market in Ireland given their technical properties and the benefits associated with liberalising this spectrum. Given the importance of this spectrum, and its finite supply, unnecessary restrictions on the assignment process used to award this spectrum could have a serious negative impact on competition.

3.145 The impact on competition is assessed at two levels which are highly interconnected:

- Competition in the auction itself. This is a once-off competitive process and can be referred to as competition 'for' the market; and
- Competition in the downstream/retail market between the winning operators. This is an on-going, dynamic process and can be referred to as competition 'in' the market. Ensuring competition at the retail level is promoted is the primary goal. Competition in the auction/for the market can therefore be seen as a means to an end. Competition at the retail level between operators for customers is what drives benefits to consumers.

3.146 Any form of administrative assignment of spectrum (i.e. Option 2) imposes a restriction on the range of possible outcomes in the auction. The more extensive the restriction, in terms of the possible auction outcomes which it precludes, the more likely it is that the actual optimal allocation is precluded from arising. Restrictions on auction outcomes will impact firstly on competition in the auction itself and ultimately downstream competition and consumers. An efficient outcome in the auction would be best achieved by not imposing unnecessary restrictions on the possible outcomes of the auction and thereby maximising the opportunities for competition in the auction itself – for example, a restriction that there must be a new entrant excludes all potential auction outcomes where no prospective new entrant is a successful bidder.

3.147 An efficient and optimal outcome in the auction is where the spectrum ends up with the operators who value it the most and which, in turn, will ensure the efficient use of spectrum. In so doing, an efficient outcome in the auction will deliver the best outcome for competition downstream and ultimately maximize the benefits for consumers. Ensuring that the spectrum is awarded to those operators that value the spectrum the most will ensure that competition in the advanced service market is enhanced. On the other hand, using an administrative assignment mechanism would not guarantee an efficient outcome in terms of spectrum holdings and this would inevitably impact on the outcomes in the downstream retail market over the licence duration. This could occur due to the fact that inefficient entry has been encouraged or an operator that may otherwise have exited the market is preserved through the grant of spectrum rights in advance. This would both reduce the capacity of the other operators to provide services (as the inefficient new entrant is holding spectrum) and may take many years before this is addressed by the market

(most probably through the market for corporate control rather than any spectrum trade or lease).

3.148 The award of licences in the 800 MHz, 900 MHz and 1800 MHz bands is critical to setting the initial conditions for the next phase of development in the mobile market in Ireland. With the liberalisation of these key spectrum bands, this is a hugely important stage of development in the market. Mistakes in this phase of market development will likely have enduring consequences for competition on the downstream retail market. Given the large proportion of customers who have 2G only devices there is significant potential for a considerable take-up of advanced handsets, and lower priced data services.

3.149 Setting the initial conditions correctly at this stage of market development is critical for the long term impacts on the market. In this regard, it is worthwhile looking back at what has happened in many markets for 2G services. The experiences with 2G throughout the EU show that initial conditions are largely determinative of market outcomes. In most cases, those operators that entered the market first have maintained a very strong market position despite later entry and very efficient Mobile Number Portability systems to facilitate customer switching. This is also evident in the Irish market.

Competition in the auction - for the market (who gets spectrum and how much they get)

3.150 When comparing the options in terms of their impact on competition the first level to assess is the impact on competition in the auction.

3.151 Looking first at Option 1. This is a CCA of all available spectrum and would produce an efficient auction outcome by design as it would not involve any unnecessary restrictions on outcomes.[65] Excluding outcomes where bidders lose as a result of failed strategic attempts to game the auction, there should be no individual other bidder (or consortium of bidders) that would have been willing to better the bids made by the winning bidders. Therefore Option 1 would ensure efficiency through having competition for all spectrum blocks on a purely non-discriminatory basis. Option 1 would ensure that the problems associated with using administrative processes described above to assign spectrum usage rights would not arise.

3.152 Ensuring that all operators compete on the merits and on a level playing field for all liberalised spectrum, and not on the basis of artificial entry incentives, or administrative spectrum assignments, would be the best means by which to ensure an efficient auction outcome where each spectrum block ends up with the operator who values it the most. By not assigning spectrum to certain operators and not limiting who can bid for certain spectrum, this would ensure that the maximum number of bidders would be able to participate in the process and hence all outcomes are possible as opposed to some outcomes being precluded in any process which included an administrative assignment. This would appear to be the best means by which to ensure spectrum is efficiently used and in turn promote competition in the downstream retail market.

[65] ComReg is of the view that the proposed spectrum caps are necessary restrictions on the potential auction outcomes as set out in Annex 6.1. These caps would result in there being at least four winners of spectrum in the proposed auction and there being at least four winners of 900 MHz spectrum in the first time-slice.

3.153 On the other hand, Option 2 would distort demand for spectrum that is not subject to the administrative assignment process, thereby restricting the range of possible outcomes in the auction. An efficient auction outcome could not be ensured.

3.154 Looking at the different forms of Option 2:

- **Option 2A:** Option 2A entails a CCA for all spectrum but with a restriction on outcomes due to the reservation of spectrum for new entrants only. This might create an artificial divide between the spectrum available to incumbents and the spectrum reserved for new entrants. This could result in inefficient entry by a new entrant if the new entrant was to win the reserved spectrum only because demand for it had been artificially restricted and there would otherwise have been another bidder (i.e. an incumbent) which valued the spectrum more (and was willing to pay more for the spectrum than what the new entrant paid). Also it would unnecessarily restrict potential outcomes for the remaining spectrum to the disadvantage of incumbents as it would reduce the amount of spectrum that the incumbent MNOs could bid for.

- **Option 2B:** As set out above, the administrative assignment of 900 MHz spectrum to incumbents would reduce the amount of 900 MHz spectrum awarded in the CCA. This would distort competition for the remaining spectrum. As explained above, new entrants would be less inclined to participate thus reducing competition in the auction compared to Option 1.

- **Option 2A+2B:** Both Option 2A and Option 2B individually restrict the range of outcomes for the auction (as noted above). Combining these two options together would therefore result in even greater restrictions than either Option when considered on a standalone basis. The more restrictions on potential outcomes the more likely it is that the final outcome would be precluded as compared to a CCA of all spectrum, under Option 1.

Competition in the market, at the retail level (competition between winners)

3.155 The previous section discussed the various options in terms of their impact on competition for the market and their likelihood to deliver an efficient outcome in the auction. Now the impacts on competition in the market, at the retail level, are considered.

3.156 As noted above, Option 1 would produce an efficient auction outcome by design as it would not involve any unnecessary restrictions on outcomes. Therefore Option 1 would deliver the best outcome in terms of competition in the market.

3.157 As noted above, Option 2 when compared to Option 1 would distort demand for spectrum and restrict the range of possible outcomes in the auction. An efficient auction outcome could not be assured. If the auction fails to deliver an efficient outcome, this would likely result in a negative impact on downstream competition.

- Option 2 would involve administratively interfering with who was awarded spectrum using an administrative process. As ComReg cannot

be certain which particular operators would be the best users of the liberalised 900 MHz spectrum, ComReg could make the wrong decision by awarding the spectrum to an operator who does not value it the most, and thereby reduce competition at the retail level.

- With a lower level of competitive intensity between the new licensees, this would reduce incentives to innovate. In terms of impact on consumers (discussed below) this is likely to result in a slower roll-out and a more limited range of advanced wireless services.[66]

3.158 Given the current (and likely future) importance of the mobile service market even small moves away from the optimal spectrum allocation could have potentially very large impacts on welfare over the period up until 2030. Market mechanisms may eventually undo mistakes made but during that time there would be less competition and less innovation relative to the optimal spectrum rights allocation and the loss to consumer welfare could be large. Moreover, given the still relatively immature nature of the mobile broadband market, errors could allow operators to obtain a stranglehold on the market that they would not have managed in an optimal spectrum rights allocation.

3.159 Looking at the different forms of Option 2 it is evident that, for different reasons, Option 2A and Option 2B would have a negative impact on downstream competition (and thereby consumers) compared to Option 1:

Option 2A

3.160 A number of respondents have argued that reserving spectrum for new entrants (Option 2A) would be a means by which ComReg would have a positive impact on competition (and thereby consumers). Artificial entry incentives can be used to attract entry that would not otherwise arise. However while attracting new entrants is clearly desirable as a means of promoting competition, promoting competition is not the same as promoting individual competitors. Option 2A would not necessarily promote competition, because:

- Artificial entry incentives could attract inefficient new entry at the expense of potentially more efficient incumbents - entry which would not otherwise be successful were it not for the additional entry incentives put in place. For example, inefficient entry could occur if Option 2A resulted in the entry of a weak new entrant compared to the alternative of a more efficient incumbent had that incumbent been able to access more spectrum (i.e. the spectrum set aside for new entrants).
- If the set aside of spectrum for new entrants is not large enough to enable a new entrant to be an efficient competitor, and the new entrant fails to win any additional spectrum, then Option 2A would not result in a promotion of competition over and above what could be achieved using a CCA (i.e. Option 1) to award all spectrum.

3.161 Although artificial entry incentives have been used in other countries this practice tends to be used where there is a very limited amount of spectrum being released to the market, or where incumbent operators have already been granted long-term licences. In the present case, the quantity of spectrum being released is substantial

[66] As noted in ComReg's draft RIA in Consultation 09/99

(some 140 MHz of spectrum in total). Further, under Option 1, where no spectrum would be reserved for incumbent operators, new entrants would be in the same position as incumbents in terms of winning spectrum and therefore artificial entry incentives are unnecessary and might not fulfil the objective of promoting efficient entry. Spectrum caps are a more appropriate instrument for facilitating competition (see Annex 6.1).

Option 2B

3.162 **Reduction in downstream competition as a result of entry deterrence:** As noted above, under Option 2B, assigning 900 MHz spectrum to incumbent operators on the basis of their incumbency, and thereby *ex ante* reducing the amount of 900 MHz spectrum available for new entrants to bid on, could act as a serious entry deterrence if new entrants perceived the Irish market to favour incumbents. Reduced competition in the auction would in turn lead to reduced competitive pressures in the retail market.

3.163 **Could help shelter inefficient incumbents:** Option 2B would involve the automatic grant of spectrum to existing operators regardless of how 'fit' a competitor they would be in the new competitive landscape. If an incumbent did not win any more spectrum in the auction and ended up with only one block at 900 MHz which was administratively assigned (and required for continued GSM use) and its existing 2.1GHz spectrum, it may not be an efficient competitor. Option 2B could therefore help shelter an inefficient incumbent. Therefore by administratively assigning 900 MHz spectrum to each of the incumbents this could run the risk of delaying the exit of an inefficient incumbent. An inefficient incumbent with valuable spectrum rights of use would not be in the best interests of competition (and ultimately consumers).

3.164 It could be argued that the likely emergence of spectrum trading (or leasing of spectrum) could negate some of these competition concerns associated with Option 2B. However at this point in the development of the market it is difficult to feel confident that this would be the case. The buying operator would likely use the additional spectrum capacity of the selling firm as a means to compete more aggressively and further weaken the selling operator. For this reason, any such transaction appears quite unlikely. Moreover, the incentives to sell the whole operator would tend to over-ride any incentive to sell or lease any of the critical spectrum assets of the operator to competitors.

Impact on Consumers

3.165 Before comparing each of the options in terms of the likely impact on consumers, there are a number of general comments that are worth setting out to inform this discussion. As noted above, there is an intrinsic link between the impact on new entrants, the impact on competition and the impact on consumers. The promotion of competition in the downstream retail market is intrinsically linked to ensuring that benefits to consumers are maximised.

3.166 Consumers will prefer the option which has the greatest potential to promote competition as this will maximise long term benefits to consumers in terms of choice, price and quality in the provision of enhanced services and will ensure the earliest deployment of 3G and 4G services in the 800 MHz, 900 MHz and 1800

MHz bands. In terms of when consumers are most likely to experience the benefits of liberalised spectrum, this is intrinsically linked to the promotion of competition. The more competitive the auction is (i.e. the lower the impact of any restrictions that are placed on possible auction outcomes and the lower the likelihood of precluding the efficient outcome), the greater the level of competition that will emerge at the retail level. It is this competitive dynamic which will spur operators to roll out new networks and commence the delivery of new, innovative services to consumers, using liberalised spectrum, and to continue to invest and innovate over the period to 2030.

3.167 In addition, consumers are likely to prefer options which avoid significant disruption to services that they use and avoid significant expenditure, for instance on new handsets. A number of the incumbents claimed that proposals (which fall under Option 2) would ensure that consumers would not face any disruption to GSM services by removing the risk that an incumbent would not win spectrum in an open auction. Under Option 1, the auction design has been amended to ensure there would be no unmanageable risk to business continuity, and therefore consumer disruption, absent a decision by an existing GSM operator to not pay a higher spectrum fee than another bidder to secure the spectrum, as explained previously. Therefore the potential for consumer disruption arising under Option 1 is a much less relevant factor, as each incumbent would have the opportunity to ensure that they retained 900 MHz spectrum, and thereby avoid any risk of their customers being disrupted, simply by bidding enough in the auction.

3.168 As noted above, Option 1 would have a more positive impact on downstream retail competition than Option 2. Therefore by extension Option 1 would be better for consumers than Option 2. Competitive auctions, such as Option 1, are the best means to ensure that the welfare of society is maximised where spectrum rights of use are sold. Ensuring that all spectrum is awarded to those operators that value it the most is critical in ensuring that the welfare effects of liberalising the band are maximised. Consumers would be better off with Option 1 which involves a CCA that would ensure that *all* spectrum is awarded to those operators who value it the most. There could be a major cost to consumers associated with an administrative assignment process as it would create the risk that spectrum would be awarded to the 'wrong' operator, that is, an operator who is not the best user of the spectrum for a period of time or that spectrum would be awarded at the wrong price. The larger the amount of spectrum administratively assigned, and the longer the period of the administrative assignment, the greater the costs to consumers associated with the risk. Even small losses to consumer welfare or unrealised potential gains would have a substantial impact on consumer welfare over the period of the new liberalised licences.[67] Therefore a CCA of all spectrum under Option 1 is the best means by which to determine the winner of each spectrum block by minimising the risk that spectrum is inefficiently assigned and thereby maximising the long term benefits to consumers.

3.169 Looking at the different forms of Option 2:

- **Option 2A:** Reserving spectrum for new entrants could potentially damage a more efficient incumbent by artificially reducing the amount of

[67] As noted in ComReg's draft RIA in Consultation 09/99

spectrum that incumbent could be awarded. Therefore Option 2A would not necessarily increase competition and is therefore not necessarily better for consumers.

- **Option 2B:** Administratively granting liberalised licences to incumbents automatically denies this spectrum to potential new entrants. Consumers would suffer if the administrative assignment of spectrum resulted in deterring entry into the market. In that scenario, the primary beneficiaries of Option 2B would be the incumbent operators, and not consumers. With a lower level of competitive intensity between the winning bidders, this would reduce incentives to innovate. In terms of impact on consumers this would likely result in a slower roll-out of advanced wireless services.[68]

3.170 In summary, there is a strong correlation between impacts on competition, new entrants and consumers. Overall Option 1 is likely to have a more positive impact on competition compared to Option 2 therefore, by extension; Option 1 would also deliver a better outcome for consumers. ComReg is of the view that using the specifically designed and tailored CCA as set out under Option 1 would produce the maximum benefit to society but particularly to consumers in terms of services, prices, choice, quality and innovation.

The Draft 'Assignment Process' RIA: Assessment and the preferred option (Step 5)

3.171 The above assessment has considered the impact of the various options from the perspective of industry stakeholders, as well as the impact on competition and consumers.

3.172 In summary, existing operators would tend to prefer Option 2B, whilst new entrants would tend to prefer Option 2A (subject to how spectrum fees were to be set). However based on the analysis above, it is evident that Option 2A and Option 2B would be in the best interests of particular operators but not in the best interests of competition and consumers. On the other hand, operators would not be disadvantaged by a CCA of all spectrum with certain necessary restrictions, as proposed under Option 1, and some respondents have expressed a clear preference for this.

3.173 Option 1 appears to be the best means to promote competition for spectrum usage rights (and hence promote new entry) and, in turn, competition in the related downstream retail market. Compared to Option 2, it would also better promote the goal of efficient investment and drive innovation in new and enhanced mobile networks. The analysis would suggest a strong preference for consumers for Option 1 over Option 2.

3.174 Option 1 would ensure an efficient auction outcome and therefore ensure that competition in the downstream market is maximised to the benefit of consumers. Such an efficient auction outcome would not however be guaranteed under Option 2.

[68] As noted in ComReg's draft RIA in Consultation 09/99

3.175 For the reasons outlined above, Option 1, involving a CCA of all spectrum in the 800 MHz, 900 MHz and 1800 MHz bands, is the preferred option identified under the draft 'Assignment Process' RIA.

Preferred Option

3.176 The draft 'Spectrum for Award' RIA concluded with a preference for the joint award of the 800, 900 and 1800 MHz spectrum bands. The draft 'Assignment Process' RIA concluded with a preference for a CCA of all spectrum subject to a number of key features. The combination of these conclusions is referred to as the 'Preferred Option' below.

Assessment against Statutory Objectives

Compliance with ComReg's Statutory Obligations

3.177 The preceding draft RIA considered a number of options potentially available to ComReg within the context of the RIA analytical framework as set out in the ComReg's RIA Guidelines (i.e. impact on industry stakeholders, impact on competition and impact on consumers). It necessarily also involved an analysis of the extent to which various options would serve to facilitate ComReg in achieving certain statutory objectives in the exercise of its functions. In particular, it involved an analysis of the extent to which the various options would serve to promote competition, and enable ComReg to ensure that users would derive maximum benefit in terms of choice, price and quality, and to ensure that there would be no distortion or restriction of competition in the electronic communications sector, whilst at the same time encouraging efficient investment in infrastructure, promoting innovation and ensuring the efficient use and effective management of the radio frequency spectrum.

3.178 In this section, ComReg has undertaken an assessment of the Preferred Option with regard to other statutory provisions relevant to the management of Ireland's radio frequency spectrum. ComReg's relevant statutory objectives, functions and duties in relation to Ireland's radio frequency spectrum are set out in Annex 1 of this document. It is not proposed to exhaustively reproduce those statutory provisions here. However, set out below is a summary of all statutory provisions relevant to the use and management of the radio frequency spectrum with an assessment (to the extent not already dealt with as part of the draft RIA) of whether, and to what extent, the Preferred Option accords with those provisions. In carrying out this assessment against its statutory objectives, ComReg has highlighted below some of the relative merits / drawbacks which would arise if ComReg was to select some of the alternative options assessed under the draft RIA above.

3.179 For the purposes of this section, the statutory provisions relevant to the management of the radio frequency spectrum are grouped as follows:

- General provisions on competition;
- Contributing to the development of the internal market;
- Promotion of the interests of EU citizens;
- Efficient use and effective management of spectrum;
- Regulatory Principles;

- Relevant Policy Directions and Policy Statements;
- General Guiding Principles (in terms of spectrum management, setting of fees and licence conditions);
  - Objective justification;
  - Transparency;
  - Non-discrimination;
  - Proportionality.

General Provisions on Competition

3.180 As noted previously, there is a natural overlap between the aims of the draft RIA and an assessment of ComReg's compliance with some of its statutory obligations, and, in particular, its core statutory objective under Section 12 of the 2002 Act of promoting competition by, amongst other things:

- ensuring that users derive maximum benefit in terms of choice, price and quality;
- ensuring that there is no distortion or restriction of competition in the electronic communications sector;
- encouraging efficient use and ensuring effective management of radio frequencies;
- ensuring that elderly users and users with special social needs derive maximum benefit in terms of choice, price and quality; and
- ensure that, in the transmission of content, there is no distortion or restriction of competition in the electronic communications sector.

3.181 There are also other various statutory provisions requiring ComReg generally to promote and safeguard competition in the electronic communications sector including, amongst other things:

- the General Policy Direction on Competition (No. 1 of 2 April 2004) which requires ComReg to focus on the promotion of competition as a key objective, including the promotion of new entry;
- the GSM Amendment Directive which requires ComReg to ensure that liberalised 900 MHz spectrum should be allocated in such a way as to ensure no distortion of competition;
- Article 4 of Directive 2002/77/EC (Competition Directive) which requires ComReg to refrain from granting exclusive or special rights of use of radio frequencies for the provision of electronic communications services;
- Regulation 9(11) of the Authorisation Regulations which requires ComReg to ensure that competition is not distorted by any transfer or accumulation of rights of use for radio frequencies (a similar obligation to that set out in the GSM Amendment Directive above); and
- Regulation 16(2) of the Framework Regulations which requires ComReg to apply objective, transparent, non-discriminatory and proportionate regulatory principles by safeguarding competition to the benefit of consumers and promoting, where appropriate, infrastructure based competition.

3.182 Based on the draft RIA conducted earlier in this chapter, ComReg is satisfied that the Preferred Option is the one that would best safeguard competition and best promote competition to the benefit of consumers. The Preferred Option would maximise competition both within the proposed assignment process as well as in the downstream retail markets by lowering barriers to entry and avoiding inefficient administrative assignment of spectrum. In choosing the Preferred Option, ComReg has applied objective, transparent, non-discriminatory and proportionate criteria and principles. In that light, ComReg is satisfied that in choosing the Preferred Option it has also complied with the obligations contained in the above statutory provisions.

3.183 As noted in the draft RIA above, the alternative options of excluding the 1800 MHz and/or the 800 MHz spectrum bands from the proposed assignment process would not achieve the above general objectives concerning competition to the same extent, if at all. In particular, excluding those spectrum bands from the assignment process would result in a comparatively less competitive assignment process and reduce the likelihood of new entry and/or enhanced competition in downstream retail markets. As noted in the draft RIA above, ComReg also considers that the alternative of using an administrative process to assign spectrum to particular operators would not achieve its general objectives concerning competition to the same extent as the Preferred Option, if at all. In particular, ComReg notes the observations made by DotEcon in Section 3 of its report (Document 11/58) concerning the impact on competition of using assignment processes which restrict the range of possible outcomes in the auction, compared to the type of open and fully competitive assignment process, i.e. a CCA of all spectrum, proposed under the Preferred Option.

Contributing to the Development of the Internal Market

3.184 In ComReg's opinion, the following aspects are of particular relevance to the application of this statutory objective in the present circumstances:

1. the extent to which the option would result in full and earliest liberalisation of the 900 MHz band in a manner which would not distort competition;
2. the extent to which an option would encourage the establishment and development of trans-European networks and the interoperability of pan-European services, in particular by facilitating, or not distorting or restricting, entry to the Irish mobile market by Electronic Communication Services ("ECS") providers based or operating in other Member States; and
3. the extent to which ComReg has had due regard to international developments, including the views of BEREC and consideration of activities of other Member States in relevant matters, in selecting an option and considering any regulatory action required by ComReg in respect of such an option.

Full and Earliest Liberalisation without Distortions to Competition

3.185 In relation to the first element, and as noted in Document 11/11, it is ComReg's view that full and earliest liberalisation of the 900 MHz spectrum band would contribute to removing remaining obstacles to the provision of electronic

communications networks, associated facilities and services and ECS at European level by falling within the aims of the GSM Amendment Directive, the main purpose of which is to reduce restrictions on the use of the 900 MHz band and obtain the benefits of harmonised use of the 900 MHz band across Europe. On the basis of its findings in the draft RIA, ComReg is satisfied that the Preferred Option would best provide for the earliest liberalisation of the band in a manner that would not distort competition.

3.186 Indeed, following the draft RIA, ComReg is satisfied that the alternative options would in one manner or another all lead to disproportionate distortions of competition within the auction and/or in downstream retail markets. In particular, ComReg notes that exclusion of the 800 MHz and/or the 1800 MHz bands from the assignment process would likely both reduce competition in the award process and reduce the likelihood of new entry and/or enhanced competition in downstream retail markets. Given that ComReg would, anyway, expect these bands to be assigned shortly thereafter, ComReg is of the view that their exclusion from a single assignment process would unnecessarily restrict competition without any clear advantage over the Preferred Option in terms of earliest liberalisation of the 900 MHz band. In this regard, ComReg would also note the possibility of advanced commencement of 900 MHz spectrum under the Preferred Option.[69]

Encouraging the Establishment and Development of Trans-European Networks and the Interoperability of Pan-European Services

3.187 ComReg notes the overlap between this objective and the objective of promoting competition in the provision of electronic communication networks and services. Encouraging the establishment and development of trans-European networks requires that operators from other Member States seeking to develop such networks are given a fair and reasonable opportunity to obtain spectrum rights of use required for such networks and, particularly, access to critical spectrum rights of use. As such, options which would restrict or distort competition or otherwise unfairly discriminate against potential entrants (such as through administrative assignment of liberalised rights of use to critical spectrum to incumbent operators) would not, in ComReg's opinion, satisfy the requirements of this sub-objective.

3.188 In this regard, ComReg refers to the draft RIA and its finding that the Preferred Option is the one most likely to be preferred by potential new entrants in terms of the spectrum bands awarded and the type of assignment process used. ComReg also notes that the Preferred Option does not involve an administrative assignment of valuable sub-1 GHz spectrum to incumbent MNOs simply by virtue of their incumbency with the associated disincentives for potential participation by undertakings from other Member States. While ComReg notes that an alternative option of reserving certain spectrum for new entrants would facilitate entry from other countries, ComReg is of the view that this option has no advantage over the Preferred Option in terms of achieving this objective. In addition, ComReg notes that the reservation of spectrum for new entrants has drawbacks in terms of ensuring an efficient outcome in the auction.

Having due Regard to International Developments, Including the Views of BEREC and Consideration of Activities of Other Member States in Relevant Matters

[69] See Chapter 7 on Advanced Commencement.

3.189 In relation to this aspect of contributing to the development of the internal market, ComReg continues to cooperate with other NRAs, including closely monitoring developments in other Member States to ensure the development of consistent regulatory practice and consistent application of the GSM Amendment Directive and relevant aspects of the Common Regulatory Framework.

3.190 For instance, ComReg would refer to Annex 11 and its previous consultation papers and its various assessments of availability of equipment in the 900 MHz, 800 MHz and 1800 MHz bands. Having assessed these developments in the present context, noting that the position taken by other Member States can be considerably influenced by, amongst other things:

- Market size, geography and distribution of population;
- existing licences and their remaining term;
- competition in the marketplace; and
- domestic legislation and policies,

3.191 ComReg's view is that the Preferred Option is consistent with the approaches taken by other Member States.

3.192 Moreover, for reasons set out elsewhere in this document, ComReg considers that its Preferred Option is entirely consistent with the purpose and intent of the GSM Amendment Directive – being earliest liberalisation of the 900 MHz band without creating distortions to competition.

3.193 ComReg notes that "having due regard to" means just that, and it does not mean that there is a necessity to strictly adhere to international developments, which may point in a number of different directions, or that appropriate and relevant distinctions ought not to be brought to bear on ComReg's approach in this jurisdiction where these are objectively justified.

The Promotion of the Interests of EU Citizens

3.194 The impact of the Preferred Option and other options on users from a more general perspective, and in the context of ComReg's objectives in the promotion of competition, has been considered in the context of the draft RIA and it is not proposed to consider this matter in any further detail here.

3.195 As discussed above in the draft RIA, ComReg is satisfied that the inclusion of both the 800 MHz and 1800 MHz spectrum bands in the assignment process will best promote the interests of end users. The alternative options of excluding those spectrum bands would reduce the likelihood of new entry with limited, if any, advantage in terms of earlier liberalisation of the 900 MHz spectrum band. ComReg is also satisfied that the proposed award process under the Preferred Option would benefit consumers in terms of minimising potential disruption, a concern initially raised by respondents but subsequently addressed by ComReg by, amongst other things, proposing the use of a CCA. As also discussed in the draft RIA, the alternative options which variously restrict the possible auction outcomes would not ensure that users derive maximum benefit in terms of price, choice and quality to the same extent as a CCA of all spectrum proposed under the Preferred Option.

3.196 While ComReg considers the above observations to be important in terms of promoting the interests of EU citizens, it notes that the majority of measures set out in Section 12(2)(c)(i) to (vii) of the 2002 Act aimed at achieving this statutory objective are more relevant in the context of licence conditions and consumer protection rules, rather than to the management of the radio frequency spectrum.

Efficient Use and Effective Management of Spectrum

3.197 Under section 10 of the 2002 Act and Regulation 17(1) of the Framework Regulations, it is one of ComReg's functions to manage the radio frequency spectrum and radio frequencies for electronic communications in accordance with a Policy Direction under Section 13 of the 2002 Act, and subject to any such direction, amongst other things. Policy Direction No. 11 of 21 February 2003 requires ComReg to ensure that, in managing spectrum, it takes account of the interests of all users of the radio frequency spectrum (including both commercial and non-commercial users). Importantly also, in pursuing its objective to promote competition under section 12(2)(a), ComReg must take all reasonable measures to encourage efficient use and ensure efficient management of radio frequencies. Section 12(3) of the 2002 Act also requires that measures taken with regard to encouraging the efficient use and ensuring the effective management of radio frequencies must be proportionate.

3.198 Regulation 9(11) of the Authorisation Regulations also provides that ComReg must ensure that radio frequencies are efficiently and effectively used having regard to section 12(2)(a) of the 2002 Act and Regulations 16(1) and 17(1) of the Framework Regulations.

3.199 In relation to the Policy Direction No. 11, the draft RIA clearly takes into account the interests of all users of the radio frequency spectrum (to the extent that such interests are consistent with ComReg's own statutory obligations), both commercial and non-commercial, and ComReg is satisfied that the Preferred Option identified as a result of the draft RIA is one that would safeguard and promote those interests.

3.200 Based on the findings of the draft RIA, ComReg is satisfied that the Preferred Option would best encourage efficient use of spectrum. For example, and as set out in greater detail in the draft RIA, the inclusion of the three spectrum bands would minimise the significant aggregation risk for bidders that would otherwise exist if the 800 MHz and/or the 1800 MHz spectrum bands were excluded from the proposed assignment process. In addition, the spectrum assignment process preferred, i.e. a CCA which maximises efficient entry as well as lowering barriers to entry, would ensure an efficient use of spectrum by those successful in the proposed assignment process. As noted in Section 3 of DotEcon's Report (Document 11/58), choosing an alternative spectrum assignment process which restricts the number of possible outcomes in the proposed auction (as is the case with the alternative award options considered in the draft RIA) would reduce the ability of the auction to produce an efficient outcome and, in turn, optimal use of the spectrum. ComReg is also satisfied that the analysis in the draft RIA itself ensures that the Preferred Option is proportionate having regard to its objectives and, in particular, the objective of promoting competition by ensuring the efficient use and effective management of radio frequencies (see section on Proportionality below).

3.201 In that light, ComReg is satisfied that the Preferred Option complies with the obligations contained in the above statutory provisions. ComReg considers that the alternative of assigning rights of use in frequency bands individually and separately (with attendant aggregation risks and potential inefficient outcome) or by means of an administrative assignment of the relevant spectrum-usage rights to particular operators, would fail to satisfy the above provisions to the same extent, if at all.

Regulatory Principles

3.202 Under Regulation 16(2) of the Framework Regulations, ComReg must, in pursuit of its objectives under Regulation 16(1) and Section 12 of the 2002 Act, apply objective, transparent, non-discriminatory and proportionate regulatory principles by, amongst other things:[70]

a) promoting regulatory predictability by ensuring a consistent regulatory approach over appropriate review periods;

b) promoting efficient investment and innovation in new and enhanced infrastructures, including by ensuring that any access obligation takes appropriate account of the risk incurred by the investing undertakings and by permitting various cooperative arrangements between investors and parties seeking access to diversify the risk of investment, whilst ensuring that competition in the market and the principle of non-discrimination are preserved;

c) taking due account of the variety of conditions relating to competition and consumers that exist in the various geographic areas within a Member State.

Regulatory Predictability

3.203 ComReg considers that this regulatory principle does not refer to the promotion of regulatory predictability *simpliciter* but instead requires ComReg to promote regulatory predictability in a specified way, i.e. "…*by ensuring a consistent regulatory approach over appropriate review periods*". ComReg notes that it places importance generally on promoting regulatory predictability and, as illustrated below, has complied with this principle in carrying out the current process.

3.204 While ComReg acknowledges that restricting the range of possible outcomes in the proposed auction would reduce the uncertainty faced by incumbent operators in any competitive assignment process, in the present context, ComReg considers the following to be of particular importance to achieving the aims of this regulatory principle:

- promoting regulatory predictability in relation to availability of spectrum rights to other users of spectrum by applying, an open, transparent, and non-discriminatory approach to spectrum release; and
- promoting regulatory predictability by avoiding administrative mechanisms in relation to (a) the quantum of spectrum assignments (b) the beneficiaries of assignment decisions and (c) spectrum usage fees for liberalised rights of use.

[70] Some of those principles listed in 16(2) are not listed here because they are either dealt with elsewhere in this chapter or were not relevant to this assignment process.

3.205 In relation to the first objective, ComReg notes that an option including both the 800 MHz and the 1800 MHz spectrum bands would give the market the utmost transparency and predictability in terms of the availability of valuable, substitutable and complementary spectrum. The alternative of excluding this soon-to-be available spectrum for an unknown but likely short period of time would clearly not contribute to the promotion of regulatory predictability. In this regard ComReg notes that nearly all respondents to the consultation process have been in favour of including both the 800 MHz and 1800 MHz spectrum in the assignment process, for reasons including regulatory predictability. ComReg also considers that alternative options, such as reserving spectrum and restricting the possible outcomes in the auction, would likely distort or restrict competition by discriminating against an existing mobile operator and/or potential new entrants. ComReg considers that the Preferred Option would be the better option in this regard as it would treat all participants equally. Administrative assignments do, of themselves, entail some measure of unpredictability.

3.206 In relation to the second objective, ComReg considers that the alternative options would not promote regulatory certainty due to the inherent uncertainties in terms of the setting of fair and non-discriminatory spectrum fees for administratively assigned spectrum.

3.207 ComReg also notes that it has at all times during this consultation process and, particularly, in relation to the proposed design of the Preferred Option, it has maintained the utmost transparency and in this way has contributed to regulatory predictability. In addition, ComReg is of the view that the Preferred Option is one that eliminates the risk of auction participants inadvertently failing to win their desired spectrum allocation for reasons other than competitive tension within the auction. Furthermore, ComReg notes that the Preferred Option is one that minimises the risks of tacit collusion and strategic anti-competitive behaviour within the auction while promoting an efficient outcome with minimum regulatory interference in the auction mechanism.

3.208 In that light, ComReg is satisfied that the Preferred Option complies with the regulatory principle of promoting regulatory predictability.

Promoting Efficient Investment and Innovation in New and Enhanced Infrastructures

3.209 ComReg considers that the Preferred Option fully complies with the aims of this regulatory principle. This is because that option has the capacity to facilitate a fully competitive, joint release of the 800 MHz, 900 MHz and 1800 MHz bands – thereby ensuring that winners of liberalised spectrum-use rights in these bands are appropriately incentivised to deploy new technologies and to provide advanced communications services to end users, while avoiding the potential costs, uncertainties and inefficiencies associated with sequential releases of such rights. In this regard, ComReg is of the view that an alternative option of excluding soon-to-be available substitutable and/or complementary spectrum and/or, reducing the likelihood of an efficient outcome in the proposed auction by restricting the range of possible outcomes, would not comply with this regulatory principle to the same extent, if at all.

3.210 The Preferred Option would give operators the scope to bid according to their own valuation of the spectrum, based on their own business plans and market and financial positions, and thus to invest efficiently in the auction. The winners of spectrum will be those bidders who value it most highly. Payments made in the auction and in annual spectrum usage fees will give spectrum holders correct incentives to invest in infrastructure and provide services using the spectrum acquired.

Conditions of Competition in Various Geographic Areas

3.211 ComReg notes that, absent regulatory intervention, there are geographic areas within Ireland, e.g. remote rural regions, which would have inferior mobile coverage to other areas, e.g. urban locations. This could result from either licensees 'cherry picking' the most lucrative urban areas and/or the simple cost inefficiencies faced by operators in building out to the most remote areas. This development is common across most Member States and is usually addressed through the imposition of coverage licence obligations (as envisaged by Condition 1 of Part B of the Schedule to the Authorisation Regulations).

3.212 ComReg has taken due account of the above variations across geographic areas and notes its proposals to incorporate coverage obligations into rights of use assigned under the current process. In addition, ComReg notes that quality of service obligations to be imposed on licensees under this assignment process do not differentiate in terms of geographic location thus ensuring that certain geographic areas would not suffer in this regard. In this light, ComReg is satisfied that the Preferred Option complies with the aims of this regulatory principle. While ComReg acknowledges that the alternative options considered in the draft RIA would also be capable of complying with this policy direction, it does not consider that those alternative options would better comply with this regulatory principle.

Relevant Policy Directions and Policy Statements

3.213 ComReg has taken due account of the Spectrum Policy Statement issued by the Department of Communications, Energy and Natural Resources in September 2010. ComReg notes that the core policy objectives and principles set out therein are broadly in line with those set out in the 2002 Act and in the Common Regulatory Framework and, in turn, with those followed by ComReg in identifying the Preferred Option.

3.214 Section 12(4) of the 2002 Act requires ComReg, in carrying out its functions, to have regard to policy statements, published by or on behalf of the Government or a Minister of the Government and notified to it, in relation to the economic and social development of the State. Section 13 of that Act requires ComReg to comply with any policy direction given to ComReg by the Minister for Communications, Energy and Natural Resources ("the Minister") as he or she considers appropriate to be followed by ComReg in the exercise of its functions.

3.215 The Policy Directions which are most relevant in this regard (and which have not been considered elsewhere in this chapter) include the following:

Policy Direction No.3 of 21 February 2003 on Broadband Electronic Communication Networks

3.216 This Policy Direction provides that:

> *"ComReg shall, in the exercise of its functions, take into account the national objective regarding broadband rollout, viz, the Government wishes to ensure the widespread availability of open-access, affordable, always-on broadband infrastructure and services for businesses and citizens on a balanced regional basis within three years, on the basis of utilisation of a range of existing and emerging technologies and broadband speeds appropriate to specific categories of service and customers."*

3.217 The purpose of this policy direction is to ensure that the regulatory framework for electronic communications plays its part in contributing to the achievement of the Government's objectives regarding the rollout of broadband networks.

3.218 ComReg is conscious that the three year objective described in this policy direction has now expired making this direction less relevant currently. In any case, ComReg is of the view that the Preferred Option is aligned precisely with this Government objective, and considers that option to be the best placed to maximise utilisation of the available radio frequency spectrum for mobile broadband services and, in particular, the potential of LTE. The Preferred Option will also complement other schemes aimed at ensuring the widespread availability of open-access, affordable, always-on broadband infrastructure and services for businesses and citizens on a balanced regional basis such as the Rural Broadband Scheme and the National Broadband Scheme.

3.219 ComReg does not consider that excluding the 800 MHz and/or the 1800 MHz spectrum bands from the current assignment process would facilitate the development of broadband infrastructure and services to the same extent as the Preferred Option. The mobile market has, in recent times, experienced ever greater demand for higher bandwidth services. As discussed in the draft RIA, such demand will be better satisfied by the inclusion of the 800 MHz and 1800 MHz spectrum bands. Indeed, ComReg is of the view that, failure to include these bands, where available, would run contrary to this policy direction. The greater quantity of spectrum available under the Preferred Option should allow both existing and potential new entrants roll out enhanced broadband services throughout the country, utilising a range of existing and emerging technologies, than would be the case under alternative options. In addition, the resulting greater competitive tension facilitated both within the proposed auction process and in downstream retail markets should result in the roll out of enhanced services in terms of bandwidth. Furthermore, ComReg does not see how a restricted auction involving some form of administrative assignment of spectrum in the place of a competitive award procedure would incentivise the roll out of broadband infrastructure by recipients to the same extent as the Preferred Option, if at all.

Policy Direction No.4 of 21 February 2003 on Industry Sustainability

3.220 This Policy Direction provides that:

3.221 "ComReg shall ensure that in making regulatory decisions in relation to the electronic communications market, it takes account of the state of the industry and in particular the industry's position in the business cycle and the impact of such decisions on the sustainability of the business of undertakings affected."

3.222 The purpose of this policy direction is to ensure that regulatory decisions take due account of the sustainability of the industry in a situation where the business cycle is having a substantial impact on such sustainability and in particular on the prospects for further investment in and development of the sector.

3.223 This policy direction is clearly relevant in terms of those costs that industry must bear which are to some extent within the control of ComReg e.g. the setting of a minimum price in the proposed auction process. However, as set out in Annex 9, ComReg notes that the proposed minimum price is arrived at utilising a benchmarking methodology which incorporates data from recent auctions that have taken place across Europe and is set at a lower bound estimate of the market price to avoid choking off demand for spectrum while achieving the important aim of reducing incentives for tacit collusion. Any amount paid for spectrum access over and above the minimum prices set will be at the discretion of bidders themselves. In this regard, the spectrum fees paid following the auction should reflect no more than the value attached by auction participants to spectrum and what the industry can actually afford in its current position in the business cycle. Indeed, ComReg considers that its proposal to assign liberalised 800 MHz, 900 MHz and 1800 MHz spectrum in a joint award process and the possibilities this creates for the electronic communications industry as a whole to develop new sources of revenue and to manage their cost base, comes at an opportune time, given the problems currently faced by the Irish economy.

3.224 ComReg is of the view that this policy direction concerns the industry as a whole rather than the position of individual competitors and is of the view that favouring individual competitors through some form of an administrative assignment process would go beyond what this policy direction requires. ComReg considers that a full and open auction which facilitates greater participation on a non-discriminatory basis in the auction and, in turn, the downstream retail markets does not in any way prejudice the position of individual competitors and certainly not the sustainability of the industry as a whole. ComReg also notes that the proposal to issue long-term licences, stretching out to 2030, avoids any excessive focus on short-term issues, and allows a reasonable period over which industry can recover investments made. ComReg is therefore satisfied that it has given due account to industry sustainability in proposing the approach to spectrum assignment as set out in this paper.

Policy Direction No.5 of 21 February 2003 on Regulation only where Necessary

3.225 This Policy Direction provides that:

> *"Where ComReg has discretion as to whether to impose regulatory obligations, it shall, before deciding to impose such regulatory obligations on undertakings, examine whether the objectives of such regulatory obligations would be better achieved by forbearance from imposition of such obligations and reliance instead on market forces."*

3.226 By preferring an open and fully competitive auction over an administrative assignment process, ComReg is minimising the role for regulatory imposition and maximising the scope for market forces to be effective.

3.227 In relation to licence conditions (see Annex 8 for further detail), ComReg notes that it has refrained from including a number of licence conditions which were

previously included in similar licences in the past. For example, ComReg has refrained from including a condition relating to international roaming as it is satisfied that market forces should be sufficient to ensure that such a service would anyway be provided in the absence of such a licence condition. On the other hand, where ComReg is proposing to impose regulatory obligations, it is satisfied that market forces would not be better suited to achieving the objectives of such regulatory obligations. For example, ComReg notes that some form of coverage obligation in licences is necessary to address situations where market forces would not otherwise ensure desired outcomes (see Annex 8 for further details). In addition, ComReg has had regard to expert economic advice when considering the risks of tacit collusion in the auction and the need to set prices at a level that would reduce incentives for such behaviour (see Section 4.4 of DotEcon's Report (Document 11/59). ComReg agrees with DotEcon that, absent some form of deterrent pricing mechanism, market forces would not be sufficient to ensure the absence of such behaviour. As such, ComReg is satisfied that it has complied with this policy direction generally and where appropriate in the proposed assignment process.

Policy Direction No.7 of 21 February 2003 on Consistency with other Member States

3.228 This Policy Direction provides that:

"ComReg shall ensure that, where market circumstances are equivalent, the regulatory obligations imposed on undertakings in the electronic communications market in Ireland should be equivalent to those imposed on undertakings in equivalent positions in other Member States of the European Community."

3.229 ComReg understands that the purpose of this policy direction is to ensure, where circumstances are equivalent, a consistent approach with other Member States, in relation to the imposition of regulatory obligations on undertakings, so that Ireland will not be at a competitive disadvantage relevant to other EU Member States by virtue of a more diverse or onerous regulatory regime.

3.230 Although ComReg has consistently had regard to international developments in the area of spectrum liberalisation (see Annex 11 of this paper and equivalent sections in previous consultation papers), it notes that the circumstances are different in each Member State and this is provided for in the GSM Amendment Regulation which requires Member States to be cognisant of market distortions when liberalising rights of use. ComReg is anyway satisfied that it is not proposing any regulatory obligation that would place Ireland at a competitive disadvantage relevant to other EU Member States by virtue of a diverse or onerous regulatory regime.

3.231 In any case, ComReg notes that under the 2002 Act and the Common Regulatory Framework as well as under EU law generally, it is required to promote the internal market and refrain from measures which would discriminate against undertakings from Member States or impede the free movement of goods and services. In this regard, ComReg notes that the Preferred Option complies with this Policy Direction to the extent allowed under Irish and, in particular, EU law. ComReg's regulatory decisions are subject to scrutiny from European Institutions notably the European Commission and BEREC (and potentially the European Court of Justice).

Policy Direction No.11 of 21 February 2003 on the Management of the Radio Frequency Spectrum

3.232 This Policy Direction provides that:

"ComReg shall ensure that, in its management of the radio frequency spectrum, it takes account of the interests of all users of the radio frequency spectrum."

3.233 The purpose of this policy direction is to ensure that ComReg achieves an appropriate balance between the interests of various users of the radio frequency spectrum, in particular, the respective interests of commercial and non-commercial users.

3.234 In carrying out the draft RIA, ComReg has considered the Preferred Option in light of the interests of MNOs (both existing operators and new entrants); and consumers.

3.235 ComReg is satisfied that it has clearly complied with this requirement in carrying out the draft RIA and that the Preferred Option is the one that best serves the interests of all users of the radio frequency spectrum and strikes an appropriate balance where those interests conflict.

General Guiding Principles (in terms of spectrum management, licence conditions and setting of licence fees)

3.236 ComReg notes that it is required to comply with the guiding principles of **objectivity, transparency, non-discrimination and proportionality** in carrying out its functions under the 2002 Act and the Common Regulatory Framework. In relation to the current process, ComReg considers that these principles are most relevant in terms of its functions concerning spectrum use and management, attaching conditions to rights of use and the setting of licence fees.

3.237 In this regard, Regulation 10(2) of the Authorisation Regulations requires that conditions attached to rights of use for radio frequencies be non-discriminatory, proportionate and transparent, Regulation 11(2) requires that ComReg grant rights of use for radio frequencies on the basis of selection criteria which are objective, transparent, non-discriminatory and proportionate and Regulation 19(2) requires that fees for right of use of radio frequencies be objectively justified, transparent, non-discriminatory and proportionate in relation to their intended purpose.

3.238 ComReg also notes the regulatory principle set out in Regulation 16(2) of the Framework Regulations, requiring ComReg in pursuing its objectives to apply objective, transparent, non-discriminatory and proportionate regulatory principles by, amongst other things, ensuring that, in similar circumstances, there is no discrimination in the treatment of undertakings providing electronic communications networks and services.

3.239 ComReg notes that the above guiding principles are Irish and EU law principles that ComReg abides by generally in carrying out its day to day regulatory functions.

3.240 ComReg is satisfied, having regard to the applicable legislation and legal principles, its draft RIA and other analyses, the contents of its various papers (including this paper), its expert advice and reports and the material to which it has had regard, that

its proposals regarding what spectrum to release, in what manner, subject to what conditions, terms and timing, with a view to performing its statutory functions and achieving its statutory objectives, are indeed objectively justified, transparent, proportionate and non-discriminatory.

3.241 Below, ComReg sets out its understanding of these principles along with an assessment of the extent to which the Preferred Option and certain other options accord with those principles.

Objectivity

3.242 In terms of spectrum management and reasons for undertaking this consultation process, ComReg notes its general statutory obligations in relation to spectrum management, the requirements of the GSM Amendment Directive and ComReg's obligation to liberalise rights of use in the 900 MHz spectrum band.

3.243 ComReg is also satisfied that the Preferred Option and the details of the proposed regulatory measures surrounding that option have been justified in the draft RIA and in this document generally and in terms of ComReg's statutory objectives, various public policy considerations and the prevailing facts and circumstances. In particular, ComReg notes that licence conditions are justified in terms of promoting competition and ensuring consumer protection, and that the application of spectrum fees are justified in terms of ensuring the optimal use of spectrum.

3.244 ComReg considers that it has made significant amendments to previous proposals e.g. moving from a SBC auction to an open CCA, in order to address concerns raised by various respondents, e.g. common value uncertainty and valuing business continuity. In this regard, ComReg considers that many of the alternative proposals previously put forward by respondents which were aimed at addressing these concerns, e.g. administrative assignment in order to protect the position of incumbents are not justified, particularly where such alternatives raise concerns in terms of promoting competition, non-discrimination and proportionality.

Transparency

3.245 In accordance with this principle, the Preferred Option can be fairly characterised by predictability, clarity and openness.

3.246 ComReg has, in accordance with its practice generally, at all times ensured the utmost transparency in this consultation process in terms of spectrum management, licence conditions and spectrum fees. This has allowed interested parties at all stages to assess and fully express their view on ComReg's proposed approach to liberalising and assigning spectrum. ComReg is satisfied that the Preferred Option ensures that stakeholders have full transparency in terms of auction participation, possible auction outcomes, minimum pricing and licence conditions. For example, ComReg would refer to its proposal for an open CCA auction in response to concerns expressed by existing operators to amend its earlier proposal for a closed auction. ComReg is of the view that an open CCA auction further enhances transparency in the auction process and that the holders of spectrum will be the highest bidders.

3.247 In relation to the minimum price, ComReg notes that the methodology used for establishing a lower bound estimate for the proposed has been fully transparent and

consulted upon, and, in terms of licence conditions, ComReg has in the past published the proposed full text of conditions to allow prospective licensees to fully understand and comment on same.

3.248 ComReg also notes that this, in turn, has contributed to regulatory predictability generally.

Non-discrimination

3.249 The principle of non-discrimination requires that comparable situations are not treated differently and that different situations are not treated in the same way.

3.250 ComReg is satisfied that the Preferred Option and the proposed regulatory measures surrounding that option are non-discriminatory in nature. For example, the method proposed for assigning spectrum (an open CCA) is open to all interested parties without discrimination. Licence conditions, generally, do not differentiate by licensee except to the extent where such differentiation can be objectively justified (e.g. additional time allowance for new entrants to achieve coverage obligations). Finally, the minimum price and the structure of licence fees apply to all auction participants without discrimination.

3.251 In contrast, if ComReg had not selected the preferred option, and instead chosen administrative assignment in favour of incumbents or new entrants, issues of discrimination may well have arisen.

3.252 ComReg would note the various arguments made by certain respondents in terms of State aid. ComReg has gone to great lengths to ensure and satisfy itself that any of its proposed measures do not breach the non-discrimination principle which is a component of ComReg's State Aid law compliance obligations.

Proportionality

3.253 ComReg notes that, simply put, the purpose of the draft RIA is to identify the most proportionate measure while still achieving the intended objectives. In this regard, the draft RIA itself constitutes a test for proportionality of the Preferred Option. As demonstrated throughout this chapter, ComReg considers that the Preferred Option is suitable and necessary to achieve its statutory objectives. ComReg considers that the short delay in liberalising 900 MHz spectrum by including 800 MHz in a joint assignment process is proportionate in terms of the objective to be achieved, i.e. to promote competition, ensures that users derive maximum benefit in terms of price, choice and quality, and encourages efficient use and effective management of radio frequencies. ComReg considers that the alternative of a sequential award process aimed at achieving an earlier liberalisation of the 900 MHz band would disproportionately and negatively impact on the achievement of these objectives. This would be particularly so where the Preferred Option leaves open the possibility of advanced commencement of 900 MHz spectrum.[71]

3.254 Furthermore, and as noted previously, where ComReg has amended its proposals to address concerns previously expressed by respondents, it does not consider that respondents' alternative proposals, many of which, unlike the Preferred Option, require some restriction to the award process and, in turn, some restriction to actual

[71] See Chapter 7 on Advanced Commencement.

or potential competition, would be proportionate in terms of the objective they were originally intended to achieve, e.g. avoid consumer disruption. For example, ComReg considers that an option which involves an administrative assignment of spectrum for the purposes of avoiding consumer disruption, where the risks of such disruption are now vastly reduced, would constitute a disproportionate restriction of competition and inefficient use of spectrum.

3.255 ComReg is, therefore, satisfied that the Preferred Option satisfies the principle of proportionality in that there is no less burdensome measure that meets ComReg's objectives in accordance with its statutory obligations.

Chapter 4

Details of the Award

Introduction

4.1 This Chapter sets out ComReg's preliminary conclusions in relation to the following details of the proposed award:

- spectrum caps;
- award format;
- temporal lots;
- full assignment round;
- possibility of interim GSM rights of use in the 1800 MHz;
- early liberalisation option;
- spectrum fees (minimum prices and structure of payments); and
- eligibility.

4.2 Certain matters set out in the annexes are repeated in brief here and the analysis set out in the annexes represents ComReg's definitive and reasoned views.

Spectrum Caps

4.3 Over the course of its consultations, ComReg first focused on the release of the 900 MHz band only. ComReg then considered the joint release of the 900 MHz and 800 MHz bands. Finally, ComReg considered the joint release of the 800 MHz, 900 MHz and 1800 MHz bands. In each case, ComReg proposed the imposition of appropriate spectrum caps, based upon the proposed spectrum release. The proposed spectrum caps would be imposed in order to conduct a competition leading to the release of the spectrum bands under new licences; the caps would not apply in perpetuity.

4.4 Fuller details in respect of ComReg's consideration of spectrum caps and respondents' submissions in relation thereto are set out in Annex 6.1.

900 MHz band

Consultations 08/57[72], 09/14 and 09/99 considered the award of the 900 MHz band. In Consultation 08/57, ComReg proposed a spectrum cap of 2 × 10 MHz for future licences in the 900 MHz band, on the basis that this would promote competition and reflect the likely needs of existing 900 MHz operators. ComReg, noting the general agreement of respondents, maintained this position in Consultation 09/14 and Consultation 09/99 although, in the latter it further stated that it was minded to relax this cap and accept bids of up to 2 × 15 MHz, if it transpired during the award process that demand did not exceed supply.

[72] Consultation 08/57 also considered the release of 1800 MHz spectrum but concluded that, at the time, there was little demand for such spectrum.

800 MHz and 900 MHz bands

4.5 Consultation 10/71 considered the joint award of the 800 MHz and 900 MHz bands, which would almost double the amount of spectrum to be awarded (2× 65 MHz in total). In Document 10/71c, DotEcon proposed that a spectrum cap of 2× 20 MHz was appropriate as this would permit reasonable competition amongst incumbents while not raising concerns about creating incentives for tacit collusion or strategic demand reduction. ComReg adopted this proposal and further expressed the view that the differences between the 800 MHz and 900 MHz bands were not sufficient to warrant different spectrum caps for each.

The 800 MHz, 900 MHz and 1800 MHz bands

4.6 Consultation 10/105 considered the joint award of the 800 MHz, 900 MHz and 1800 MHz bands, resulting in 2 × 140 MHz of spectrum being released simultaneously.

4.7 In its report to ComReg (Document 10/105a) DotEcon considered spectrum caps in the context of such a joint award of the three bands. DotEcon advised that:

- a symmetric cap for incumbents and new entrants was preferable; and
- this should not be set so tight as to prescribe symmetric spectrum holdings in individual bands or to result in spectrum not being contested (as the purpose of an auction is to allow competition to determine the amount of spectrum to be awarded to each bidder).

4.8 DotEcon considered that an overall cap of 2 × 50 MHz, coupled with a 2 × 20 MHz cap on sub-1GHz spectrum, would be reasonable where all three bands were being auctioned simultaneously.

4.9 Section 3.3 of Consultation 10/105 addressed the issue of spectrum cap(s) in the context of a three band award. In light of the amount of spectrum that would be made available across the three bands, ComReg expressed the view that existing spectrum holdings (in the 2.1 GHz band) were unlikely to be large enough to materially affect the long-run structure of the market. Accordingly, ComReg proposed that existing spectrum assignments in the 2.1 GHz band would not count towards the proposed spectrum caps in a triple band award.

4.10 ComReg further stated that it was of the view that it was important to limit the amount of 1800 MHz spectrum that a bidder could obtain, as one party acquiring the entire 1800 MHz band could have an adverse effect upon downstream competition in the longer term.

4.11 Accordingly, ComReg proposed to adopt the spectrum caps recommended by DotEcon.

Key Consultation Questions

4.12 **Question 8 of Consultation 10/71**: Respondents were asked if they agreed with ComReg's proposal to set a sub 1 GHz cap (in the context of a competition for the

joint award of the 800, 900 and 1800 MHz bands). Of the eleven respondents, there was general agreement with this proposal with one respondent remaining neutral[73] and one disagreeing.

4.13 **Q9 of Consultation 10/71:** Respondents were asked if a 2× 20 MHz cap is the most appropriate cap to set for a joint award of 800 MHz and 900 MHz spectrum. Of the eleven respondents, four agreed, five disagreed, while two did not comment on the level of the spectrum cap.

4.14 A number of submissions were made to the effect that spectrum should be reserved and/or administratively assigned, variously for existing operators and new entrants. These submissions do not appear to be directly relevant to spectrum caps and are considered in Annex 3 of this consultation.

4.15 One respondent submitted that it believed that ComReg's proposal was focused on securing revenue in the award process, at the expense of long-term competition in mobile market, while another expressed concerns in relation to possible interference with broadcasting. Two respondents set out a number of considerations for ComReg to take into account in setting the spectrum cap. These issues are considered in relation to the proposed 900 MHz cap in the first time-slice discussed below.[74]

4.16 **Q2 of Consultation 10/105:** Following the proposal to include the 1800 MHz band in the award process, respondents were asked if they agreed with the proposal to set an overall cap of 2 × 50 MHz, together with a sub-1GHz spectrum cap of 2 × 20 MHz. As set out in Annex 6.1, respondents to this question were split. Essentially, Vodafone and O2 agreed with the proposed level of the cap while H3GI disagreed. eircom group agreed with the sub-1 GHz cap but disagreed with the proposed overall cap.

4.17 As set out in Annex 6.1, H3GI made further submissions to ComReg relating to spectrum floors, as proposed in the UK, and it submitted its consultant's report in relation to this matter. H3GI proposed that ComReg should impose appropriate spectrum floors and caps and added that it did not believe that the proposed spectrum cap would be sufficient to ensure "Credible Future MNO Competition" and on this basis argued that it would be inappropriate for ComReg to proceed on the unproven assumption that the proposed spectrum cap would do so.

4.18 H3GI's consultants recommended, with H3GI's support, a total spectrum cap of 2 × 40 MHz across the three bands and a spectrum floor of 2× 10 MHz of contiguous sub 1 GHz spectrum with a 2 × 20 MHz sub 1 GHz spectrum cap. However, their

[73] Nine respondents (Digiweb, eircom Group, Ericsson, ESBN, H3GI, Imagine, O2, Qualcomm, UPC and Vodafone) agreed while one respondent (RTE & RTENL) disagreed. O2 did not believe that a spectrum cap was necessary. It did however supply detailed responses to the more detailed questions relating to spectrum caps, without prejudice to that position. Accordingly, in the discussion below its responses are characterised as positive where it approved of detailed proposals, without repeating its overarching view on each occasion.

[74] Ericsson submitted that there are differences between the 800 MHz and 900 MHz bands and that one could argue that a 2 × 10 MHz cap per band, while allowing and supporting spectrum sharing, could result in a better overall outcome. Qualcomm recommended that ComReg take into account and recognise that the 800 MHz and 900 MHz bands correspond to different service offerings and terminal availability timelines, and thus currently have different eco-systems.

consultant's report stated that *"… the MSP [Minimum Spectrum Portfolio] used in the rest of this document herein was:*

- *2× 10MHz of contiguous sub-1GHz; and*
- *2×10GHz [sic][75] of 1800MHz spectrum."*

Alternative Suggestions and DotEcon's Views

4.19 In the course of the consultation process, ComReg received proposals as to alternative spectrum caps, put forward by respondents. These proposals were for:

- an increase in the sub-1 GHz spectrum cap;
- a decrease in the sub-1 GHz spectrum cap;
- a lower overall spectrum cap to avoid harm to competition; and
- a spectrum floor

4.20 In its latest report, published by ComReg as Document 11/58 and which accompanies this Response to Consultation and Draft Decision document, DotEcon considers the proposal to impose an overall 2 × 50 MHz spectrum cap together with a 2 × 20 MHz sub-1GHz spectrum cap, and it also considers the imposition of an additional cap on the 900 MHz band in the first time slice. Noting that most respondents agreed with the proposals in respect of the first two of these caps, while some suggested lowering or increasing the spectrum caps, DotEcon's view on the appropriateness of having caps and the size of those caps is unchanged.

4.21 In relation to the suggestion of increasing the sub-1GHz spectrum cap, DotEcon considers that this could result in a more extreme outcome, with two operators gaining 2×25 MHz with 2×15 MHz distributed in some way between other operators, and that this could have a damaging effect on competition. DotEcon, therefore, did not further consider the option of increasing sub-1GHz spectrum cap above 2 × 20 MHz per bidder.

4.22 DotEcon considers that the arguments for lowering the cap and for reserving some part of the sub-1 GHz bands should be considered together, as they have the same effect. Setting a sub-1GHz spectrum cap of 2×15 MHz, and assuming the four existing operators achieved this cap, would result in the certain availability of at least 2×5 MHz of sub-1GHz spectrum for an entrant. However, DotEcon considers that imposing a 2×15 MHz sub-1 GHz cap, and thus effectively reserving spectrum for a new entrant, could only result in negative consequences for the efficiency of the auction outcome, as there is no obvious case on competition grounds for requiring such an outcome.

4.23 DotEcon concludes, in Section 4.2.1 of its Report (11/58): "Overall, therefore, given the high intrinsic value of sub-1GHz spectrum and the importance of ensuring that this spectrum is awarded in the most efficient way to ensure its most efficient use in providing services over the duration of the relevant licences, we do not consider that there is a case for imposing a spectrum cap of 2×15MHz, as it would

[75] Obviously a typographical error which should presumably have read as '10 MHz'.

likely result in inefficiency of the auction outcome for no obvious gain in terms of the competitiveness of service markets."

4.24 DotEcon considered the submission by H3GI that a sub-1 GHz spectrum cap of 2×20 MHz would mean that it risked being awarded just 2×5 MHz of the spectrum, and that a lower cap would prevent this and so avoid harm to competition. DotEcon considered that a 2×20 MHz sub-1 GHz cap would not enable three operators to use their bids in the auction so as to prevent a fourth bidder from winning any of the sub-1 GHz spectrum. Further, the risk of being awarded only 2×5 MHz of spectrum would apply equally to all bidders, including all of the existing operators. DotEcon also considered that the proposed multi-round combinatorial auction should give all bidders the opportunity to observe how much others value this spectrum (in the aggregate) at round prices. Each bidder could therefore calculate the cost of bidding on different amounts of spectrum in the auction, with a view to facing different levels of cost and service capabilities over the duration of the resulting licences. DotEcon therefore concluded that a 2×20 MHz sub-1 GHz spectrum cap strikes a good balance, having regard to the above relevant factors.

4.25 DotEcon's concluding view on the proposed spectrum floor of 2× 10 MHz of contiguous sub 1 GHz spectrum is set out in Section 4.4.5 of its Report (11/58):

"It would be counterproductive to apply restrictions on the auction outcome, such as tighter caps or spectrum floors that lead to fragmentation of spectrum. In particular, caps and floors are only restrictions on auction outcomes and not long run market structure. Imposing unnecessary restrictions would not create a gain in long-run competitive intensity in service markets if it simply created unsustainable outcomes."

4.26 DotEcon also considered the suggestion of a lower overall cap as a means to avoid harm to competition, as suggested by Meteor which argued against an overall spectrum cap of 2×50 MHz on the grounds that this would unfairly favour O2 and Vodafone. DotEcon noted again that the sole purpose of setting spectrum caps is to preclude outcomes that are sufficiently extreme as to harm competition. With this in mind, DotEcon noted that neither of the most asymmetric outcomes that might result from the proposed spectrum caps would be unequivocally harmful to competition.

4.27 In contrast, in Section 4.2 of its Report DotEcon set out its view that Meteor's proposal of an overall 2 × 40 MHz spectrum cap *"would ensure almost fully symmetric outcomes where the number of alternative feasible allocations of spectrum amongst bidders would be small. For example, if only the four existing mobile operators were to bid in the auction, the outcome would most likely be that each existing operator would win 2×15 MHz or 2×20 MHz of sub-1 GHz spectrum plus 2×15 MHz or 2×20 MHz of 1800 MHz spectrum, or some small variant thereof. Given the number of alternative outcomes that would be precluded relative to the alternative 2×50 MHz cap, it is highly likely that the imposition of such a cap would result in significant inefficiency of allocation, and potentially spectrum going unsold inefficiently. The benefit to competition of ensuring relatively symmetric spectrum holdings of operators after the auction is not clear, and in any case does not appear to be sufficiently great to offset the efficiency loss as a result of significantly limiting the breadth of feasible auction outcomes."* DotEcon therefore concluded that it did not think that there is a case for lowering the overall spectrum

cap on account of asymmetric outcomes resulting in claimed potential harm to competition.

An additional cap on the 900 MHz band in the first time slice

4.28 DotEcon considered whether it would be prudent to have an additional spectrum cap on the 900 MHz band, in the first time slice. DotEcon noted that its proposed caps (overall cap of 2× 50 MHz and a sub-1GHz cap of 2× 20 MHz) are intended to prevent auction outcomes that are so asymmetric that they would undoubtedly harm competition. The levels of the already proposed caps are based upon three assumptions:

- that there will be at least four bidders in the auction;
- that 800MHz and 900MHz spectrum are closely substitutable in the long run (so that it is reasonable to use an overall sub-1GHz cap); and
- that 1800MHz spectrum is complementary to sub-1GHz spectrum and is substitutable at least at the margin (so that it is reasonable to set an overall spectrum cap, as opposed to a 1800MHz-specific cap, in combination with the proposed sub-1GHz cap).

4.29 However, DotEcon also noted that the proposed caps do not necessarily address competition concerns that may result as a consequence of the 800 MHz and 900 MHz spectrum bands not being close substitutes 'in the short run', due to the fact that while the bands are similar as to their characteristics, mobile technologies evolve at different paces in each band. DotEcon noted in particular that the 900 MHz band has been used to provide harmonised 2G mobile services for many years, and 3G equipment which utilises the 900 MHz band is readily available, whereas the 800 MHz band has only been harmonised relatively recently and while equipment for using the 800 MHz band is fast being developed, the availability of such equipment is far more limited at this time than is the case in the 900 MHz band.

4.30 DotEcon also took note of the importance of the 900 MHz band as asserted by a number of interested parties, and thus considered it prudent to consider the costs and benefits of an additional cap on the 900 MHz band, in the short term. DotEcon considered that the purpose of a spectrum cap on the 900 MHz band is to address competition issues arising from imperfect substitutability between 800MHz and 900MHz spectrum, at present and in the short run. DotEcon considered that the time period for such a band-specific cap should be the first time slice – i.e. up until July 2015 when the second time slice commences. DotEcon considered that the 800 MHz band should be well established by then, with harmonisation complete in EU member states, and that there should be equipment and handsets available for deploying services using LTE (and potentially other advanced technologies) which utilise 800 MHz or 900 MHz spectrum. DotEcon therefore recommends a 2×10 MHz cap on 900MHz spectrum in the first time slice, in addition to the overall 2× 50 MHz cap and the sub-1GHz 2×20 MHz cap.

4.31 Taking this into account, as well as presenting other arguments, DotEcon concluded in Section 4.3 of its Report (11/58) that "*there is merit in imposing a 2×10MHz cap on 900MHz spectrum in the first time slice, and that the cost of doing so, if any, is small. On this basis, we recommend that such a cap be implemented in the*

proposed multi-band auction in addition to the sub-1GHz and overall spectrum cap already part of the current auction design".

Dealing with unsold spectrum at the end of the auction

4.32 eircom, in its response to Question 12 of Consultation 10/71, queried ComReg's proposed approach for dealing with unsold spectrum at the end of the auction.

4.33 In considering eircom's view, DotEcon maintained that the particular approach for dealing with unsold spectrum will depend on the amount and type of spectrum that is unsold. DotEcon recommends that ComReg retain discretion to decide how to proceed if the issue of unsold spectrum becomes a reality, given the uncertainty as to the amount and type of spectrum that may go unsold, if any. However, DotEcon further recommends, in Section 5.1 of its Report (11/58) that *"a principle should be set that spectrum left unsold at the end of the auction would not be otherwise allocated for a period after the auction of at least 1-2 years. This is to avoid providing a negative incentive to bidders to "wait and see", that is, strategically withhold demand during the auction in the hope of being allocated this spectrum on the same terms as those offered in the auction in a follow-up process."*

Spectrum sharing and the ability of bidders to combine their individual spectrum cap allowances

4.34 In its response to Consultations 10/71 and 10/105, O2 proposed that if a spectrum cap is imposed then ComReg should allow the possibility of eligible bidders combining their individually capped allowances to bid as single entity.

4.35 DotEcon, having considered this submission in Document 11/58 concluded in Section 12 therein that in such cases the caps for the combined bid vehicle should be the same as for any other bidder: *"One important issue for operators in respect of spectrum sharing agreements is how a spectrum cap on a bid vehicle would be treated within the auction. In this respect, we consider that where operators bid as a bid vehicle representing a spectrum sharing venture, the spectrum caps set for such a bid vehicle should be the same as those set for any other bidder i.e. a 2×10MHz cap on 900MHz spectrum in the first time slice, a 2×20MHz sub-1GHz cap and an overall cap of 2×50MHz."*

ComReg's Position

4.36 With the exception of O2, which did not object to ComReg's spectrum cap proposals for this spectrum award but expressed a preference for no spectrum cap, the other respondents to the consultations supported the application of a spectrum cap. Their reasons included the fact that this would promote competition, encourage market entry, and would be in the interests of consumers. The rationale put forward by respondents generally accords with that of ComReg, as set out in previous consultations. No new information has been submitted to cause ComReg to alter its view that spectrum caps are important to promote and safeguard competition. ComReg thus agrees with DotEcon that the main purpose of spectrum caps is to ensure that extreme outcomes which could harm competition do not emerge from the proposed auction, while also ensuring that the distribution of spectrum shall be determined by competition amongst the bidders and not by the cap set on the amount of spectrum that each bidder may be obtain.

4.37 Prior to setting out its spectrum cap proposal below, ComReg would comment as follows in relation to the scope of these proposed spectrum caps:

- ComReg proposes that the spectrum caps should take account of existing spectrum assignments in the 900 MHz and 1800 MHz bands; and
- the only other band to consider is 2.1 GHz, as current licences in that band run until 2022 and 2027 and are used to provide 3G services. Each of the four current MNOs holds 2× 15 MHz of paired 2.1GHz spectrum. When considered against the total amount of spectrum to be made available under the proposed award (2× 140 MHz), the 2.1 GHz holdings are not likely to be large enough to materially affect the long-run structure of the market, after the award process. ComReg therefore considers that existing 2.1GHz assignments should not count towards the spectrum cap.

4.38 In the context of a joint auction of the 800 MHz, 900 MHz and 1800 MHz bands, ComReg proposed an overall spectrum cap of 2 × 50 MHz for the three bands, together with a separate spectrum cap of 2 × 20 MHz for the two sub-1 GHz bands.

4.39 With the exception of RTÉ & RTÉNL, all other respondents to Consultations 10/71 and 10/105 supported the inclusion of a sub-1GHz spectrum cap (although there were varying views regarding the appropriate level of the cap). DotEcon also considers it appropriate to set such a cap.

4.40 ComReg remains of the view that the proposed competition caps are appropriate. They take account of the fact that the propagation qualities of the sub-1GHz spectrum bands make them particularly valuable and sought after. Further, the caps would allow a bidder to acquire sufficient 1800 MHz spectrum so as to effectively compete with users of sub-1GHz spectrum while also allowing a bidder to acquire up to 2 × 20 MHz of sub-1GHz spectrum and 2 × 30 MHz of 1800 MHz spectrum which would seem to be enough spectrum to deploy a service and provide additional capacity in populous areas.

4.41 ComReg agrees with DotEcon that it would be prudent to have an additional spectrum cap on the 900 MHz band, for the first time slice. While ComReg agrees that the 800MHz and 900 MHz spectrum bands may not be closely substitutable for one another in the short term, this should change as equipment which utilises 800 MHz spectrum becomes more readily available. In the interim period, a spectrum cap on the 900 MHz band will address short-term competition concerns which arise from the current imperfect substitutability between the 800 MHz and 900 MHz bands. Having regard to DotEcon's comments and its recommendation, ComReg considers that a cap on the 900 MHz band should apply in the first time slice.

4.42 ComReg agrees with DotEcon that the approach for dealing with any unsold spectrum will depend on the amount and type of spectrum that is unsold. ComReg therefore proposes to retain discretion as to how to proceed if some spectrum is left unsold, though ComReg also agrees with DotEcon that spectrum that is left unsold should not be assigned for a period following the auction.

4.43 ComReg has also considered the proposal that separate parties who bid as a single entity should be allowed to combine their individual spectrum cap allowances (so that, for example, two parties who place a combined bid could potentially win

double the amount of spectrum which an individual bidder could win). ComReg is of the view that in the case of any such combined bid the spectrum cap should remain the same as in any other bid.

4.44 ComReg also agrees with DotEcon's conclusions in Section 4.4 of its Report (11/58), regarding H3GI's submission that ComReg should impose spectrum floors in order to ensure effective market competition. While this maybe a reasonable action for Ofcom to take in its particular circumstances, there is not a compelling basis for ComReg to do likewise, given the patently different market conditions between Ireland and the UK and the fact that other features of the proposed multi-band award are different. In particular, ComReg agrees with DotEcon that the case for ensuring four fairly symmetric national network operators in Ireland is ambiguous, whilst the proposed spectrum caps will in any event ensure that at least four bidders can win sub-1GHz spectrum, and provide appropriate safeguards against excessively asymmetric outcomes. Imposing floors and caps along the lines proposed in the H3GI submission would constrain auction outcomes, and thereby reduce the potential for realising a competitive and efficient result.

4.45 ComReg thus proposes:

- an overall competition cap of 2 × 50 MHz for the three bands;
- a separate competition cap of 2 × 20 MHz for the two sub-1 GHz bands; and
- a separate competition cap of 2× 10 MHz for the 900 MHz band, for the first time slice;
- any unsold spectrum would not be assigned for at least 2 years post-auction;
- combined bids should be treated the same as any other bid in the competition and be subject to the same spectrum caps as any other bid.

Auction Format

4.46 This section considers ComReg's favoured award process for the 800 MHz, 900 MHz and 1800 MHz bands. It first sets out ComReg's previously expressed view as to the most appropriate auction format and then describes how that view has developed over the entire consultation process, in light of submissions by respondents and in changing circumstances.[76]

ComReg's position in Consultations 08/57 and 09/14

4.47 In Consultation 08/57, ComReg stated that it preferred allocating spectrum via auction where demand exceeds supply. Given that a large portion of the 900 MHz is occupied by incumbents, ComReg considered that demand for this spectrum would likely exceed supply and so it proposed an auction for the release of 900 MHz spectrum.

[76] In Consultations 08/57, 09/14 and 09/99, ComReg was, in the main, considering the award of the 900 MHz band only. In Consultation 10/71, ComReg considered the joint award of the 800 MHz and 900 MHz bands. In Consultation 10/105, ComReg considered the multiple award of the 800 MHz, 900 MHz and 1800 MHz bands.

4.48 ComReg proposed three possible "competitive award processes" for 900 MHz spectrum in Consultation 08/57. Whilst the three options considered the potential for two stages ("assignment phase" and "licence competition") ComReg did not specify an auction format. In light of responses to Consultation 08/57, ComReg presented two award process proposals in Consultation 09/14, both involving an auction. ComReg did not present information as to the exact format of the proposed auction at that time, though some respondents to both Consultations 08/57 and 09/14 had offered their views on same.

Respondents views in response to Consultations 08/57 and 09/14

4.49 Three respondents to Consultation 08/57 commented on their preferred auction format and suggestions included: a two stage (award and assignment) combinatorial clock auction ('CCA'); a simultaneous multiple round ascending ('SMRA') auction which assigned spectrum to the users who valued it most and which ensured contiguous spectrum assignments; and a combinatorial auction.

4.50 Four respondents to Consultation 09/14 offered views on the auction format. Again, one respondent called for a two stage award process whilst others stated that they required more information on details of the auction format.

ComReg's position in Consultation 09/99

4.51 Having considered responses to Consultations 08/57 and 09/14 and having taken into account the recommendations of DotEcon's Report Document 09/99c, ComReg discussed four potential auction formats in Consultation 09/99:

- standard simultaneous multiple-round ascending (SMRA) auction;
- SMRA auction with augmented switching (SMRA/AS);
- combinatorial clock auction (CCA); and
- sealed-bid combinatorial (SBC) auction.

4.52 DotEcon advised that there would be numerous disadvantages with an SMRA approach for this particular award, including that it was poor as regards aggregation risks, gave rise to significant fragmentation risks, and would potentially allow for collusive outcomes. DotEcon further advised that although SMRA/AS could help address fragmentation risks, the bidding process would be complex, it would be difficult for bidders to bid within their budget constraints, and aggregation risks would still exist.

4.53 ComReg therefore stated its preference for a combinatorial auction which would address aggregation risk. DotEcon considered two combinatorial auction formats - CCA and SBC. Taking account of DotEcon's analysis, ComReg preferred an SBC auction as it was of the view that common value uncertainty was unlikely to be substantial in the 900 MHz band and that a CCA could lead to an inefficient outcome, as price discovery leads to the possibility of strategic behaviour amongst bidders. ComReg sought stakeholder's views.

Respondents views in response to Consultation 09/99

4.54 There were mixed views from respondents as to whether it was appropriate to select a combinatorial auction format in order to ensure a competitive outcome. Three

respondents supported the proposal to ensure a competitive outcome whilst three others disagreed with the proposal. The latter's reasons included that it could increase the overall price paid for spectrum and that a full band auction for 900 MHz spectrum was not appropriate.

4.55 Moreover, there were mixed views and significant resistance to an SBC auction. Reasons cited for disagreeing with an SBC auction included:

- common value uncertainty would not be low as ComReg suggested in Consultation 09/99;
- there was no evidence that bidders would collude and there are measures which could be included in the auction rules to ensure the scope for collusion is minimised; and
- the one-shot bid would create a risk for incumbent operators as regards ensuring business continuity.

ComReg's position in Consultations 10/71 and 10/105

4.56 Having taken into account the views of respondents to Consultation 09/99, the inclusion of the 800 MHz band in the award, and DotEcon's updated Report (10/71a), ComReg proposed to adopt a CCA format in Consultation 10/71 and sought views on same. With the proposed inclusion of the 1800 MHz band (in Consultation 10/105) ComReg maintained its view in relation to the use of a CCA.

4.57 DotEcon, in its Report (10/71a), recommended that a CCA with limited transparency and high minimum prices, using a second price rule and a relative cap activity rule, was the most effective spectrum release format to achieve ComReg's objectives, whilst also addressing issues such as business continuity, price discovery, and incentives for tacit collusion and strategic demand reduction.

Views of Respondents to Consultations 10/71 and 10/105

4.58 There was considerable support for a CCA from respondents to Consultation 10/71. Respondents stated that a CCA would address concerns of strategic bidding incentives, common value uncertainty, tacit collusion and business continuity risks. Only one respondent offered a view in response to Consultation 10/105, though it reiterated its support for a CCA in light of the inclusion of the 1800 MHz band.

DotEcon's Current Recommendation

4.59 DotEcon reiterates its recommendation for the CCA with relative cap activity rule in its most recent Report.[77]

ComReg's Current Position

4.60 Having considered respondents' views and DotEcon's advice and recommendations, ComReg considers that a CCA with relative cap activity rule to be the most appropriate auction format for the multiband release of the 800 MHz, 900 MHz and 1800 MHz spectrum bands.

[77] Section 6.3 of ComReg Document 11/58.

Temporal Lots

4.61 This section sets out ComReg's previous consideration of and current proposals in relation to the use of temporal lots for the award of liberalised rights of use in the 800 MHz, 900 MHz and 1800 MHz bands, as set out in Consultations 08/57, 09/14, 09/99, 10/71 and 10/105.

900 MHz

4.62 In Consultation 08/57, ComReg proposed that all new 900 MHz licences should have a minimum duration of 10 - 15 years and have a common termination date. Consultation 09/14 set out ComReg's revised proposal for 15 year terms for all new 900 MHz licences[78]. In Consultation 09/99, in light of DotEcon's Report (09/99c, Section 7) ComReg proposed that 900 MHz licences be issued in two temporal lots:

- the first temporal lot ("first time slice") would run from 2011 to 2015. Its commencement date would be based upon the expiry dates of the Vodafone and O2 900 MHz licences while its expiry date would be based upon the expiry date of Meteor's 900 MHz licence.
- the second temporal lot ("second time slice") would commence immediately after the first time slice and would run for 15 years, from 2015 to 2030.

900 MHz and 800 MHz

4.63 In Consultation 10/71, ComReg proposed including the 800 MHz band in a joint award with the 900 MHz band. ComReg noted what it considered to be the two most practical temporal lot options for such a joint award:

- two temporal lots mirroring the proposed time periods for 900 MHz lots; or
- one temporal lot spanning the time period from some common start date (early 2013was the envisaged start date) to the proposed final termination date of the 900 MHz licences (c. 2030).

4.64 ComReg formed the view that two temporal lots (mirroring the approach for the 900 MHz band) was the preferable option.

800 MHz, 900 MHz and 1800 MHz

4.65 In Consultation 10/105, ComReg proposed including the 1800 MHz band in its joint award of the 800 MHz and 900 MHz bands. Again, consideration of the temporal lot approach for the 1800 MHz band focused on two issues:

- whether there should be a common start date for all liberalised licences in the 800 MHz, 900 MHz and 1800 MHz bands; and
- whether there should be a "2 temporal lot" approach or a "3 temporal lot" approach for the 1800 MHz band.

[78] See Section 6.3.1.2 of Document 09/14

4.66 Having considered DotEcon's view and the submissions of respondents, ComReg formed the view that two temporal lots would provide the best means to achieve its statutory objectives:

- the first temporal lot ("first time slice") would run from 2013 to 2015. Its commencement date would be based upon the expiry dates of the (interim) Vodafone and O2 900 MHz licences while its expiry date would be based upon the expiry date of Meteor's 900 MHz licence.
- the second temporal lot ("second time slice") would commence immediately after the first time slice and would run from 2015 to 2030, resulting in licences of 15 years duration.

Key consultation questions

4.67 Question 11 of Consultation 10/71 asked: Do you agree with ComReg's proposal to use two temporal lots for the 800 MHz band and that these temporal lots should mirror the time periods of the 900 MHz band? There were ten responses, with respondents having diverging views on the proposal to use two temporal lots for the 800 MHz band.

4.68 Those who supported the proposal to use two temporal lots for the 800 MHz band were broadly of the view that it would allow bidders to pursue more refined bidding approaches in the auction, which would likely result in an efficient allocation of spectrum. Those who expressed conditional support did not provide any specific comments.

4.69 Objections included assertions that there is no justification for replicating the temporal lot approach for the 800 MHz band, as there are no existing mobile licences with differing termination dates in the band and the use of two temporal lots may lead to an increase in the number of potential transitions in the band which may in turn hamper the development of services.

4.70 Question 3 of Consultation 10/105 asked: Do you agree with ComReg's proposal to use two temporal lots as proposed for the sub-1GHz spectrum, namely early 2013 – 12th July 2015 and 13th July 2015 – 12th July 2030, in the joint award including the 1800 MHz band? There were three respondents who, to varying degrees, all supported the proposal.

4.71 Of note, Vodafone supported ComReg's proposal for a two temporal lot approach to the 1800 MHz band but also submitted its own proposal as to how the auction could be modified to address the timing issue arising from the different expiry dates of the existing GSM 1800 MHz licences by buying out the tail period of all existing GSM licences so that all would expire in early 2013. O2 supported ComReg's proposal to release the 800 MHz, 900 MHz and 1800 MHz in two temporal lots if it were to proceed with a single joint award.[79] It was of the view that three temporal lots would complicate the auction process unnecessarily.

[79] ComReg notes that O2's preference was for the 1800 MHz band to be released at a later date alongside the 2.6 GHz band, and potentially the 2.3 GHz band. This alternative spectrum release proposal is addressed in Annex 3 of this document.

DotEcon Commentary

4.72 DotEcon provided its views (in section 8 of 11/58) on:

- the two time-slice proposal;
- the single time-slice for the 800 MHz band; and
- the one time-slice for all bands with spectrum buy-out.

(a) Two time-slice proposal

4.73 DotEcon stated, in Section 8.2.1 of its Report (11/58), that common temporal lots are necessary in order to maintain substitutability between different bands in any auction: "To reap the full benefits of providing such flexibility, it is important to apply the same temporal lot structure across all substitutable bands. If time periods for different bands do not match up, this inhibits the ability of bidders to switch between bands, especially if there is a cap on the overall amount of spectrum they can hold at any one time."

4.74 DotEcon evaluated the relative merits of the two time-slice and three time-slice options and concluded that while the two time-slice option might require ComReg to consider issuing interim licences to ensure continuity of GSM services in certain circumstances, the three time-slice option would avoid the need for interim measures, but at the cost of substantially higher complexity in terms of bidding and the risk of increased re-tuning costs for one or more operators.

4.75 DotEcon noted that some respondents had objected to the whole award process or the temporal packaging in general but further noted that while upholding their general objections, it nonetheless preferred the two-time-slice option over the three-time-slice option. DotEcon considered that no respondent favoured the three time-slice option over the two time-slice option.

4.76 DotEcon concluded that the three time-slice option was unnecessarily complex and did not offer substantial advantages to justify its use. Noting that none of the respondents approved of this option DotEcon did not consider it further.

(b) Single time slice for the 800 MHz band

4.77 Some respondents to Consultations 10/71 and 10/105 argued that 800MHz spectrum should be awarded in a single temporal lot, as there are no existing licences in the 800MHz band. DotEcon recognised that offering spectrum in one time-slice, running from 2013-2030, would make bidding somewhat simpler in that part of the auction. However, DotEcon considered that this benefit is limited, as:

- by making package bids that include both time slices in the 800 MHz band a bidder can achieve the same result as would arise with a single time slice option; and
- if a bidder were to bid on spectrum in bands other than the 800MHz band, it would need to express its demand for these lots across the two proposed time slices anyway.

4.78 DotEcon considered that if the 800 MHz and 900 MHz bands are generally substitutable for one another (a point on which there is general agreement) then bidders would be significantly limited in the bids they could place for sub-1GHz spectrum if the single time slice model was pursued. DotEcon stated its view that, as a general principle, all substitutable bands should be provided using the same time-slices, if flexibility is to be maximized and the auction process is to be allowed explore the full range of potential outcomes.

4.79 DotEcon concludes that the two time slice option for the 800 MHz band is a better, lower risk option than a single time slice, as this approach would treat all bands similarly, maximize flexibility for bidders, and would avoid distortions to the auction outcome that might result from an asymmetric treatment of the bands.

(c) One time slice for all bands with spectrum buy-out

4.80 DotEcon considered Vodafone's proposed 'modified auction approach' and recognised that this could simplify the auction. However, DotEcon did not see any significant added benefits to the proposal, nor did it think that it could be achieved within a reasonable timescale.

4.81 While DotEcon noted Vodafone's assertion that there is no need for temporal lots when employing its modified option, DotEcon considered that the advantage of there being no temporal lots is very limited and should not be considered as a significant factor in deciding between alternative auction design proposals.[80]

4.82 In respect of Vodafone's statement that there is a need for 1800 MHz licences between December 2014 and July 2015, without its proposed modified approach, DotEcon considered that granting a 6-month licence does not represent such a *"significant complexity that existing operators would benefit greatly from avoiding"*.[81]

4.83 Vodafone claimed that its approach would remove the requirement for an early liberalisation option. DotEcon contested this, stating that overall it does *"not consider that the complexity of the auction process as a result of the early liberalisation option and associated two time slice proposal is significant, and we do not believe that the benefit of removing this complexity is sufficiently great as to merit the adjustment of the auction design as currently proposed"*[82]

4.84 DotEcon considered Vodafone's "buy-out" mechanism which would dispense with the need for time slices and allow one common time period for all licences. The benefit would be simplification of the auction design. However this approach could only work if existing licensees in the 900MHz and 1800MHz bands agreed to return their current spectrum holdings to ComReg, so that the returned spectrum could then be released as liberalised spectrum from 2013. This raised the question of whether such bidders could return (or reduce) their current spectrum holdings.

4.85 In considering this question, DotEcon noted that the existing GSM licensees are in very different situations. While Vodafone and O2 may be willing to accept the risks

[80] Section 8.2.3 of DotEcon Report Document 11/58
[81] Section 8.2.3 of DotEcon Report Document 11/58
[82] Section 8.2.3 of DotEcon Report Document 11/58

involved in selling their existing 1800MHz licences, Meteor is in a different position. In order to benefit from a simpler lot structure Meteor would have to sell or agree to ComReg "buying back" its 900MHz licences as well as its 1800MHz licences. Put simply, DotEcon considered that setting terms for a buy-back arrangement is problematic and if disputed it would lead to significant delay.

ComReg's proposal

4.86 Almost all respondents supported ComReg's proposal of two temporal lots, for both the 900 MHz and 1800 MHz bands, though Vodafone proposed its 'modified auction approach' while Qualcomm did not favour temporal lots in any form. Most respondents also supported ComReg's proposal of two temporal lots for the 800 MHz band, with those who did not support this proposal arguing that it was unnecessary as the 800 MHz band is not affected by incumbent licences.

4.87 ComReg agrees with DotEcon's view that Vodafone's proposed modified auction is not practical, given the different incentives of existing licensees, the necessity to obtain their consent, and the fact that it is unlikely that the approach could be implemented in the time available. In any event, ComReg does not consider that there are substantive benefits to such an approach, other than a simplification of the auction process while the added complexities of that process can be properly managed. ComReg therefore does not intend to adopt this approach.

4.88 Some respondents submitted that the use of temporal lots may lead to an increase in the number of potential transitions in the band which may in turn hamper the development of services. ComReg considers that the potential downside of having additional transitions is minor compared to the benefits of the temporal lot approach in the proposed auctions, which include increased bidder flexibility and switching possibilities.

4.89 In relation to the proposal to release the 800 MHz band in one temporal lot for the entire 2013-2030 period, ComReg notes that while it can be argued that this might simplify the auction of the 800 MHz band, its downsides are considerable. It would prevent bidders from pursuing refined strategies across the sub-1GHz spectrum bands if there are different valuations between the sub-1GHz bands across time slices. For example, a bidder may wish to obtain 900 MHz spectrum in the first time slice (to support GSM services) but may be indifferent between 900 MHz and 800 MHz spectrum in the second time slice (it might wish to obtain a contiguous 2 × 20 MHz spectrum block in either sub-1GHz band).

4.90 In addition, ComReg's notes and agrees with DotEcon's observation in Section 8.2.1 of its Report (11/58) that in a multi-band auction of substitutable and complementary spectrum it is important to apply the same temporal lot structure across all substitutable bands, in order to reap the full benefits of providing such flexibility. Additionally, ComReg notes that there are mechanisms within the auction for a bidder to obtain lots in both time slices, as a bidder can then submit a package bid across both time slices and therefore avoid situations where it might be required to incur additional transitional costs by winning spectrum in one time slice but not in the other.

4.91 In light of ComReg's statutory objectives, and having considered the views of respondents and the advice of DotEcon, ComReg remains of the view that it is

appropriate to apply a two temporal lot approach across all spectrum bands, in order to reap the full benefits of a simultaneous multi-band auction of substitutable and complementary spectrum. ComReg therefore proposes that the 800 MHz, 900 MHz and 1800 MHz bands would be awarded in two temporal lots, namely:

- **First time slice:** Subject to the 800 MHz band becoming available in the foreseen time period (i.e. once "analogue shut off" in the terrestrial television broadcasting sector is complete) the current intent is to commence on the first time slice on 1 February 2013 and the first time slice shall run until 12 July 2015; and
- **Second time slice:** The second time slice shall commence upon the expiration of the first time slice (13 July 2015) and shall run until 12 July 2030, a period of fifteen years.

4.92 On 12 July 2030, the end date of the second time slice, all 800 MHz, 900 MHz and 1800 MHz licences granted under the proposed joint auction shall expire and all spectrum rights of use granted thereunder shall cease to exist and such licences shall not be renewed or extended in the case of any licensee. ComReg, or its successors, reserves the right to administer the entire spectrum that shall be released upon that date, at its absolute discretion and subject to its statutory remit.

Full Assignment Round

Introduction

4.93 Throughout this consultation process, ComReg has expressed its preference for assigning spectrum in contiguous blocks as this contributes to the efficient use and effective management of spectrum. Contiguous blocks result in fewer co-ordination boundaries with neighbouring networks, which may give operators increased flexibility and allow them to use their spectrum more efficiently. Contiguous blocks also reduce the requirement for inter-operator co-ordination and reduce or remove the possibility of "stranded" and unused spectrum blocks. They can also ease interference management requirements for users of adjacent spectrum blocks. ComReg has recognised that the location of the existing assignments in the 900 MHz and 1800 MHz bands raise co-ordination and spectrum contiguity issues, which were discussed in the previous consultations.

4.94 Annex 6.4 sets out fuller details of ComReg's consideration of this issue, its consultants' reports and the submissions of respondents.

Background

4.95 In Consultation 09/99 ComReg indicated that the location of Meteor's current assignment in the 900 MHz band could impact upon the efficiency of the proposed auction and the subsequent use of certain liberalised 900 MHz blocks. ComReg stated that it might be appropriate to shift Meteor's assignment by 200 kHz. This would ensure homogeneity of all liberalised 900 MHz blocks in the proposed award. ComReg proposed compensatory measures for Meteor for any incurred costs arising from such a variation to its spectrum assignment.

4.96 In Consultation 10/105, ComReg proposed a joint award of the liberalised 800 MHz, 900 MHz and 1800 MHz spectrum bands. This required that ComReg reconsider location issues arising from current assignments in the 900 MHz and 1800 MHz bands. In doing so, ComReg noted that most respondents to question 8 of Consultation 09/99[83] had agreed with its analysis of the potential co-ordination issue in the 900 MHz band, resulting from Meteor's location in that band. Moreover, ComReg identified fragmentation and co-ordination issues caused by current GSM 1800 MHz assignments.

4.97 In light of these issues, ComReg considered two approaches - proposed by DotEcon - to ensure that the proposed release of liberalised 1800 MHz spectrum would result in contiguous spectrum assignments:

- approach 1 - "all or nothing" whereby partial liberalisation of existing GSM 1800 MHz assignments would not be permitted.
- approach 2 – "full assignment round" whereby every lot in the 1800 MHz band would be included in the assignment round of the proposed auction, including those lots currently occupied by existing licensees, irrespective of whether they availed of any early liberalisation option or not.

4.98 ComReg favoured Approach 2, "full assignment round", for the reasons set out in Annex 6.4. ComReg considered that overall the benefits of a full assignment round would likely outweigh any downsides. Most importantly, ComReg noted that the relocation costs involved in this approach would likely be incurred by licensees in any event. Accordingly, ComReg proposed to implement the full assignment round approach for the 1800 MHz band.

Proposed application of "full assignment round" approach to the 900 MHz band

4.99 Having identified the benefits of the full assignment round approach in the 1800 MHz band, ComReg proposed to apply this same approach to the 900 MHz band. ComReg noted that including the entire 900 MHz band in an assignment round would increase the number of potential spectrum assignment outcomes and would ensure that all successful bidders would be assigned contiguous spectrum. While this approach may require Meteor to relocate and incur relocation costs, it would appear reasonable to assume that Meteor would seek liberalised 900 MHz rights in the second time slice and, if successful, it is likely that some relocation cost would be incurred in any event. Therefore, adopting the full assignment approach in the 900 MHz band would, in effect, bring forward the relocation activities of Meteor to before the start date of the liberalised licences in the first time slice, as opposed to before the start date of the second time slice.

Estimated Relocation Costs

[83] Question 8 of Consultation 09/99 asked:
i) Do you agree that Meteor's continuing presence (within its current assignment of 892.7 – 899.9 MHz paired with 937.7 - 944.9 MHz) has the potential, depending on the auction outcome, to have a detrimental impact on future liberalised use of Block E or any other block in the 900 MHz band?
ii) Do you agree with ComReg's proposal that, if the circumstances justify it, Meteor's assignment should be adjusted post-auction?
iii) Are there any other issues which should be considered?

4.100 Before setting out its proposal for compensatory measures for relocation costs incurred by 900 MHz and 1800 MHz licensees, arising from its full assignment round proposal, ComReg set out its understanding of the likely relocation costs and considered the views of interested parties regarding its proposal, in Consultation 09/99, to move Meteor's existing GSM 900 MHz assignment by 200 kHz, if necessary.

4.101 ComReg noted that Red-M/Vilicom's report (Document 10/105b) estimated that the cost of relocating an existing GSM 1800 MHz assignment for a 'typically' sized Irish network would be in the order of €240,000, with the worst-case estimate of time required to carry out a full (as opposed to a partial) relocation to be in the order of 5 months. In the case of the 900 MHz band, Red-M/Vilicom in its previous report (Document 10/71c) estimated relocation costs for a typical network would be in the order of €500,000.

4.102 In relation to its earlier proposal to move Meteor's GSM 900 MHz assignment by 200 kHz, if necessary, ComReg received four responses. There was general support for the principle of providing fair and reasonable compensation in the event of a required relocation and it was generally considered that such compensation should be provided via the auction (by way of a discount on the auction fee) and should not be funded by other operators. Meteor accepted that retuning could be required and asserted that only it could provide an accurate estimate of the likely costs of such a retune (Meteor did provide its confidential estimate of such costs). Meteor also stated that while it could accept some retuning it could not accept a reduction in the quantum of its 900 MHz assignment nor a complete relocation to alternative 900 MHz spectrum blocks. Red-M/Vilicom considered that Meteor's confidential estimate appeared, ostensibly at least, to be a reasonable estimate of the actual cost of this scenario.

Full Assignment Round Proposal - Compensatory Measures for Required Relocation

4.103 In Consultation 10/105, ComReg summarised its proposal in respect of compensation for relocation. Compensation would be provided if a 900 MHz or 1800 MHz licensee incurs relocation costs as a result of the proposed "full assignment round" and these costs would not have been otherwise incurred as a result of the joint award. Such costs would need to be objectively justified, proportionate and independently verified.

4.104 ComReg also noted that, in certain circumstances, the full assignment round would not introduce any new relocation activities but would bring forward relocation activities to before the start date of the first time slice, in early 2013. Where an existing licensee acquired spectrum in the second time slice but did not opt for early liberalisation in the first time slice, ComReg considered that a required relocation by that licensee would not introduce new relocation costs as such costs would be incurred by the licensee in any event, just at a later date. ComReg stated that it was not minded to grant compensation in such circumstances. ComReg also indicated that compensation for relocation may be appropriate in other circumstances. For example, it would appear reasonable to compensate an existing GSM licensee which did not win spectrum in the second time slice and did not opt for early liberalisation in the first time slice, as such a licensee would likely incur costs which were objectively justified, proportionate and independently verified.

Respondent's views to Consultation 10/105

4.105 Question 7 in Consultation 10/105 asked: Do you consider it appropriate that ComReg would provide compensation to a GSM licensee, in either the 900 MHz or 1800 MHz band, for required relocation costs that otherwise would have been avoided?

4.106 All respondents, to the full assignment round proposals, agreed that there are important benefits to ensuring contiguous spectrum assignments for the first time slice and that some form of compensation should be offered to incumbent licensees for any incurred relocation costs. Three respondents agreed with ComReg that relocation costs are only appropriate where such costs are incurred as a direct result of the full assignment round, but not otherwise.

4.107 Meteor submitted that "compensation must be provided for the full cost of any, and all frequency relocations/adjustments required of existing licensees". Meteor further submitted that existing licence holders could be required to relocate their assignments and in doing so they would incur additional costs, and that such costs are not simply brought forward with no net loss as implied by ComReg in Consultation 10/105 since:

- future costs are subject to the time value of money. Bringing relocation costs forward by 2.5 years would effectively increase relocation costs by 22% in real terms;
- bidders may not gain the same spectrum in the second time slice in which case the full relocation cost is additional; and
- if bidders are required to incur any of the costs of relocation then they would need to devalue their primary bids by this amount. Bidders not faced with this additional cost would have a bidding advantage which would lead to an inefficient outcome at the end of main stage of the auction.

4.108 Some respondents provided views on how such relocation costs should be met and one respondent suggested that ComReg should appoint an independent expert to approve the level of appropriate costs that ComReg intends to provide.

Other relevant considerations - DotEcon's view

4.109 In Section 11.1 of its Report[84] DotEcon considered this issue in relation to both the 900 MHz and 1800 MHz bands, stating that spectrum would be allocated "on a 'generic' basis; that is, lots are linked to a band and a time slice, but not to specific frequencies within the given band. There is therefore a requirement for a process through which lots won are assigned to specific frequency blocks."

4.110 DotEcon considered that one of the benefits of a two-stage process, where the first stage is to allocate generic lots and the second stage is to assign specific frequencies, is that assignment options would be limited to those that allow contiguous assignment of frequencies

[84] DotEcon Report Document 11/58

4.111 In Document 10/105a, DotEcon identified one drawback to the full assignment round approach - in certain circumstances, existing licensees in a band could be assigned spectrum in another part of the band, unless they outbid others in order to maintain their current locations, thus incurring an additional cost. However DotEcon did not consider this drawback significant, as analysis by Vilicom/Red-M indicated that the costs of relocation would be small, relative to the costs of running a mobile network. DotEcon also stated that the proposed CCA format would allow bidders to bid for the same frequencies in the two time periods, and given the reasonable assumption that bidders will want to minimise relocation costs it is expected that where a bidder is to make a package bid it will be assigned the same spectrum for both time slices.

4.112 DotEcon thus recommended applying the "full assignment round" approach to both the 900 MHz and 1800 MHz bands in Document 10/105a. While noting that the benefits of ensuring a contiguous allocation of spectrum were likely to be smaller in the case of 900MHz spectrum, DotEcon considered that such benefits are nonetheless material and that there is a benefit to having a consistent approach across spectrum bands.

ComReg's position

4.113 ComReg, having assessed the various options and having taken into account the views of respondents to its consultations and of DotEcon, proposes to implement the "full assignment round", so that every lot in the 900 MHz and 1800 MHz band would be included in the assignment round of the proposed auction, including those lots currently occupied by existing licensees.

4.114 On the issue of compensation for relocation costs, ComReg notes Meteor's argument that a bidder (who is also an incumbent) may not acquire the same spectrum in the second time slice as it acquired in the first time slice, and that the spectrum that it acquires in the first time slice may not be the same spectrum which it currently holds. In such circumstances, the relocation costs incurred by the bidder would be additional. However, the current spectrum rights of use will not exist in the second time slice and therefore all bidders who win spectrum in the second time slice would have to relocate in any event. Hence they would not incur any additional costs but would just incur the same costs but at a slightly earlier time. Therefore, a full assignment round would not cause incumbent licensees to incur costs which they would not otherwise incur. ComReg therefore considers that it would not be objectively justified, proportionate or reasonable to compensate for relocation costs incurred as a result of an incumbent licensee acquiring a different spectrum assignment in the second time slice. Meteor also argued that future costs are subject to the time value of money. ComReg recognises that bringing forward relocation activities would result in a licensee incurring additional costs. However, as noted by Meteor itself, this would only apply when an existing GSM licensee chooses not to avail of early liberalisation. In such circumstances, ComReg considers that it would be inappropriate to compensate a licensee for relocation costs.

4.115 ComReg has identified circumstances where payment of compensation may be appropriate:

- Where an existing GSM licensee does not avail of early liberalisation in the first time slice and does not win spectrum in the second time slice. Here, it would be appropriate to compensate the licensee for relocation costs which it is forced to incur, as it cannot remain where it was until expiry of its existing licence.
- Where an existing GSM licensee does not avail of early liberalisation in the first time slice and wins spectrum in the second time slice. The licensee would be forced to bring forward its relocation which it otherwise could defer until the expiry of its existing licence. It would be appropriate to compensate the licensee for those aspects of the costs, which result from it having to relocate earlier than would otherwise be necessary. However, the licensee would not be compensated for the relocation costs themselves as these would have to be borne in any event. ComReg proposes that the calculation of any such time-value-of-money compensation should be:
  - Additionally it may be appropriate to take into consideration changes in the relocation costs for the time period between when these costs are actually incurred and when they would have been incurred in the future; and
  - pro-rata to the quantum of time involved. In this regard, ComReg notes that the quantum of time involved would vary per licence and would be:
    - approximately 2 years 5½ months for Meteor's existing 900 MHz and 1800 MHz spectrum rights (i.e. relocation activities would be brought forward from before 12 July 2015 to before 31 January 2013) and:
    - approximately 1 year 11 months for O2 and Vodafone's existing 1800 MHz spectrum rights (i.e. relocation activities would be brought forward from before 31 December 2014 to before 31 January 2013).

4.116 Finally, in Chapter 6 ComReg presents two spectrum assignment proposals that would reduce the possibility of bidders obtaining non-contiguous spectrum assignments.

Possibility of Interim GSM Rights of Use in the 1800 MHz band

4.117 This section deals with ComReg's proposal on the possibility of granting interim GSM rights of use in the 1800MHz band following the proposed joint award of 800 MHz, 900 MHz and 1800 MHz spectrum bands. The initial proposal set out in Consultation 10/105, together with responses and ComReg's analysis, are set out in Annex 6.5.

4.118 Currently there are three GSM licences in the 1800 MHz band, each of 15 years duration. Two of the licences, belonging to Vodafone and O2, expire on 31 December 2014. The third licence, belonging to Meteor, expires on 12 July 2015. This raises timing issues which are discussed below.

Background/Summary of ComReg's position as set out in previous consultations

4.119 To facilitate the inclusion of the 1800MHz band in the Joint Spectrum Award, ComReg proposed in Section 3.4 of Consultation 10/105 that the two temporal lot approach (initially proposed for the 800 MHz and 900 MHz bands in consultation 10/71) also be used for the 1800 MHz band. ComReg considered that this approach would allow bidders to switch more fluidly between all three bands during the auction, and it would avoid additional complexity arising from the introduction of a third temporal lot.

4.120 Using the same two temporal lot approach for the 1800 MHz band has the advantages set out above. However, this approach also raises timing issues due to the six and a half month period between the expiry of Vodafone and O2's current GSM 1800 MHz licences and the proposed commencement date of liberalised 1800 MHz licences in the second time slice (13 July 2015).

4.121 This timing difference only becomes an issue if Vodafone and/or O2 wish to continue to provide a GSM service during the six and a half month period and if Vodafone and/or O2:

- did not avail of the proposed 1800 MHz early liberalisation option (as set out in Section 3.7 of Consultation 10/105); and
- did not acquire sufficient liberalised spectrum in the first temporal lot in the Joint Spectrum Award to allow them to continue to provide a GSM service during the six and a half month period; and

4.122 ComReg also noted that no issues would arise from the timing difference if:

- Vodafone and O2 did not acquire liberalised rights of use in the 1800 MHz band in the second time slice; or
- Vodafone and O2 fully availed of the proposed early liberalisation option set out in Section 3.7 of that Consultation 10/105 (i.e. obtained 2× 15 MHz of liberalised 1800 MHz rights of use).

Views of Respondents / Updated Information

4.123 ComReg has considered the three responses to Question 4 of 10/105[85] (Vodafone, O2 and Eircom/Meteor) and the independent expert advice provided by DotEcon and Vilicom/Red-M.

ComReg's Position

4.124 First, ComReg acknowledges the positions expressed by both Vodafone[86] and O2[87] in relation to the potential impact of not having GSM 1800 MHz rights of use in the relevant temporal lot (where the auction produced a particular outcome) and that these respondents would like ComReg to make a decision on this issue prior to the auction, i.e. that ComReg will grant interim rights of use for the relevant period, should the auction produce this outcome.

[85] Question 4 of 10/105 - Do you agree with ComReg's approach in relation to the period between the expiry of Vodafone and O2's respective GSM 1800 MHz licences and the proposed commencement date of licences for the second "time slice" in the 1800 MHz band?
[86] The points raised by Vodafone are detailed in Annex 6.5.
[87] The points raised by O2 are detailed in Annex 6.5.

4.125 As stated in Section 3.5 of Consultation 10/105, and confirmed in the advice received from Vilicom/Red-M, the large number of variables concerned[88] makes it very difficult to ascertain in advance the probability that, Vodafone and/or O2 would, as a result of the auction, be placed in a position where they would seek the grant of interim GSM rights of use in the 1800 MHz band. Equally, at this remove, it is difficult to evaluate the consequences to Vodafone and/or O2 of not having such rights of use.

4.126 Given the inherent uncertainty caused by the results of the proposed auction not being known. It would be inappropriate for ComReg to commit to granting any future interim GSM 1800 MHz rights of use at this time.

4.127 However, ComReg will re-consider the matter once the outcome of the auction is known and significantly prior to expiry of the relevant GSM 1800 MHz licences. ComReg will, at that point, evaluate whether GSM 1800 MHz interim licences are reasonably required by Vodafone and/or O2 for the six and a half month in question period and ComReg will determine whether to grant such licences having regard to the salient facts at that time and to its statutory functions and objectives.

4.128 While ComReg identified a number of factors in Consultation 10/105 which would suggest that interim GSM 1800 MHz licences are unlikely to be required, certain respondents argued to the contrary and ComReg will take their views and any supporting material into account when making its final determination on this matter.

ComReg's Proposal

4.129 ComReg will consider whether to grant interim GSM 1800 MHz licences (of approximately six and a half month duration) following the proposed auction but significantly prior to licence expiry. ComReg shall grant such interim licences only where it is justified, reasonable and proportionate to do so, having regard to the salient facts at that time and its statutory functions and objectives.

Early Liberalisation Option

Summary of ComReg's proposals in previous consultations

4.130 In Consultation 08/57, ComReg noted that:

- a [then] draft EC Decision on the harmonisation of the 900 MHz and 1800 MHz frequency bands for terrestrial systems capable of providing pan-European electronic communications services in the Community had been approved by EC Radio Spectrum Committee (RSC) and was expected to be formally adopted by the European Commission[89]; and,
- there were a number of potential benefits associated with the liberalisation of the 900 MHz and 1800 MHz bands and that liberalisation of these bands has the potential to deliver improvements in the quality of new wireless technologies and applications to consumers,

[88] Set out in Section 2.5 of Document 10/105b

[89] See "RSCOM07-04 final", approved by RSC through a favourable Regulatory Opinion on 22 May 2007, http://ec.europa.eu/information_society/policy/ecomm/radio_spectrum/_document_storage/rsc/rsc20_public_docs/07_04%20final_900_1800.pdf

while also enabling operators to lower their investment and operating costs due to the use of more favourable spectrum.

4.131 In light of the potential benefits and the obligations that would arise from the draft EC Decision, once adopted, ComReg proposed that it would liberalise the existing GSM licences in the 900 MHz and 1800 MHz bands as soon as practicable after the EC Decision entered into force.

4.132 In Consultation 09/14, ComReg discussed liberalisation of the existing GSM licences, in light of updated information and views received in the response to Consultation 08/57, and ComReg noted that:

- the benefits of liberalisation were acknowledged and the principle of liberalisation was generally welcomed by the majority of the respondents to Consultation 08/57, and accordingly ComReg was further satisfied that its proposal to award all new licences in the 900 MHz band on a liberalised basis following an open and transparent process was the appropriate approach; and,
- there was an argument against ComReg's proposal in Consultation 08/57 to liberalise the licences as soon as practicable after the EC Decision enters into force, on the grounds that this could distort competition in the mobile market by conferring a significant advantage on the existing GSM licensees that would not be available to a non-GSM mobile operator.

4.133 Noting that the European Commission had recognised this issue of potential competitive distortion, ComReg was of the view that there was no requirement to liberalise the existing GSM licences, given the short term remaining on them.

4.134 Moreover, ComReg noted that legacy issues existed such that any operator benefits (and by extension any consumer benefits) that could be derived from liberalisation of the existing licences would be reduced, ComReg revised its liberalisation proposal accordingly, clarifying that existing GSM licences would not be liberalised while all new licences in the 900 MHz band would be granted on a liberalised basis.

4.135 In Consultation 09/99, following further consideration of this issue in light of respondents' submissions and DotEcon's analysis (Document 09/99c), ComReg stated that it saw merit in the inclusion of an early liberalisation option, in line with the methodology proposed by DotEcon. DotEcon considered that there would be little point in providing an early liberalisation option where GSM incumbents could relinquish existing 900 MHz GSM licences unconditionally prior to the auction, as this would create unacceptable business continuity risk. DotEcon instead proposed an auction design that would allow existing licence holders to relinquish their spectrum holdings, contingent on them winning liberalised spectrum back for the same time period.

4.136 DotEcon considered that there was also a need to create appropriate incentives for early liberalisation and to create a level-playing field between those "upgrading" their existing licences (from GSM to liberalised) and those buying new liberalised licences. DotEcon recommended that a rebate be given to an incumbent relinquishing its existing licence , and that the amount of the rebate would be based on the original purchase price of the licence and the remaining term of the licence, assuming some amortisation schedule.

4.137 ComReg saw merit in the early liberalisation option proposed by DotEcon and with a view to adopting this approach in the auction ComReg sought views from stakeholders, in particular with regard to the rebate that would apply.

4.138 In Consultation 10/71, ComReg proposed to release liberalised 800 MHz spectrum in a joint award with liberalised 900 MHz spectrum. As there are no existing GSM licences in the 800 MHz band the consultation did not discuss liberalisation of such licences or the "early liberalisation" option.

4.139 In Consultation 10/105, ComReg proposed including the 1800 MHz spectrum band in a joint award with the 800 MHz and 900 MHz bands and further discussed the early liberalisation option and the potential rebate for the residual licence period with regard to both the 900 MHz and 1800 MHz bands.

A. Early liberalisation option

4.140 In Document 10/105a, DotEcon noted that existing GSM licensees in the 900 MHz and 1800 MHz bands would have the option of acquiring liberalised usage rights for the remaining term of their licences. DotEcon considered a potential mechanism by which an existing GSM 1800 MHz licensee could obtain a liberalised 1800 MHz licence for some or all of its current 1800 MHz assignments, via a competitive award process.

4.141 In light of its statutory objectives and having considered the advice of DotEcon and responses to Consultation 09/99, ComReg formed the view that the early liberalisation option would provide a reasonable and proportionate means by which to achieve earliest liberalisation of the entire band in a manner that would minimise any distortion in competition. ComReg therefore proposed that the early liberalisation option should be provided for under the proposed auction, adding that the option should apply to the 900 MHz and 1800 MHz bands. ComReg sought views on this proposal.

B. Potential rebate for the residual licence period.

4.142 Having reviewed responses to Consultation 09/99, ComReg, in Consultation 10/105, noted that views were expressed for and against a rebate to Meteor. These views related only to Meteor as it is the only existing GSM licensee that might benefit from the early liberalisation option proposed for the 900 MHz band.

4.143 A number of respondents agreed with the rebate proposal, on the basis that the principle of a rebate is objective and justified, it is appropriate to base a rebate on the original purchase terms, and a rebate would incentivise early liberalisation.

4.144 On the other hand, some other respondents disagreed with the rebate proposal and their reasons included that:

- a rebate was not objectively justified or necessary in the context of the 900 MHz band to provide a rebate, as there are sufficient incentives for the incumbent to liberalise;
- a rebate offered an unfair advantage in the competition and could be considered a form of unlawful State aid; and

- a rebate would allow Meteor to obtain liberalised 900 MHz spectrum cheaper than other bidders in the auction.

4.145 For the reasons set out in Consultation 09/99, ComReg remained of the view that it would be appropriate to issue a rebate for the residual time remaining on a GSM licence if an operator was to opt for early liberalisation, and that this should apply to both 900 MHz and 1800 MHz GSM licensees.

4.146 Consultation 09/99 also set out ComReg view as to how the rebate should be calculated, i.e. that it should be based upon the original purchase price of the spectrum adjusted for inflation using the consumer price index taking into account the amount of spectrum being released and the remaining term of the licence.

Views of Respondents on ComReg's Early Liberalisation Option Proposal

4.147 Over the course of ComReg's previous consultations, ComReg notes that respondents were generally in favour of the application of a rebate (despite some opposition voiced by certain of the existing GSM operators) in respect of the residual term of a GSM licence and its calculation.

4.148 Respondents' various submissions on this issue are considered in greater detail in Annex 6.6

Eircom/Meteor's views on the calculation of the rebate

4.149 eircom/Meteor stated that ComReg's proposed methodology as set out in Consultation 10/105 did not appear to take account of its response to Question 3[90] of Consultation 09/99, and it therefore re-iterated its views on the matter and submitted further information, as follows:

- ComReg's proposed approach significantly understates the value of the spectrum to eircom Group and does not allow for a reasonable return on eircom Group's investment in spectrum. This is because the allowance for inflation converts nominal spectrum fees from 2000 into 2010 terms, but does not allow for the expected return on investment over the time period;
- there is a sound basis for arguing that operators have reasonable expectation of higher returns in the last two years of the licence compared with the earlier years of licence, therefore forgoing the final two years could result in greater loss than a pro rata calculation suggests;
- given the complexity and subjectivity of undertaking a full loss of profits calculation, eircom Group believes that it is reasonable to use the cost of capital as a proxy. Indexing with the cost of capital provides a conservative estimate of the impact on operators' loss of the final period of licence; and

4.150 eircom/Meteor stated that it believed that ComReg's proposed rebate approach:

[90] Question 3 of Consultation 09/99 asked: *"What factors should ComReg consider in calculating any such rebate?"*

- would under-compensate eircom Group (and other operators with licences subject to early liberalisation); and
- would be likely to adversely impact the efficiency of the auction process for 800 MHz, 900 MHz and 1800 MHz spectrum and the broader development of the mobile market.

DotEcon's view

4.151 In its latest report to ComReg, Document 11/58, DotEcon provide its views on the early liberalisation option for existing licence holders and the calculation of rebates.

4.152 DotEcon's view on the early liberalisation option is set out in Section 9.3 of its Report (11/58): "…our view on this issue is unchanged; that is, existing operators in the 900MHz and 1800MHz bands should be permitted to liberalise existing spectrum holdings, and where this option is taken up, receive a rebate based on purchase price and time remaining on the licences for the spectrum usage rights relinquished in return."

4.153 On the issue of rebates, DotEcon, in Section 9.4 of its Report (11/58), notes its understanding that ComReg proposes to adopt its proposal that the rebate for the residual term of a licence should be related to the original price of the licence.

4.154 DotEcon then provide a proposed approach which expresses as a proportion of the original 15-year licence price, the proportionate impact of the curtailment in year N terms.

4.155 DotEcon expressed the rebate in terms of the effect of a curtailment of a 15-year GSM licence. If an existing GSM licensee should win liberalised spectrum that will replace its GSM spectrum then its current GSM licence will terminate at some point earlier than its maximum 15-year term. DotEcon wished to determine how such curtailment of a GSM licence would affect its notional purchase price, at the time of the auction.

4.156 Having considered the various proposed methodologies for calculating the rebates (Section 9.4 of its Report), DotEcon sets out the rebates that would result from each of the proposed methodologies:

- DotEcon methodology:
  - €0.81m for the O2 and Vodafone 1800 MHz licences (Feb 2013 - Dec 2014)
  - €3.86m for the Meteor 900 MHz and 1800 MHz licences (Feb 2013 - Jun 2015)
- eircom/Meteor methodology:
  - €3.74m for the O2 and Vodafone 1800 MHz licences
  - €9.84m for the Meteor 900 MHz and 1800 MHz licences.
- ComReg methodology:
  - €1.23m for the O2 and Vodafone 1800 MHz licences
  - €3.42 for the Meteor 900 MHz and 1800 MHz licences.

4.157 DotEcon's conclusion in Section 9.4 of its Report (11/58) is as follows: "In conclusion, we consider that our methodology for calculating rebates most adequately reflects the terminal value of licences that might be relinquished within the auction in exchange for liberalised licences for the same time period … we recommend that either the approach laid out above be used to set rebates, or that ComReg maintain their existing proposals for the rebates. Meteor's proposal should not be adopted."

ComReg position

4.158 Over the course of previous consultations, respondents have submitted views on various aspects of ComReg's proposed early liberalisation option. This section considers these views under the following categories:

- the inclusion of an early liberalisation option for existing GSM licences in the proposed auction; and
- the application of a rebate in respect of the residual term of a GSM licence and its calculation.

The inclusion of an early liberalisation option for existing GSM licences in the proposed auction

4.159 In considering this issue, ComReg notes that, while respondents had differing views on various aspects of ComReg's proposal, all respondents generally supported the inclusion of an early liberalisation option in the proposed auction. A number of reasons in support of the early liberalisation option were provided by respondents and by DotEcon in its various reports. The reasons given included that the it would minimise any potential distortion of competition caused by an existing GSM licensee not having access to liberalised spectrum until its GSM licence expired, that it would assist in achieving early liberalisation of the 900 MHz and 1800 MHz bands, and that it would provide flexibility to GSM licensees so that they can determine how best to plan for the evolution of technology within their existing spectrum holdings.

4.160 ComReg notes that the above reasoning is in keeping with its previous proposals as set out in Consultation 09/99 and 10/105, and therefore believes that it is appropriate to include an early liberalisation option for both the 900 MHz and 1800 MHz bands in the proposed auction.

The application of a rebate in respect of the residual term of a GSM licence and its calculation.

4.161 Having considered the views expressed by respondents and having assessed its current proposals in light of its statutory functions and objectives, ComReg believes that its early liberalisation option and associated rebate proposals are in line with its relevant functions and objectives and are objectively justified, transparent, non-discriminatory and proportionate.

4.162 ComReg also accepts that the approach recommended by DotEcon in its report is also a valid approach. However, given that there is no material difference in the outcome, ComReg proposes to maintain its current approach.

4.163 In the absence of a compelling reason to adopt the alternative approach, ComReg proposes to:

- include an early liberalisation option for the 900 MHz and 1800 MHz bands in the proposed auction;
- apply a rebate in respect of the residual term of the existing GSM licence; and
- adopt a conservative approach to calculating the rebate in which the rebate will be based upon the original price paid for licence, adjusted by the proportion of licence foregone and then this amount adjusted for Euribor[91].

4.164 **Table 3** below presents ComReg's proposed rebate for each operator based upon the assumption that an operator is choosing to avail of the early liberalisation option for its full spectrum assignment. Rebates for the early liberalisation of partial spectrum assignments would be calculated on a pro-rata basis.

Table 3. ComReg's Proposed Rebate for an operator which avails of the early liberalisation option for its full spectrum assignment[92].

Operator	Spectrum Band, Assignment & Start Date	Original Access Fees paid	Proportion of Licence foregone	Proportion of Access fee foregone[93]	Adjustment for Euribor[94] (from start date of GSM licence [95])	Proposed Rebate
Vodafone	1800 MHz 2× 14.4 MHz Jan 2000	IR£5.69m	2 years/ 15 years	€963,308	42.7%	€1,374,640
O2	1800 MHz 2× 14.4 MHz Jan 2000	IR£5.686m	2 years/ 15 years	€962,631	42.7%	€1,373,674
Meteor	1800 MHz 2× 14.4 MHz July 2000	IR£7.5m	2.5 years/ 15 years	€1,587,173	43.8%	€2,282,354
Meteor	900 MHz 2× 7.2 MHz July 2000	IR£3.75m	2.5 years/ 15 years	€793,586	43.8%	€1,141,177

4.165 Finally it should be noted that:

- should a GSM licensee avail of the early liberalisation option and relinquish the residual part of its licence, the spectrum usage fees associated with the existing GSM licences will be adjusted to coincide with commencement date of the early liberalisation licence (i.e. they

[91] Euribor is used as a proxy for a reasonable rate of return had the money forgone been invested.
[92] The period of the rebate used in this table is for illustrative purposes only. Any actual rebate would be based on the actual number of days by which the original licence is curtailed.
[93] €1= IR£0.787564
[94] Based on the 12 month Euribor rate.
[95] This figure will be updated in due course to reflect the most recent data available at the time ComReg's rebate proposal is finalised.

would apply for the period up to 1st February 2013 subject to advanced commencement);

- any spectrum retained for GSM purposes will have to conform with the co-existence rules of the Decision 2009/766/EC and Decision 2011/251/EU and the GSM channel raster plan. This is discussed in further detail in Annex 6.4 (Full assignment Round) and Annex 8 (Licence Conditions).

Spectrum Fees (minimum prices and structure of payments)

Introduction

4.166 Over the course of consultations 09/99, 10/71, and 10/105, ComReg asked seven questions relating to the following:

- setting minimum prices for liberalised 800 MHz, 900 MHz and/or 1800 MHz spectrum;
- the benchmarking methodology, and the application of same by DotEcon, which would inform ComReg's minimum price proposals (including the relativity analysis in relation to the proposed minimum price for liberalised 1800 MHz spectrum);
- the structure of payments of licence fees for liberalised 800 MHz, 900 MHz and/or 1800 MHz spectrum, to include an upfront "spectrum access fee" ("SAF") and ongoing "spectrum usage fees" ("SUFs"), and the appropriate division of each total licence fee between these two types of payment; and
- the proposed deferred payment scheme for licence fees, including interest costs, and whether other approaches to mitigate any potential for auction disruption arising from the current financial and economic climate should be considered by ComReg.

4.167 Consultation responses reflect the evolving nature of the proposed award of liberalised rights of use of the 800 MHz, 900 MHz and/or 1800 MHz spectrum bands.

4.168 This section presents ComReg's proposals regarding minimum licence fees, including the appropriate benchmarking methodology, the appropriate payment structure, and the possibility of deferred payments. Annex 9 sets out in greater detail the background to these issues and how ComReg's position has evolved over the course of the consultation process, having had full regard to respondents' submissions and the views of DotEcon, its independent external consultant.

Background: Minimum prices and benchmark methodology, and application

4.169 A key consideration in designing an auction is determining whether a minimum price is required and, if so, at what level it should be set. A further key consideration is the appropriate methodology to support the minimum price determination. These matters were consulted upon and considered by ComReg in Consultations 09/99, 10/71 and 10/105.

4.170 In Section 13.2 of Consultation 09/99 ComReg set out its views as to whether a minimum price would be required and, if so, at what level it should be set. ComReg further stated therein, and subsequently revised in Consultations 10/71 and 10/105, some specific reasons for setting minimum price levels for the proposed auction, namely:

- to deter frivolous bidders without genuine business cases whose participation may prolong the auction process and waste resources;
- to ensure that the administrative cost of the auction process is recovered;
- to disincentivise and guard against uncompetitive auction outcomes, including those which could arise from anti-competitive collusive behaviour of potential bidders;
- not setting the minimum price so high that the risk of choking off efficient demand would be significant; and
- ensuring the efficient use of spectrum.

4.171 In addition, ComReg's approach to setting minimum prices was informed by its statutory functions and objectives, including the promotion of competition through encouraging the efficient use and ensuring the effective management of radio frequency spectrum. ComReg has consistently remained of the view that in order to achieve these objectives it is essential that rights of use of spectrum go to those who value them most. The proposed auction reflects this view and indeed similar approaches are becoming increasingly prevalent across Europe and worldwide (see Annex 11 on international updates)

4.172 DotEcon was asked to advise on possible methodologies for setting the minimum price. In undertaking this task, DotEcon had regard to ComReg's statutory functions and objectives including the requirement that the approach be proportionate and transparent.

4.173 ComReg concluded that a benchmarking exercise was preferable to other approaches and would best suit the circumstances surrounding the award of liberalised 900 MHz spectrum. DotEcon's initial benchmark exercise produced a conservative lower bound range of €16 to €34 million for 900 MHz spectrum.[96] As a result of developments which are set out in Consultation 10/71, DotEcon revised its benchmark exercise and produced a conservative lower bound range of €18 to €26 million for sub-1 GHz spectrum (i.e. 800/900 MHz spectrum).[97] As a result of the developments which are set out in Consultation 10/105, DotEcon conducted a relativity analysis in order to produce a range of minimum prices for 1800 MHz spectrum. DotEcon's range of conservative lower bound minimum prices for 1800 MHz was €8 to €18 million, given that the market value of 1800 MHz spectrum, compared against sub-1 GHz spectrum, is 45 to 60 % lower.[98]

4.174 ComReg tended towards the upper end of the minimum price ranges produced by DotEcon because of concerns relating to the likelihood of tacit collusion. Initially,

[96] See Section 10 in Document 09/99c for a discussion on the issues presented.
[97] See Document 10/71b.
[98] See Section 7 in Document 10/105a and in particular paragraph 220 therein for a discussion on the issues presented.

ComReg proposed that the minimum price for liberalised 900 MHz should be €30 million[99] per 2 × 5 MHz of lot. ComReg subsequently revised and lowered its proposal to €25 million per 2 × 5 MHz of lot for sub-1 GHz spectrum. ComReg also proposed that the level of the minimum price for liberalised 1800 MHz should be 50% that of sub-1 GHz spectrum.

Overview of respondents' views

4.175 In summary, none of the eight respondents to Consultation 09/99 opposed the notion of a minimum price in the auction, with six respondents accepting that some form of minimum price would likely be appropriate. However, in the main respondents were of the view that the level of ComReg's proposed minimum price was too high.[100]

4.176 There were conflicting views as to whether the proposed benchmarking exercise (and the application of a relativity exercise in the case of 1800 MHz spectrum) would be the most appropriate methodology for determining the minimum price. In ComReg's view, the substantive issues raised seem to be associated with the inputs used in the benchmarking exercise Respondents also sought clarity as to how ComReg selected its proposed level of minimum price from DotEcon's conservative lower bound range of the market value of the 800, 900 and 1800 MHz spectrum.

4.177 Respondents' principal concerns with the benchmarking exercise may be summarised as follows[101]:

- the dataset used by DotEcon includes auction results from the year 2000 onwards, and market expectations at that time would not reflect the current state of the Irish economy. Accordingly, the minimum price should be discounted by 50%;
- benchmarks would be unreliable as they depend on obtaining a sizeable sample of comparators of similar spectrum, sold with similar terms, in a similar market in a recent time;
- setting the minimum price at the sale price would inhibit the efficiency of the auction as a means to determine the market value of the spectrum;

[99] It was proposed that the minimum price of €30 million would be structured as follows: For a licence for a licence from 2011 to 2015 (4 years) the reserve price would be €6.3 million with SUFs of €1.8 million per annum for each 2 × 5 MHz lot of liberalised 900 MHz spectrum. And for a licence from 2015 to 2030 (15 years) the reserve price would be €10.2 million with SUFs of €1.8 million per annum for each 2 × 5 MHz lot of liberalised 900 MHz spectrum.

[100] For example, Digiweb was of the view that the minimum price should be €5 million. Vodafone was of the view that the minimum price should be *"€20 million per 2 × 5 MHz lot"*. O2 was of the view that the minimum price should be at the lower end of DotEcon's range (which, later, through its submission to Consultation 10/71, it stated that ComReg should have chosen a minimum price of *"€18 million per lot prior to revision"*). Eircom Group was of the view that a 50% discount should be applied to the range (€ 16.7 to 26.1 million so as to give a range of €8.4 to € 13 million per lot) and a minimum price at the bottom end of the range should be selected. These views together with other minimum price proposals received in responses to Consultations 09/99, 10/71 and 10/105 are assessed in Annex 9.

[101] Please see Annex 9 for further detail in relation to these main points and where other points raised by respondents are detailed.

- frivolous bidders would be outbid by serious bidders so there is no need to set the level so high in order to deter frivolous bidders;
- ComReg should reflect on its previous experience where it set the minimum price for licences in an auction for licences with rights of use to spectrum in the 26 GHz spectrum band;
- comparing spectrum values from awards between countries with different market sizes would be incorrect; and
- it was also asserted that the general value of spectrum is in decline.

4.178 Some respondents also queried the rationale for setting the minimum price at *"market value"*.

4.179 Views were also expressed that a more suitable benchmark for the minimum price would be minimum prices set by other National Regulatory Authorities or reserve prices set in other jurisdictions rather than the final prices achieved in those award processes.

Background: Structure of reserve prices and Spectrum Usage Fees ("SUFs")

4.180 Following the proposal to apply a benchmarking exercise in order to set a minimum price for liberalised 900 MHz spectrum, ComReg considered the possibility of structuring the minimum price into two parts - an upfront reserve payment (the "spectrum access fee", or "SAF") followed by ongoing annual payments ("spectrum usage fees", or "SUFs"). In Section 13.5 of Consultation 09/99, ComReg set about determining the portion of the minimum price which should constitute the upfront SAF and the portion which should be set aside as the annual SUF.

4.181 ComReg considered that SUFs should create sufficient incentive for licensees to make efficient use of spectrum and to hand back part or all of any spectrum holdings which they no longer have any use for. ComReg also stated that it would be seeking to set the SUFs not so high as to penalise those licensees who make efficient use of their spectrum holdings.

4.182 Having regard to the above, and to the views of DotEcon as set out in Section 12.2 of Document 09/99c, ComReg proposed a "50/50" division between the upfront SAF and annual SUFs[102]. ComReg considered that this should create incentives to release and return spectrum which is not being used.[103] ComReg further considered that SUFs should be annualised using a discount factor that reflects the cost of capital of a licensee.

4.183 ComReg's proposals in relation to the structure of the minimum price remained unchanged in Consultations 10/71 and 10/105, in the context of the proposed joint award of 800 MHz and 900 MHz bands and then in the context of also including the 1800 MHz band.

Overview of respondents' views

[102] The 50:50 split is on the basis of zero inflation.

[103] See also Section 14 of Document 11/58 for a discussion on DotEcon's current position in relation to structure of reserve prices and SUFs

4.184 Five respondents expressed a view on the above payment structure; three agreed with it and two did not. The three respondents who agreed with the proposal gave the following reasons:

- a reserve price higher than that necessary to deter frivolous bidders may be appropriate for the auction format that ComReg had proposed in Consultation 09/99;
- there could be merit in establishing reserve prices and SUF price levels at 50% present value of the minimum price and that a balance would need to be struck between discouraging frivolous or non-constructive speculative participation in an auction and facilitating near term investment in infrastructure development;
- the overall price should be divided between an annual fee and an upfront reserve, as this gives an on-going incentive to use any allocated spectrum;

4.185 Of the two respondents who opposed the proposal, one asserted that "high rates" for SUFs would be counter productive to delivering value to customers and that the application of high usage fees in order to provide spectrum release incentives would be unnecessary, while the other asserted that SUFs should only be charged in the first 3-5 years of the licences.

4.186 In the subsequent consultations (Consultations 10/71 and 10/105) respondents provided additional views, including views on possible alternative approaches to the structure of the SAF and SUFs.[104]

Background: Deferred payment scheme and interest costs

4.187 ComReg considered the matter of a deferred payment scheme and interest costs as set out in Section 13.6 of Consultation 09/99. That section set out several reasons as to why ComReg would consider providing an option for bidders to defer some of the auction payments, especially in the early stages of any new licence. These included that in the current economic climate it might be prudent to safeguard against unexpected financing problems which bidders may face. In addition, the high level of capital expenditure that would likely be faced by a bidder in the first several years of its licence (due to rolling out infrastructure, marketing expenses etc), if combined with substantial payments during this time, could be too burdensome for some potential bidders, such as new entrants.

4.188 The issue of the deferred payment scheme remained open for views and responses in the follow-up consultations, even though it was not explicitly raised again as a consultation issue.

Overview of respondents' views

4.189 Four responses were received to the deferred payment scheme proposal. Those who opposed the proposal argued that it could undermine ComReg's statutory objectives as regards the efficient use of spectrum, and it would increase the likelihood of bidders defaulting on their payment conditions.

[104] See Annex 9 for further discussion.

4.190 Those in favour of the proposal considered that it would be prudent to safeguard against potential financial constraints in the manner proposed, that it would help to strike a balance between payment of spectrum fees and necessary investment by operators, and that it would financially benefit the State (if the interest rate on deferral was set slightly above the Government debt rate). All four respondents were opposed to the proposed rate of interest of 12%, although there was some support for interest to be applied.

4.191 Respondents did not propose any other approaches for mitigating any auction disruption that may arise from the current economic climate.

ComReg's position

4.192 This section sets out ComReg's position having considered respondents' views and DotEcon's analysis as they relate to and address the matters raised. ComReg considers that a minimum price would be appropriate, for the following reasons:

- to deter frivolous bidders without genuine business cases whose participation my prolong the auction process and waste resources;
- to disincentivise and guard against uncompetitive auction outcomes, including that arising from anti-competitive collusive behaviour of potential bidders;
- encouraging efficient use and ensuring effective management of spectrum; and
- to ensure the administrative cost of the auction process is recovered.

4.193 As regards the methodology for setting the minimum price, ComReg considers that there are no compelling reasons to change its previously expressed preference to apply a benchmark exercise and a relativity analysis. This should yield a conservative lower bound estimate from which ComReg may choose a minimum price for liberalised 800 MHz, 900 MHz and 1800 MHz spectrum, while the auction format will assist bidders in determining the market value.

4.194 One respondent proposed that ComReg should update the benchmark to account for new data from recent spectrum awards. Interested parties will note that DotEcon, in this regard, has actively updated its datasets.[105] For practical and logistical purposes, however, and to ensure some predictability in relation to the level of the minimum price for potential bidders, once the Information Memorandum outlining the award is published it will be necessary to fix on the minimum prices that will be used in the award. This would be based on ComReg's assessment of the relevant benchmark report available to it at that time.

4.195 Having considered the views of respondents and the analysis by DotEcon, ComReg considers that that there should be a common minimum price for liberalised sub-1 GHz spectrum. The rationale for this view includes that a minimum price would not imply that liberalised 800 MHz spectrum and 900 MHz spectrum are of identical value, but would merely reflect the similarities of the two bands in terms of their propagation characteristics and their potential substitutability in the longer term. Further, while equipment availability timetables may differ at present, such

[105] See DotEcon Report Document 11/59

differences should be far less relevant in the longer term; the physical characteristics of the spectrum should determine its fundamental long-term value.

4.196 ComReg also proposes that the minimum price should be split between an SAF and annual SUFs on the basis of the discount rate chosen. This should help to ensure the efficient use of spectrum by incentivising licensees to return under-utilised spectrum holdings (as otherwise they shall be required to pay SUFs for such spectrum). ComReg also considers that the SUFs should be indexed to inflation.[106] Annual SUFs are a common feature of previous licences granted by ComReg and there are no compelling reasons why future licences for liberalised 800 MHz, 900 MHz and/or 1800 MHz spectrum should be an exception.

4.197 ComReg considers that there is a real risk that a deferred payment scheme could incentivise the participation of non-credible bidders, and that such a scheme is not consistent with the specific aims for the award of liberalised 800 MHz, 900 MHz and/or 1800 MHz spectrum. ComReg therefore proposes that it shall not implement such a scheme.

Level of the minimum price

4.198 In choosing an appropriate minimum price, ComReg must try to minimise the risk of tacit collusion or strategic behaviour (aimed at weakening competition in the auction) but without choking off demand for the spectrum. This is consistent with a key objective of the award which is to encourage the efficient and optimal use of newly released liberalised spectrum.

4.199 Respondents expressed views on whether there should be a minimum price, and what methodology should be used to set the minimum price. They also expressed views on the proposed methodology for selecting the level of the minimum price from the conservative lower bound benchmark ranges produced by DotEcon. There were no specific consultation questions on this issue.

4.200 ComReg's position on the level of the minimum price is informed by the views of respondents and DotEcon. DotEcon summarises its position in section 1.4 of document 11/59, as follows:

"a) It is still reasonable to treat 800MHz and 900MHz on a par for setting minimum prices provided these are set conservatively relative to central estimates of likely market value;

b) sub-1 GHz spectrum should have a minimum price for a 2 × 5 MHz block in the range €15m to €26m, with the entire range reflecting a likely lower bound estimate of market value for Ireland;

c.) 1800 MHz spectrum should have a minimum price at around 45% to 60% of that of sub-1 GHz spectrum (€6.75 to €15.6m), again assuming reasonably conservative minimum prices; and

[106] SUFs would be subject to a simple form of indexation reflecting the annual rate of inflation using the CPI published by the Central Statistics Office. Interested parties should also note that indexing the fees in this manner gives an incentive to trade spectrum, which might be useful if permitted in the future. Further as noted by DotEcon, indexing using CPI would be reasonable as operators' revenues are influenced by consumer inflation. See Section 14.3 of DotEcon Report 11/58.

d.) within this range, the primary consideration is trading off the suppression of incentives for strategic behaviour to weaken competition within the auction and the risk of choking off demand from serious bidders."

4.201 The auction format should not only promote competition but should also minimise the possibility of any form of tacit collusion amongst bidders. Since the outset, ComReg has been concerned about tacit collusion occurring, and expressed its concerns in Consultations 09/99, 10/71 and 10/105. While the proposals to auction the 800 MHz and 1800 MHz bands with the 900 MHz band may have reduced these concerns, ComReg remains of the view that collusion could occur, especially in respect of the 900 MHz band where a spectrum cap is proposed in the first time slice.

4.202 DotEcon has provided some considerations for choosing a minimum price, in particular, that "*the lower half of the range is likely to create a useful moderation of incentives for strategic behaviour whilst running very little risk of discouraging serious bidders with a chance of winning spectrum*".[107]

4.203 ComReg has previously tended towards the upper end of the ranges produced in the benchmarking exercise, due to its concerns in relation tacit collusion. ComReg proposes to apply the level of the minimum price in line with the recommendations of its advisor, having taken into account respondents' submissions and all other relevant circumstances.

4.204 ComReg accordingly proposes a minimum price of €20 million. This is below the midpoint of the range recommended by DotEcon in the updated benchmarking report (11/59). ComReg further proposes to select a minimum price for the 1800 MHz band at 50% of that of the sub-1 GHz bands. The reasons for this include the need to be consistent in setting minimum prices for both categories of spectrum on a conservative lower bound basis, the desirability of facilitating bidders to switch preferences between the bands over the course of the auction, and the relative value between bands as set out in the DotEcon Benchmarking Report.

4.205 In summary, ComReg proposes that the minimum price for licences with liberalised rights of use to 800 MHz, 900 MHz and 1800 MHz spectrum bands should be as follows[108]:

- For a licence from 2013 to 2015 (Temporal lot 1 circa 2.5 years)[109]
  - the reserve price would be €3.34 million with SUFs of €1.21 million per annum for each 2 × 5 MHz lot of liberalised rights of use in respect of 800 or 900 MHz spectrum;
  - the reserve price would be €1.67 million with SUFs of €0.60 million per annum for each 2 × 5 MHz lot of liberalised rights of use in respect of 1800 MHz spectrum; and

[107] See Section 4.4 in Document 11/59 for a discussion on considerations for choosing a minimum price.
[108] DotEcon's latest views on indexation of SUFs are set out in Section 14.3 of Document 11/58. Accordingly, and for reasons set out in Annex 9, ComReg intends to index SUFs based on changes to the Consumer Price Index ("CPI").
[109] Fee calculation based on licence commencing on 01/02/2013 to 31/07/2015.

- For a licence from 2015 to 2030 (Temporal lot 2 circa 15 years)
  - the reserve price would be €8.48 million with SUFs of €1.21 million per annum for each 2 × 5 MHz lot of liberalised rights of use in respect of 800 or 900 MHz spectrum;
  - the reserve price would be €4.24 million with SUFs of €0.60 million per annum for each 2 × 5 MHz lot of liberalised rights of use in respect of 1800 MHz spectrum.

4.206 For the avoidance of doubt, these figures represent in today's terms the minimum value for delivery in 2013 and 2015, licences for liberalised rights of use of the spectrum bands with durations of circa 2.5 and 15 years. Accordingly, the auction Information Memorandum will set out the figures so that they represent the minimum value at that date based on DotEcon's most up to date dataset.

Eligibility Points

Introduction

4.207 An activity rule is intended to discourage strategic behaviour by bidders and to promote simple, continual, meaningful bidding and thus price discovery.[110] They are commonly used in multi-round auction formats such as a simultaneous multiple-round ascending auction (SMRA) or a combinatorial clock auction (CCA).

4.208 An activity rule addresses strategic bidding by making the right of a bidder to continue bidding in future rounds of the auction contingent on the bidder's activity in any given round. A common method of monitoring a bidder's activity is to assign "eligibility points" to each lot category in the auction.

4.209 This section outlines respondents' views on the number of eligibility points to be assigned to blocks of spectrum in each band and ComReg's proposals on same. Annex 6.7 provides greater detail on this issue.

Background: System of eligibility points in an auction activity rule, and application

4.210 In Consultation 09/99 ComReg proposed an auction based upon a sealed bid format. In a sealed bid auction, bids are collected in a single round and hence activity rules between rounds and a system of eligibility points are not required. Consequently, the use of eligibility points was not discussed in Consultation 09/99.

4.211 In Consultation 10/71, ComReg proposed to release liberalised 800 MHz spectrum in a joint award with liberalised 900 MHz spectrum. In section 4 of that consultation, ComReg proposed the use of a combinatorial clock auction (CCA) format, instead of the sealed bid format proposed in Consultation 09/99. A CCA format involves multiple bidding rounds and hence the proposal to use this format brought the issue of activity rules and a system of eligibility points into consideration.[111]

[110] Harsha P and Barnhart C., "Strong Activity Rules for Iterative Combinatorial Auctions" www.eecs.harvard.edu/~hq/papers/HBPZ2009.pdf

[111] See Annex 6.2 for a discussion on the details of the award format.

4.212 In arriving at its proposal to use a CCA auction format, ComReg again considered the advice of its independent consultant DotEcon, set out in Document 10/71a. This report considered a number of detailed aspects of the proposed auction, including the lot categories, the ability to switch bids between lot categories, and the appropriate eligibility points ratio.

4.213 In Consultation 10/105, ComReg proposed including the 1800 MHz spectrum band in its joint award of the 800 MHz and 900 MHz bands. Section 3.9.1 of Consultation 10/105 discussed activity rules and eligibility points and stated that:

"In order to provide incentives for bidders to reveal information about their valuation through their bidding behaviour (which is the main reason for adopting an open auction format),

....ComReg believes that the simplest way to implement these eligibility weights across the spectrum bands is to assign twice as many eligibility points to the sub-1GHz lots as compared to lots in the 1800 MHz band, as depicted in Table 3 below."

Band	Number of eligibility points for a 2×5MHz lot
800 MHz band	2
900 MHz band	2
1800 MHz band	1

Table 4. Table 3 of Consultation 10/105: The proposed eligibility points for a 2× 5 MHz lot

4.214 ComReg thus proposed to assign twice as many eligibility points to the sub-1 GHz lots as compared to lots in the 1800 MHz band, and invited views from interested parties on above proposal.

Overview of respondents' views

4.215 There were three respondents to Q11 of Consultation 10/105[112]. All three supported the use of eligibility points though varying views were submitted in relation to the number of eligibility points to assign to lots in each spectrum band, with one respondent noting that in other auctions ratios from 1:1 to 1:3 had been used.

ComReg's position

4.216 The principle of constraining bidding flexibility through the use of activity rules has been supported by all three respondents. In relation to the number of eligibility points to be assigned to each spectrum band, O2 supported the setting of an equal eligibility ratio between 800 MHz and 900 MHz lots while no other respondent commented on the appropriateness of the proposed 2:2:1 ratio. However respondents did provide general comments on factors to consider in setting the eligibility points per spectrum band.

4.217 The value of the different spectrum bands was commented on by all respondents, with Vodafone emphasising that the appropriate value of the spectrum bands would

[112] Question 11 of Document 10/105 asked: *"Do you agree with ComReg's proposal to set a 2:1 ratio in relation to the eligibility points awarded to lots in the sub-1GHz and 1800 MHz bands, whereby twice as many eligibility points would be awarded for sub-1GHz lots as for lots in the 1800 MHz band? Please provide reasons for your view."*

be determined by the auction and could not be inferred from the minimum price or eligibility ratio. ComReg is also of the view that the value of the spectrum bands will be determined by the auction, and for this reason the proposed minimum price per lot shall be set on a conservative lower bound basis (see Annex 9).

4.218 eircom Group suggested that the eligibility ratio between the sub-1GHz bands and the 1800 MHz band should reflect the underlying spectrum values. O2 asserted that *"it would not be possible to comment on whether 2:1 is the correct ratio until the auction process, minimum prices, and activity rules were further clarified"*. On this point, O2 acknowledged that the eligibility ratio need not precisely correspond to the valuation ratio and various differing eligibility weights (3:1, 2:1 and 1:1) have been applied in other countries.

4.219 The benchmarking study of DotEcon (ComReg 11/59) considered the valuation of each of the spectrum bands in the proposed auction and concludes that it is reasonable to treat 800 MHz and 900 MHz on a par for setting minimum prices, while the 1800 MHz band should have a minimum price setting of 45-60% of that of the sub-1Ghz spectrum. This benchmarking exercise suggests that a 2:2:1 eligibility point ratio would be a reasonable reflection of the value of the spectrum in each of the three bands.

4.220 In light of its statutory objectives and having taken into account the views of respondents and the advice of DotEcon, ComReg maintains the view that bidders should be allowed to switch their bidding demand between spectrum bands in the proposed auction. To mitigate against strategic behaviour, ComReg proposes to apply an auction activity rule through a system of eligibility points. ComReg considers it unnecessary to set eligibility points that exactly reflect the relative values of spectrum in each of the different bands. In relation to the number of eligibility points to be assigned to each spectrum band, ComReg proposes a 2:2:1 ratio whereby twice as many eligibility points would be assigned to the 800 MHz and 900 MHz lots as against the 1800 MHz lot category.

4.221 ComReg maintains its view that eligibility points will not be transferable between time slices, i.e. a bidder would not be able to increase its eligibility in one time slice as a result of reducing its bidding activity in the other time slice.

4.222 Additionally, ComReg notes that the forthcoming draft Information Memorandum associated with the proposed auction will set out further detail on the activity rules, auction processes etc.

Chapter 5

Licence Conditions

Introduction

5.1 This Chapter sets out ComReg's preliminary conclusions in relation to the following details of the proposed Licence Conditions:

- technology and service neutrality;
- adjacent spectrum bands and existing users in the band;
- proposed technical conditions;
- terminal station proposals;
- coverage;
- quality of service ("QoS");
- miscellaneous licence conditions;

5.2 ComReg is no longer proposing to include licence conditions in relation to international roaming, billing obligations (being addressed as a separate process), non-ionising radiation and access to the emergency services as these matters are already or will be provided for by the General Authorisation.

5.3 Regarding ComReg's proposal to attach a condition stating that ComReg would review the QoS obligation during the lifetime of the licence, Regulation 15 of the Authorisation Regulations makes provision for amendments to the conditions attached to rights of use for radio frequencies and as such ComReg no longer considers such a condition necessary.

5.4 In Consultation 09/99 ComReg sought the views of respondents on whether or not it should impose a broadband QoS obligation. Having considered this further ComReg is of the view that imposing minimum broadband speeds could prevent operators from offering a low cost, low speed option and could therefore lead to a reduced choice for consumers. This would particularly affect those consumers for whom speed is not a priority. Therefore, ComReg has not pursued this proposal any further.

5.5 The following Sections provide a summary of the principal issues considered followed by ComReg's preliminary conclusions on same. ComReg welcomes and appreciates the views from interested parties on the above. ComReg notes that respondents' views reflect the evolving nature of the proposed award of liberalised rights of use to 800, 900 and/or 1800 MHz spectrum bands and all non-confidential versions of respondents' submissions have been published on ComReg's website.[113]

5.6 Readers are referred to the particular annexes that relate to each section, as these include additional detail on:

[113] For a full listing of all relevant material see http://www.comreg.ie/radio_spectrum/gsm_band_liberalisation__and_800_mhz_spectrum.713.html

- Respondents' views;
- ComReg's analysis and assessment of interested parties' views and
- DotEcon's recommendations.

5.7 Certain matters set out in the annexes are repeated in brief here and the analysis set out in the annexes represents ComReg's definitive and reasoned view.

Technology and Service Neutrality

5.8 Throughout this consultation process, ComReg has stated that it intends to apply a technology and service neutral approach to all new licences issued in each of the spectrum bands, in line with the relevant EC Decisions[114]. In light of the views received and any recent developments, the following sections summarise ComReg's technology and service neutrality proposal for each spectrum band in the proposed award.

5.9 In section 15.4 of Consultation 09/99, ComReg proposed that it was not necessary to mandate a particular technology or service in the 900 MHz band. This proposal was supported by all respondents to Consultation 09/99. The same proposal was made in respect of the 800 MHz band (see section 4.6.2 of Consultation 10/71) and the 1800 MHz band (see section 3.10.2 of Consultation 10/105). Respondents to these consultations also supported this approach.

5.10 However, in order to minimise the potential for disruption to consumer services, ComReg proposes to require licensees give six months' notice of its intention to terminate the provision of services using one technology, which the licensee intends to provide with another technology in all bands in which spectrum is being awarded. For example, replacing a GSM-based service to UMTS.

The 900 MHz and 1800 MHz bands

5.11 Pursuant to Articles 4 and 5 of Decision 2009/766/EC[115] Member States must make these bands available for systems listed in the Annex to the Decision and are allowed to make these bands available for other terrestrial systems not listed in the Annex to the Decision, provided such terrestrial systems can co-exist with the listed technologies.

5.12 Decision 2011/251/EU[116] amended Decision 2009/766/EC by replacing the Annex thereto and thereby permitted LTE and WiMax systems in these bands alongside GSM and UMTS.

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[114] This issue was discussed in, amongst other places, section 7.4 of Consultation 08/57, section 6.1 of Consultation 09/14, section 15.4 of Consultation 09/99, section 4.6.2 of Consultation 10/71 and section 3.10.2 of Consultation 10/105.

[115] EC Decision 2009/766/EC of 16 October 2009 on the harmonisation of the 900 MHz and 1800 MHz frequency bands for terrestrial systems capable of providing pan-European electronic communications services in the Community

[116] EC Decision 2011/251/EU 18 April 2011, amending Decision 2009/766/EC on the harmonisation of the 900 MHz and 1800 MHz frequency bands for terrestrial systems capable of providing pan-European electronic communications services in the Community

5.13 As discussed in previous consultations, and in particular section 6.1 of Consultation 09/14 and section 3.10.2 of Consultation 10/105, ComReg proposes to make these bands available for all technologies listed in the Annex to Decision 2009/766/EC (as amended) and will consider submissions from operators interested in deploying other technologies which they can show can co-exist with the listed technologies.

The 800 MHz band

5.14 For the 800 MHz band, EC Decision 2010/267/EU[117] and the Annex thereto set out the technical parameters that are to be applied in the 800 MHz band in the form of frequency arrangements and a Block Edge Mask (BEM).

5.15 ComReg sets out below its revised technical conditions for the 800 MHz band and these are fully compatible with the parameters set out in the Annex to Decision 2010/267/EU.

5.16 As stated in section 4.6.2 of Consultation 10/71, ComReg proposes to make the 800 MHz band available for any terrestrial systems that are capable of providing ECS in compliance with the technical parameters for the 800 MHz band as set out below.

5.17 As with the 900 MHz and the 1800MHz bands, ComReg remains of the view that it is neither necessary nor appropriate to mandate the provision of a particular service or technology in the 800MHz band.

Adjacent Spectrum Bands and Existing Users in the Band

5.18 In order to assist potential licensees in understanding the 800 MHz, 900 MHz and 1800 MHz spectrum bands in Ireland, this section summarises the adjacent spectrum bands and existing users in those bands.

5.19 A number of studies have been carried out by CEPT on the sharing and compatibility of Electronic Communications Services (ECS) in the 800 MHz, 900 MHz and 1800 MHz and systems in the adjacent bands. These studies and associated mitigation requirements to avoid harmful interference are detailed in Annex 8.

The 800 MHz band and adjacent spectrum bands

5.20 As shown in Figure 3 below, there are a number of spectrum bands adjacent to the 800 MHz band.

[117] EC Decision 2010/267/EU Commission Decision of 6 May 2010 on harmonised technical conditions of use in the 790-862 MHz frequency band for terrestrial systems capable of providing electronic communications services in the European Union

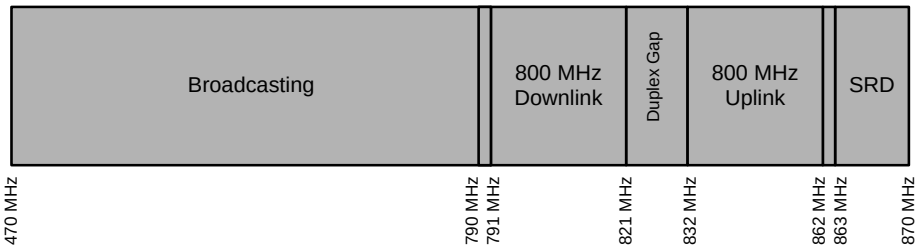

Figure 3. The 800MHz band and adjacent spectrum bands.

5.21 In summary, the mitigation requirements in the 800 MHz band are as follows:

5.22 Broadcasting:

- CEPT Report 30[118] considered the two most likely interference scenarios between electronic communications networks operating in the 790 – 862 MHz band and terrestrial broadcasting services in the adjacent band. The outcome of these studies was the development of technical conditions and a "block edge mask" ("BEM") for electronic communications networks. These technical conditions and BEM were subsequently adopted by the European Commission for inclusion in the 800 MHz Decision.

5.23 800 MHz Duplex gap:

- ComReg intends to require any PMSE users to comply with ECC Decision 09(03), including any amendments to this Decision. No further mitigation is considered necessary.
- Short Range Devices (SRDs): Due to the combination of frequency separation and very low transmit powers SRDs in the band 863 – 870 MHz are unlikely to cause interference in the 800 MHz band.[119]

The 900 MHz band and adjacent spectrum bands

5.24 As shown in Figure 4 below, there are a number of spectrum bands adjacent to the 900 MHz band with active services.

[118] Report from CEPT to the European Commission in response to the Mandate on the identification of common and minimal (least restrictive) technical conditions for 790 – 862 MHz for digital dividend in the European Union.
[119] It should be noted that in general Short Range Devices operate on a non-interference, non-protected basis.

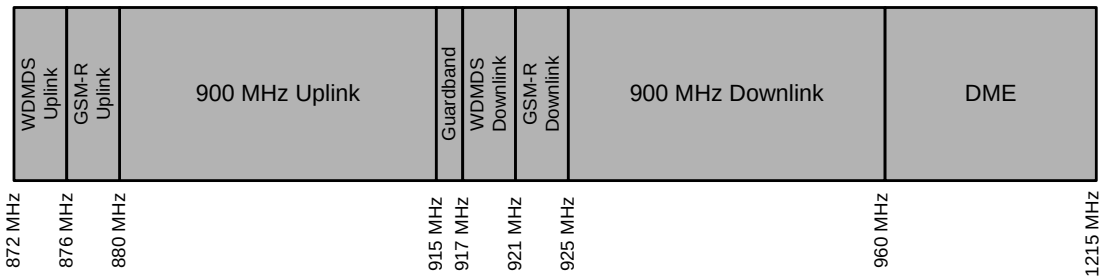

Figure 4. The 900 MHz band and adjacent spectrum bands.

5.25 In summary the mitigation requirements in the 900MHz band are as follows:

5.26 GSM-Railway (GSM-R):

- ComReg will implement a 300 kHz guard band in the GSM-R spectrum to ensure that the required carrier separation is achieved between the respective services.

5.27 Wide Band Digital Mobile Data Systems (WDMDS):

- there is currently a 2 MHz guard band in place separating existing GSM services from WDMDS services.

5.28 Aeronautical Distance Measuring Equipment (DME);

- no interference is expected from UMTS base stations into DME airborne receivers above 972 MHz.

5.29 Mobile Communications services on vessels (MCV services):

- MCV systems facilitate the use of mobile communications on board ships using the same frequencies as the land-based systems. Such systems may only operate on a non-interference and non-protected basis. Provided that the conditions set out in the relevant ECC[120] and CEPT[121] reports are complied with there should not be any interference to land based GSM and UMTS networks operating in the 900 MHz or 1800 MHz frequency bands.

The 1800 MHz band and adjacent spectrum bands

5.30 As shown in the Figure 5 below, there are a number of spectrum bands adjacent to the 1800 MHz band.

[120] See ECC Report 122 on the Compatibility between GSM Use Onboard Vessels and Land-based Networks, Vilnius, September 2008.
[121] See CEPT Report 28 "Report from CEPT to the European Commission in response to the Mandate "Mobile Communication Services on Vessels (MCV)".

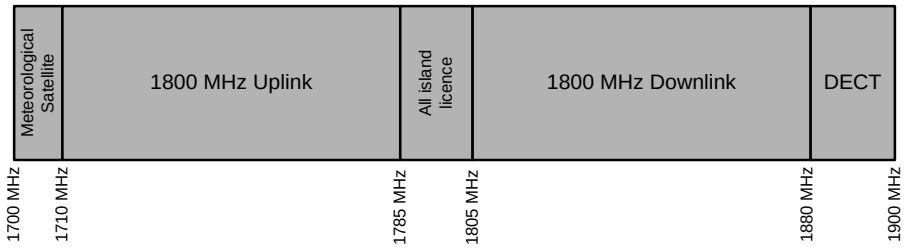

Figure 5. The 1800 MHz band and adjacent spectrum bands.

5.31 In summary the mitigation requirements in the 1800MHz band are as follows:

5.32 Meteorological Satellite (METSAT) and Digital Enhanced Cordless Telecommunications (DECT):

- these systems have been studied in ECC Report 96 and CEPT Report 41. No further mitigation other than that set out in these reports is considered necessary.

5.33 The 1785 – 1805 MHz Wireless Access Platform for Electronic Communications Services Licence ("All Island Licence");

- a number of technical conditions were placed on the "All Island Licence" to ensure compatibility with existing GSM 1800 deployments in the adjacent band. No further mitigation is considered necessary.

5.34 Mobile communication services on aircraft (MCA services);

- MCA systems facilitate the use of mobile communications on board aircraft using the same frequencies as the land-based systems. Such systems may only operate on a non-interference and non-protected basis. Provided that the conditions set out in the relevant ECC and CEPT reports[122] and Exemption Order[123] are complied with, there should not be any interference to land based GSM and UMTS networks operating in the 900 MHz or 1800 MHz frequency bands. ComReg will address any such incident of interference if and when any such incident arises and in accordance with its standing procedures.

Proposed Technical Conditions

5.35 This section summarises the technical conditions that ComReg proposes for future licences in any or all of the 800 MHz, 900 MHz and 1800 MHz bands. The proposed conditions are in line with Decision 2010/267/EU (800 MHz band) Decision 2009/766/EC (900 MHz band) and Decision 2011/251/EU (1800 MHz band).

[122] See: ECC Report 93 - Compatibility Between GSM Equipment On Board Aircraft and Terrestrial Networks, Revised Nicosia, May 2008; CEPT Report 16 - Report from CEPT to the European Commission in response to the EC Mandate on Mobile Communication Services On Board Aircraft (MCA)

[123] Wireless Telegraphy Act 1926 (Section 3) (Exemption of Apparatus for Mobile Communications Services on Aircraft) Order 2008, S.I. No. 178 of 2008, http://www.comreg.ie/_fileupload/publications/ComRegSI178of2008.pdf

The 800 MHz band

5.36 In line with Decision 2010/267/EU124 and in accordance with ComReg's statutory objectives and in particular its mandate to encourage the efficient use and ensure the effective management radio spectrum, and noting provisions under the Wireless Technology Act 1926 relating to harmful interference, ComReg is proposing to include the following technical conditions in any new licences issued in the 800 MHz band. As discussed in Annex 8 and shown in Figure 6 below, ComReg is proposing that the 800 MHz band will be assigned on a FDD duplex mode arrangement in 2× 5 MHz block sizes.

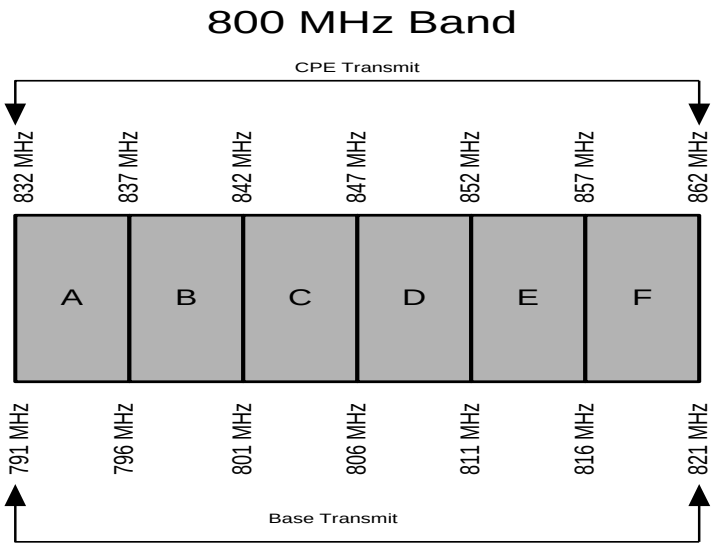

Figure 6. The 800 MHz band plan

Block Edge Mask

5.37 ComReg notes that all respondents approve of the proposal to impose block edge masks on licences in the 800 MHz band in the State. ComReg further notes that Member States that make the 800 MHz band available for ECS must do so in compliance with the parameters set out in the Annex to Decision 2010/267/EU.

5.38 ComReg proposes to impose the BEM technical parameters as provided for in the 800 MHz Decision on all licences issued in the 800 MHz. Details of these technical conditions are set out in Annex 8.

5.39 The 800 MHz EC Decision sets out three sets of base line requirements (cases A, B and C) for frequencies in the 470 – 790 MHz band. As Digital Television Terrestrial (DTT) services are deployed in the 470 – 790 MHz broadcasting band and it is a protected band, ComReg is proposing to implement Case A, as detailed in Annex 8, for all terrestrial systems operating in the 800 MHz band.

5.40 ComReg has also considered the issue of whether additional measures are required to achieve co-existence between ECS in the 800 MHz band and DTT broadcasting in the adjacent channels. As discussed in Annex 10, ComReg is not proposing any

[124] EC Decision 2010/267/EU Commission Decision of 6 May 2010 on harmonised technical conditions of use in the 790-862 MHz frequency band for terrestrial systems capable of providing electronic communications services in the European Union

further technical restrictions in future 800 MHz licences other than those detailed in that Annex[125].

The 900 MHz and 1800 MHz bands

5.41 ComReg is proposing to include the following technical conditions in future licences issued in the 900 MHz and/or 1800 MHz bands. As discussed in Annex 5 and as shown in Figure 7 and Figure 8 below, ComReg is proposing that the 900 MHz band and the 1800 MHz band will be assigned on a FDD duplex mode arrangement in 2× 5 MHz block sizes.

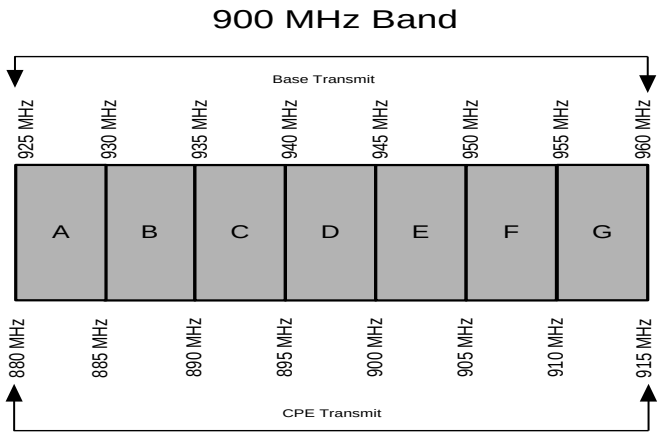

Figure 7. The 900 MHz band plan

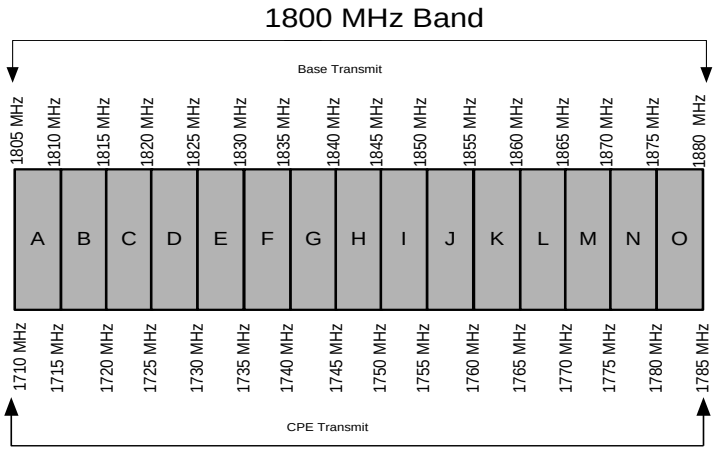

Figure 8. The 1800 MHz band plan.

Co-existence of GSM with UMTS/LTE/WiMAX

5.42 This section provides a summary of these proposals the details of which are contained in Annex 8.

[125] See Annex 10, sub-chapter entitled 'ComReg Assessment and Proposals on Measures to Facilitate the Coexistence of Services in the 800 MHz Band and the Broadcasting Service below 790 MHz'.

5.43 ComReg considers that each new licensee in the 900 MHz and 1800 MHz band will be responsible for the management of their interference within their spectrum assignments, and no guard bands will be set aside by ComReg.

5.44 The annex to Decision 2011/251/EU sets out the technical conditions necessary to ensure co-existence between the terrestrial systems permitted to be deployed within the band. These technical conditions are set out in Annex 8. Future licensees will be obliged to meet these co-existence conditions, unless otherwise agreed in bilateral or multilateral agreements between neighbouring networks.

5.45 There are three compatibility scenarios regarding neighbouring networks in the 900 MHz band:

- GSM adjacent to GSM
- UMTS/LTE/WiMAX adjacent to UMTS/LTE/WiMAX
- GSM adjacent to UMTS/LTE/WiMAX

1. GSM adjacent to GSM

5.46 In this instance, ComReg considers that the neighbouring GSM operators should share the guard band responsibility equally.

2. UMTS/LTE/WiMAX adjacent to UMTS/LTE/WiMAX

5.47 In this scenario ComReg considers that the neighbouring UMTS/LTE/WiMAX operators should equally share the co-existence responsibility

3. GSM adjacent to UMTS/LTE/WiMAX

5.48 Two scenarios were identified:

- Scenario A: These separation requirements assume no coordination between adjacent operators to reduce the need for a guard block between adjacent GSM and UMTS/LTE/WiMAX operator. Furthermore, CEPT Report 40, referenced in Commission Decision 2011/251/EU, recommends that when LTE/WiMAX networks in 900/1800 MHz band and GSM900/1800 networks are in uncoordinated operation, the recommended frequency separation between the LTE/WiMAX channel edge and the nearest GSM carrier's channel edge is 200 kHz or more;
- Scenario B: When LTE/WiMAX networks in 900/1800 MHz band and GSM900/1800 networks are in coordinated operation (co-located sites), no frequency separation is required between the LTE/WiMAX channel edge and the nearest GSM carrier's channel edge

5.49 Scenario A, where prospective networks are not coordinated, presents the question of who should bear this guard band. ComReg's preference would be for neighbouring operators to agree upon the guard band requirements between them. ComReg's further consideration of the issue is set out in detail in Annex 8 and summarised below.

5.50 In ComReg Document 09/99c, DotEcon considered two options to address this issue:

- Option 1: the guard band obligation falls on the GSM operator, or
- Option 2: the guard band obligation falls on the UMTS operator.

5.51 In considering this issue, DotEcon noted that:

- Under Option 1, where responsibility for providing the guard blocks falls on the GSM operator, the impact of failing to agree coordination measures with neighbours is typically limited to the loss of one GSM channel (200 kHz) or, in the worst case, two channels if the GSM frequency assignment is sandwiched between two UMTS/LTE/WiMAX neighbouring users. Therefore, the impact on licence valuation of GSM users needing to coordinate with neighbours is small.
- Under Option 2, where responsibility for providing the guard blocks falls on UMTS operators, the amount of usable spectrum for UMTS only operators varies dramatically depending on the technology deployed by neighbours.

5.52 Given the above, DotEcon recommended that ComReg clarify its view on this guard band issue and noted the following reasons for adopting Option 1:

- it would allow UMTS use to the edges of a 2×5 MHz block;
- it would allow GSM use in the entirety of a licensee's frequency allocation on similar terms to current GSM licences, except for within 200 kHz of the boundaries of the allocation;
- within 200 kHz of the boundary of a frequency allocation, GSM use would be possible only with the agreement of the neighbouring user;
- any other technology allowed by the EC Decision would have to allow neighbouring users to deploy UMTS across their entire frequency allocation and GSM to within 200 kHz of the boundary of their allocation.

5.53 ComReg notes the advice of DotEcon and proposes to include a condition that would require the GSM operator to meet the guard band obligation as set down in Decision 2009/766/EC and Decision 2011/251/EU.

Compliance with International MOUs on the 800 MHz, 900 MHz and 1800 MHz bands

5.54 ComReg and the UK Regulator, Ofcom, have signed a number of Memoranda of Understanding ("MoU") in relation to the mitigation of cross border interference and all current and future licensees are obliged to comply with such MoUs.[126]

[126] All MoUs currently in force are available for download at http://www.comreg.ie/radio_spectrum/search.541.874.10003.0.rslicensing.html

5.55 In relation to the 800 MHz band ComReg expects to adopt a MOU with Ofcom on the 800 MHz band in due course – a draft of the MoU as it currently stands is contained in Annex 12.

5.56 Licensees in the 800 MHz, 900 MHz and 1800 MHz bands will at all times be obliged to comply in full with any such MoU affecting their licence(s).

Proposals for Terminal Stations

5.57 As set out in this document, ComReg proposes that new licences in the 900 MHz and 1800 MHz band will be issued on a liberalised basis and such licences will permit the use of other technologies (such as LTE, WiMAX and UMTS) as well as GSM. In addition, it is proposed that new licences in the 800 MHz band will permit the deployment of ECS.

5.58 Decision 2010/267/EU sets an in-block emission limit of 23 dBm for terminal stations in the 800 MHz band. ComReg proposes that licence exemption for the 800 MHz band should only apply to those terminal stations complying with the in-block limits as set out in Decision 2010/267/EU.

5.59 Given the above, it is necessary for ComReg to update legislation[127] in order to exempt terminal stations in the 800 MHz, 900 MHz and 1800 MHz bands in line with the ComReg's proposed licensing regime for the bands. Annex 8 discusses in detail ComReg's proposal to create a new Statutory Instrument which would exempt 800 MHz, 900 MHz and 1800 MHz terminal devices from individual licensing, provided that such devices are in line with internationally recognised technical standards.

Coverage and Roll-out

5.60 This section discusses ComReg's proposals for the implementation of coverage and roll-out obligations as they would apply to new liberalised licences.

5.61 During the consultation process, ComReg has considered the need for coverage and roll-out obligations in the new liberalised licences. Although coverage and roll-out obligations were originally proposed in the context of 900 MHz licenses, the inclusion of the 800 MHz band and subsequently the 1800 MHz band did not have a significant impact on ComReg's view but did give rise to some amendments.

5.62 ComReg welcomes and appreciates the views from interested parties on this issue. A summary of the previous views of interested parties is set out in Annex 8. The issues addressed in detail in Annex 8 and summarised in the following text are as follows:

- should ComReg impose coverage and roll-out obligations?
- whether coverage and roll-out obligations should differ depending on the status of licensees (i.e. symmetric/asymmetric obligations);

[127] The Wireless Telegraphy Act 1926 (section 3) (Exemption of Mobile Telephones) Order 1997 to 2003, S.I. 409 of 1997 and S.I. 158 of 2003, http://www.comreg.ie/_fileupload/publications/SI158of2003.pdf

- the coverage level;
- the timing of roll-out;
- whether multiple frequency bands should count toward coverage obligations;
- whether national roaming should count toward coverage obligations;
- the proposed metrics for measuring coverage; and
- the inclusion of performance guarantees against coverage and roll-out obligations.

Should ComReg impose coverage and roll-out obligations?

5.63 In Consultation 09/99 ComReg was of the view that setting appropriate coverage and roll-out obligations would ensure the efficient use of the 900 MHz band by ensuring that the spectrum is used to deploy services to a wider geographic range than may otherwise be the case.

5.64 In Consultation 09/99, ComReg undertook a draft RIA to consider whether such conditions were necessary or appropriate. ComReg noted that, provided the requirements were not out of line with operators' investment plans (both incumbents and new entrants), a coverage obligation would be unlikely to have a negative impact on competition.

5.65 As set out in its draft RIA in Consultation 09/99, ComReg was of the view that if it did not set any coverage obligations, consumers in low population density areas would not have any certainty of services being available to them. In essence, an operator could choose only to provide services in high density areas or choose to differentiate itself as a provider with an extensive network footprint.[128] Accordingly, if coverage obligations were included in the licences then consumers would be guaranteed the provision of mobile services in a specified minimum percentage of the geographic area of the country.

5.66 Therefore, on the basis of the draft RIA set out in Consultation 09/99, ComReg considered that there would be reasonable grounds for setting coverage and roll-out conditions in future licences of rights of use of liberalised spectrum as a safeguard to ensure that consumers are provided with an acceptable level of coverage and that this coverage would be maintained. ComReg's view was that setting appropriate coverage and roll-out obligations would ensure the efficient use of the 900 MHz band through the deployment of services to a wider geographic range than may otherwise be the case. Such obligations would also facilitate widespread availability of open access, affordable, always on, broadband infrastructure and services for businesses and citizens.

5.67 The proposed addition of the 800 MHz and 1800 MHz frequency bands to the award process, in Consultations 10/71 and 10/105 respectively, did not change ComReg's view that it was appropriate to impose coverage and roll-out obligations on liberalised licences.

[128] It should be noted that while the option of no coverage obligation was considered and discounted in the draft RIA provided in Consultation 09/99, it has been reconsidered in ComReg's current draft coverage RIA in the interest of completeness.

5.68 The majority of respondents supported the case for coverage and roll-out conditions but with some concerns centring on ensuring that the obligations were well defined and not detrimental to competition.

5.69 It is important to note that, the level of competition in the market will determine the extent of the coverage that operators will provide. If high coverage is considered by consumers to be an important factor, then operators may have an incentive to compete on this differentiating factor by offering coverage levels above that of their rivals in order to gain a competitive advantage.

5.70 However, even in a highly competitive market there is no guarantee that competition will deliver and maintain an acceptable level of coverage across the country that is in line with consumer expectations, or that this coverage would be provided in a timely manner. If the level of coverage is not deemed to be acceptable, and if ComReg wants to ensure that consumers enjoy services in at least the minimum specified percentage level of the country, then regulatory intervention is required in the form of a licence condition specifying a certain minimum level of coverage.

5.71 Therefore, ComReg maintains its view, as set out in the Draft RIA in Consultation 09/99, that there are reasonable grounds for setting coverage and roll-out conditions in future licences for liberalised spectrum as a safeguard to ensure that consumers are provided with an acceptable level of coverage and that this coverage is maintained.

Symmetric or asymmetric coverage and roll-out obligations

5.72 ComReg has also considered whether coverage and roll-out conditions should be the same for all new licences (i.e. symmetric coverage obligations) or whether it would be appropriate to have varying conditions for different licences (i.e. asymmetric coverage obligations)

5.73 In Document 09/99c, DotEcon considered international practice in setting coverage obligations. [129] DotEcon recommended that any coverage obligations should apply homogenously to all licences (i.e. symmetric licence conditions) and that this would require coverage and roll-out obligations appropriate for new entrants so as not to unfairly impede entry.

5.74 ComReg identified three types of potential 900 MHz licensee as follows:

- existing 900 MHz mobile operators: These operators have already deployed extensive networks and consequently they would be in a position to meet a coverage condition that matched or exceeded its obligations under their current GSM licences;
- an existing non-900 MHz MNO: This applies to H3GI who would be in a position to meet a coverage obligation that exceeds its current 2100 MHz coverage obligation, should coverage in the 2100 MHz band count toward a 900 MHz coverage obligation;
- a new entrant: who would have no existing network in place.

[129] See sections 14.4.7 and 15.1.3 of DotEcon's Report (Document 09/99c).

5.75 Initially, ComReg proposed a minimum 90% geographic coverage level to be imposed on all licences for liberalised 900 MHz spectrum with an asymmetric rollout period depending on whether or not the operator in question had an existing network in place. ComReg proposed a roll-out period of 3 years from the licence commencement date for an incumbent operator, and a longer rollout period of 10 years (with a number of interim milestones) for a new entrant who would not have an existing network in place.

5.76 Having taken account of the responses received to Consultation 09/99, and the subsequent inclusion of the 800 MHz and then the 1800 MHz bands, (Consultations 10/71 and 10/105) ComReg maintained its views on the appropriateness of setting a symmetric overage level, with an asymmetric rollout period for incumbents/new entrants.

5.77 In Document 10/105a (Section 8), DotEcon analysed the international experience of coverage obligations. DotEcon noted that an entrant (or incumbent) winning sub-1GHz and 1800 MHz spectrum in the auction would meet its 1800 MHz coverage obligation when it met those of its sub-1GHz licence. If a licensee were to win only 1800 MHz spectrum, but already had an existing 2.1 GHz licence, the coverage of its 2.1 GHz network would count significantly toward the proposed coverage obligation for 1800 MHz. In the case of a new entrant winning only 1800 MHz spectrum, given the proposed coverage level and the roll out time (7 years for new entrants), DotEcon noted that this would be a less onerous obligation than those that were set (and achieved) in the 2.1 GHz licences and should therefore be achievable.

5.78 With the addition of the 1800 MHz band to 800 MHz and 900 MHz in the licence award process ComReg was of the view that the coverage obligations proposed in Consultation 10/71 for sub-1 GHz spectrum should apply to all spectrum bands in the award including the case where an operator wins only 1800 MHz spectrum.

5.79 Taking note of the responses received to Consultations 09/99, 10/71 and 10/105 ComReg's position remains that it is appropriate to set the same coverage requirement for all categories of licensee but with asymmetric roll-out targets to facilitate market entry.

Coverage level

5.80 Having given due regard to the views expressed by respondents to Consultation 09/99 and to the inclusion of the 800 MHz band ComReg revised the coverage level it proposed in Consultation 10/71 (90% geographic) to 70% population coverage. A demographic coverage level of 70% equates to the population of the 5 major cities in Ireland, and every town with over 50 inhabited houses.[130] It is the top end of the coverage level recommended by DotEcon in their report (Document 09/99c, Section 16.1).

5.81 Some consideration was given to setting the coverage level at a level greater than 70% as one respondent had maintained that there was a risk of roll-back of mobile voice coverage. However, ComReg considers that the possibility for this appears quite limited for the following reasons:

[130] This is based on CSO data which indicates that just under 70% of the population live in towns with 50 inhabited houses or more.

- in the short term, existing 900MHz licensees will need to offer legacy GSM services at 900MHz until nearly all handsets are upgraded;
- coverage has been an important competitive differentiator, and one that has been given prominence in advertising and marketing. On the basis of competition between networks, the first MNO to roll back voice coverage would create significant opportunities for rivals to win its customers; and
- the coverage obligations in 3G licences (and the greater coverage levels actually achieved under competition) underpin voice coverage levels.

5.82 ComReg's position on this matter is informed by a draft 'Coverage' RIA set out in Annex 8 of this document. In this draft RIA, ComReg considers the following options as they might apply to coverage levels:

- Impose no obligation on coverage[131].
- Impose a coverage obligation which would require all new licensees to provide a minimum level of coverage sufficient to serve no more than 50% of the population.
- Impose a coverage obligation which would require all new licensees to provide a minimum level of coverage sufficient to serve 50 – 70% of the population[132].
- Impose a coverage obligation which would require all new licensees to provide a minimum level of coverage sufficient to serve 71% - 90% of the population.
- Auction high coverage and low coverage blocks.

5.83 ComReg's draft coverage RIA concludes that:

- existing operators are likely to prefer a medium to high level of coverage while prospective new entrants are likely to prefer a minimum level to aid market entry and maximise flexibility.
- a high coverage level could act as a barrier to entry, as it would entail a major own-build network rollout.
- any option that could deter entry would clearly be bad for competition and consumers whilst an option that could potentially de-stabilise the current urban / rural cross-subsidisation equilibrium might also negatively impact consumers.
- setting a minimum coverage obligation at an appropriate level requires finding the balance between these factors including the likely preference of prospective new entrants and consumers.

[131] It should be noted that while the option of no coverage obligation was considered and discounted in the draft RIA provided in Consultation 09/99, it has been reconsidered in ComReg's current draft coverage RIA in the interest of completeness.

[132] This option is consistent with DotEcon's recommendation as set out in Section 15.1.9 of its report (Document 09/99c).

- In ComReg's view a minimum coverage level in the 50-70% range seems unlikely to significantly deter entry or to result in inefficient infrastructure investment.
- the higher the position adopted in this range the less risk of the current equilibrium level of coverage being distorted through a destabilising effect on the cross-subsidisation model. For this reason and in the best interests of consumers, ComReg believes it is preferable to assume a cautious approach and adopt the top end of this range, 70%.

5.84 In summary, and having taken full account of respondent's views, DotEcon's recommendation[133] and its own analysis, ComReg is of the view that that the proposed 70% minimum level is proportionate, reasonable and appropriate having regard to ComReg's statutory objectives and actual coverage levels are likely to significantly exceed this amount. Therefore ComReg proposes that a minimum coverage obligation of 70 % coverage should be applied to all liberalised licences.

Timing of roll-out

5.85 In Consultation 09/99 ComReg proposed an asymmetric roll-out period, depending on the licensee type with a phased roll-out period for new entrants with targets at years 4, 7, and 10 to achieve the required levels of coverage, and a 3 year rollout period for an incumbent operator with an existing mobile network (to reach the proposed coverage level of 90% geographic coverage). The shorter timeframe was proposed for existing MNOs as these operators have access to existing infrastructure and can use this infrastructure to meet the coverage obligation. A new entrant to the mobile market would not have an existing mobile network and thus a longer timeframe was proposed.

5.86 However, following feedback from respondents to Consultation 09/99, and having revised the coverage requirement to 70 % demographic coverage, ComReg amended the proposed roll-out period for a new entrant to the Irish mobile market from 10 years to 7 years.

5.87 ComReg maintains its view that a 3 year rollout for an operator with an existing mobile network, and a 7 year rollout for a new entrant would be appropriate with, in the latter case, an interim coverage requirement that half of the target coverage level be achieved after 3 years.

The use of multiple frequency bands to provide coverage

5.88 In addition to the coverage level and roll-out periods, ComReg also considered whether use of multiple frequency bands should be allowed to count toward a 900 MHz band coverage obligation. DotEcon recommended that coverage conditions should be service related and frequency neutral in order to allow operators flexibility to optimise their spectrum holdings.[134] This supported ComReg's view that allowing the use of multiple frequency bands would facilitate a better service as a network operator would have more resources at its disposal and could therefore select the best frequency band to service the needs of its customers. Although there

[133] DotEcon has reviewed and re-affirmed its original recommendation (see Section 13.1.3 of Document 11/58).
[134] See DotEcon's Report (Document 09/99c), Sections 14.4.1 and 16.1

would be a possibility that without an express obligation to use spectrum below 1 GHz to meet its coverage requirement, a licensee may use its other frequency holding to meet the conditions of its licence, ComReg was of the view that this would be most unlikely given the extremely favourable propagation characteristics of sub-1 GHz spectrum.

5.89 Therefore, ComReg maintained that the benefits of allowing the use of multiple frequency bands would outweigh the drawbacks and as such proposed to allow the use of multiple frequency bands to count towards a sub-1 GHz coverage obligation.

5.90 In response to respondents' calls for clarity on the use of multiple bands to meet the coverage and roll-out obligations, in Consultation 10/71 ComReg proposed that licensees would be required to provide a minimum of 50% coverage using the 800/900 MHz bands in order to ensure a minimum deployment level in these bands.

5.91 Taking due note of the various responses, support for the proposals, requests for clarification and the reports of its external consultants, ComReg proposed that other frequency bands (namely the 2100 MHz band) could count towards the 70% coverage obligation, provided that a minimum of half of the 70% coverage level (i.e. 35% population coverage) is provided via spectrum in the 800/900/1800 MHz spectrum bands.

5.92 ComReg maintains its view regarding the use of other frequency bands to meet the proposed coverage level. ComReg is of the view that the coverage obligation should apply per licence, and not per lot, and include all spectrum in respect of which an operator has obtained rights of use within that particular licence.

Should national roaming count towards coverage?

5.93 ComReg, cognisant that two of the existing GSM and 3G operators currently had a national roaming agreement with another operator, which facilitated these operators in providing nationwide coverage, also invited views on whether coverage via national roaming agreements should count towards the proposed coverage obligations.

5.94 Having taken into account views of respondents and the newly proposed coverage level in Consultation 10/71, ComReg set out its view that coverage via national roaming would not be permitted to count towards the coverage obligation, as coverage obligations should be met using a licensee's own network infrastructure. It should be noted that the higher 90% geographic coverage requirement, proposed in Consultation 09/99, was still under consideration when ComReg made its proposal[135] regarding national roaming contributing to the achievement of coverage obligations.

5.95 Therefore, in light of the responses to the consultation documents and the views of its consultants ComReg maintains its proposal that coverage via national roaming will not be allowed to count towards the coverage and roll-out obligation.

Proposed metrics for measuring coverage

[135] See Section 4.6.3 of Consultation 10/71

5.96 In the earlier consultation documents ComReg stated its intention to define a distinct field-strength level for each type of technology that can be deployed in the liberalised frequency bands and to use this field strength level for measuring coverage. It was seen as important that, in setting the level of population coverage to be achieved by a licensee, the field-strength level used to determine compliance with the coverage requirement should be clear, easily measured, and verifiable.

5.97 Specifically, ComReg proposed to apply the field strength levels in existing licences for GSM and 3G technologies to the new licences and to add objectively justified and proportionate field strength conditions for additional types of technologies that can co-exist with GSM and UMTS if and when they are deployed in the future.

5.98 In Consultation 10/71 ComReg proposed to measure coverage as set out in Consultation 09/99 with the exception of use of the Ec/Io[136] metric for UMTS technology.

5.99 The proposed measurement metrics for coverage in the 1800 MHz, 900 MHz and 800 MHz frequency bands were set out in Annex 3 of Consultation 10/105.

5.100 There were various requests for clarification of the methodology and metrics and those issues are addressed in detail in Annex 8 of this document.

5.101 On the basis of the above factors, the analysis set out in Annex 8 and the materials considered therein, ComReg now proposes to proceed with the metrics for coverage as set out in Consultations 09/99, 10/71 and 10/105 and detailed in Annex 8 of this document. In addition ComReg is proposing to include a licence provision stating that ComReg may amend these metrics in accordance with the Authorisation Regulations 2011. Any such amendments will only be made in objectively justified cases and in a proportionate manner.

Performance Guarantees on coverage and roll-out obligations

5.102 In Consultation 09/99 ComReg presented proposals in respect of coverage and roll-out obligations, which included performance guarantees. ComReg was of the view that for any new spectrum licences where conditions are imposed, it would be necessary to have a range of appropriate sanctions in the event of non-compliance with those conditions. Given the importance of coverage and roll-out conditions to the provision of services to consumers, ComReg proposed to include a performance guarantee of €2 million against the coverage and roll-out obligations and sought the views of respondents on the matter.

5.103 In order to enforce a licence condition ComReg believes that it is appropriate to utilise mechanisms, from within a range, that are appropriate in light of any particular non-compliance. Regulations 16 and 17 of the Authorisation Regulations 2011 (SI 335 of 2011) set out provisions relating to enforcement of licence conditions, including the possible suspension or revocation of licences. In addition, ComReg intends that future licences to keep and have possession of apparatus for wireless telegraphy which will operate in the 800 MHz, 900 MHz and/or 1800 MHz spectrum bands will be granted under regulations made by ComReg pursuant to

[136] Ec/Io is analogous to Carrier to Interference (C/I) ratio in GSM, and for a useable service Ec/Io ≥ -8dB.

section 6 of the Act of 1926, and that the relevant licences and regulations will include appropriate provisions related to non-compliance with licence conditions.

5.104 DotEcon, in Section 15.5 of its report 09/99c and repeated at Section 13.2 of its report (Document 11/58), recognises that operators should face appropriate consequences if they fail to meet a licence condition and proposed that a performance bond guarantee of around €2 - 3 million may be appropriate for minor licence compliance breaches, which would result in the loss of some or all of the bond.

5.105 ComReg concurs with DotEcon's recommendation and is of the view that performance guarantees can be a useful sanction in the case of certain minor compliance matters prior to ComReg availing of its other statutory enforcement tools.

5.106 Therefore, given the importance of coverage and roll-out conditions for the provision of services to consumers, ComReg will include a performance guarantee of €2 million in respect of coverage and roll-out obligations.

Quality of Service

5.107 During the consultation process, ComReg has discussed the issue of attaching Quality of Service ("QoS") obligations within conditions attached to new liberalised licences. This section discusses ComReg's proposals for the implementation of QoS obligations on new liberalised licences.

5.108 In Consultation 09/99 ComReg presented its draft RIA to consider whether such conditions were necessary or appropriate. Following the analysis contained in the Draft RIA, ComReg maintained that setting appropriate QoS obligations in the conditions attached to any new liberalised licences granted in respect of the 900 MHz band would safeguard consumers and overcome any information deficit that may arise in the event that the consumer cannot attribute the source of a quality of service problem to a particular operator.

5.109 Although QoS obligations were originally proposed in the context of 900 MHz licenses, the inclusion of the 800 MHz band and subsequently the 1800 MHz band caused ComReg's view to remain that QoS obligations should apply in the 900MHz band and also to all spectrum bands in the award process.

5.110 The issues addressed in detail in Annex 8 and summarised below as follows:

- whether QoS conditions should be imposed at all and if so, how should they be imposed?;
- ComReg's proposals relating to specific QoS obligations for voice calls and availability of services; and
- additional relevant considerations relating to reporting on compliance, performance guarantees, and review of QoS.

Should ComReg impose QoS obligations?

5.111 ComReg first proposed the adoption of QoS conditions to all new licences in the 900 MHz band in Consultation 08/57 (Section 7.3.3). This view was reiterated in Consultation 09/14, respondents to which were broadly supportive of ComReg's proposal to attach such conditions. Consultation 09/99 set out ComReg's detailed consideration of the QoS conditions that could be attached to new 900 MHz licences. A draft RIA analysis was set out on this matter which considered whether or not to impose QoS conditions.

5.112 In this draft RIA in Consultation 09/99, ComReg noted that

> *"even in competition[sic] markets there may be circumstances where minimum QoS standards may still be needed in order to prevent a potential market failure. In telecommunications markets, a potential market failure could arise as a result of an information problem whereby consumers may not be in a position to identify the quality of different operators' services and if there is a problem with the quality of the service it may not be possible for the customer to attribute the source of the problem to a particular operator. This can give incentives for operators to compete on a very low level of quality. In these circumstances we believe that it is appropriate to set minimum QoS standards to overcome this information problem."*

5.113 Accordingly, ComReg stated that it believed that it was appropriate to set minimum QoS standards to overcome this information deficit and invited comments on the matter.

5.114 ComReg subsequently consulted in Consultations 10/71 and 10/105 on the matter of award of rights of use of spectrum in the 800 MHz and 1800 MHz bands along with the 900 MHz band in the same award. ComReg proposed that appropriate QoS obligations should extend to these bands also if included in the award[137].

5.115 Having regard to the views of respondents, the recommendations of DotEcon[138] and the analysis presented in Annex 8 ComReg is of the view that, in general QoS standards can have benefits for all users as follows:

- act as a safeguard for consumers against poor service quality;
- consumers would be guaranteed a minimum QoS from each operator in the market based on specific metrics;
- it would ensure that all consumers receive a reasonable standard of service without being reliant on understanding the various service offerings available;
- as the regulator would act as a watchdog for consumers, consumers would have a form of redress to the regulator if these standards are not met;
- licensees would be assured that no other licensee could avoid meeting these minimum standards, thus ensuring that investments in QoS by licensees are not wasted.

[137] See section 4.6.4 of Consultation 10/71 and Section 3.10.5 of Consultation 10/105.
[138] See section 13.2 of DotEcon's report (Document 11/58).

5.116 ComReg remains of the view that it is appropriate to impose QoS obligations on new liberalised licences in the 800 MHz, 900 MHz and 1800 MHz frequency bands. However, ComReg notes that attaching QoS conditions to licences may result in compliance costs for licensees and regulatory costs for ComReg. Accordingly, and in arriving at its proposal, ComReg has endeavoured to ensure that QoS conditions are only imposed where they are necessary, proportionate and objectively justified. ComReg briefly sets out each issue in turn below but readers are referred to Annex 8 for ComReg's full analysis of the matter.

ComReg's proposals relating to specific QoS obligations for voice calls and availability of services

5.117 In consultation 09/99 ComReg maintained that any QoS standards should only apply if a particular service is offered and there should be no compulsion on operators to provide any particular service. ComReg proposed two particular services where it may be appropriate to set QoS standards, namely, voice call services and broadband services. ComReg is not proposing to impose a QoS obligation for broadband and this is addressed below.

5.118 In Consultation 09/99 ComReg proposed Voice (non-VoIP) QoS obligations as set out in Annex 8 specifying requirements for the maximum number of blocked calls, dropped calls and sound transmission quality for every six month period of the licence duration.

5.119 Having regard to the analysis in the draft RIA set out in Consultation 09/99 and respondents' submissions, ComReg is of the view that it is appropriate to set voice call QoS obligations for all non-VoIP calls, in line with GSM standards for all liberalised licences and these are set out in Annex 8.

5.120 In addition to its proposals relating to voice services, in Consultation 09/99, ComReg set out its view that it would be appropriate to set licence conditions relating to network performance to protect consumers against unreasonable levels of disruption. Having regard to the views of respondents and the analysis set out in Annex 8 including ComReg's draft RIA on the imposition of QoS on voice services, ComReg has set out in Annex 8 its proposed minimum QoS network standard for the availability of the network.

5.121 Moreover, having regard to the views of respondents and the analysis set out in Annex 8 including ComReg's draft RIA on the imposition of QoS on service availability of the network, ComReg is of the view that it is appropriate to set a minimum QoS network standard for voice calls and the availability of the network for all liberalised licences.

5.122 ComReg considers that all consumers, including those obtaining a service via a MVNO, are entitled to services that meet a minimum QoS standard. Therefore it is proposed to include all relevant services of the licensee including those provided by any third party/s, via contractual or other arrangement with the licensee.

Additional relevant considerations relating to reporting on compliance, performance guarantees, and review of QoS.

Reporting on Compliance

5.123 In Consultation 09/99 ComReg was of the view that it would be appropriate to include a reporting provision on compliance obligations in any new liberalised licence issued, to ensure compliance and to enable ComReg monitor the continuing appropriateness of the obligations.

5.124 ComReg welcomes the responses received to its position on this issue as set out in Consultations 09/99, 10/71 and 10/105.

5.125 Having regard to the analysis presented in Annex 8 and to enable ComReg to ensure that licensees are complying with their QoS licence conditions ComReg will provide for a compliance reporting provision in the new licences as detailed in Annex 8.

Performance Guarantees

5.126 In Consultation 09/99 ComReg stated that it would be beneficial to have a range of appropriate sanctions relating to QoS obligations. ComReg proposed that a performance guarantee of €1 million against the QoS obligations.

5.127 ComReg welcomes the responses received on this matter in response to Consultations 09/99, 10/71 and 10/105.

5.128 Having regard to the views of respondents along with its analysis at Annex 8, ComReg considers that performance guarantees are an appropriate sanction in the event of non-compliance with licence conditions. ComReg notes that as part of the 3G licence award, applicants provided performance guarantees well in excess of what is currently proposed. ComReg considers that these performance guarantees have acted as a positive incentive in ensuring consumers receive an acceptable quality of service.

5.129 Given the importance of ensuring a minimum network and voice call QoS standard on the provision of services to consumers, ComReg proposes to include a performance guarantee of €1 million against the QoS obligations in any new licences in the 800 MHz, 900 MHz and 1800 MHz licence issued. This performance guarantee is separate from and in addition to the performance guarantee in respect of coverage and rollout obligations.

Review of QoS Obligations

5.130 In Consultation 09/99 ComReg stated that it may be appropriate to carry out a review at regular intervals to ensure that applicable QoS obligations remained appropriate.

5.131 ComReg notes that Regulation 15 of the revised Authorisation Regulations 2011 makes provision for amendments to the conditions attached to rights of use for radio frequencies.[139] This provision will enable ComReg to conduct a review of QoS

[139] European Communities (Electronic Communications Networks and Services) (Authorisation) (Regulations) 2011 S.I. 335 of 2011 Regulation 15 "*The Regulator may amend the rights, conditions and procedures concerning the general authorisation, rights of use for radio frequencies and rights of use for numbers provided that any such amendment may only be made in objectively justified cases and in a proportionate manner, taking into consideration, where appropriate, the specific conditions applicable to transferable rights of use for radio frequencies."*

obligations in conditions attached to liberalised licences in the 800 MHz, 900 MHz and 1800 MHz bands without the need for an express licence condition.

Miscellaneous Licence Conditions

5.132 In Consultation 09/99 ComReg proposed to provide the following conditions on licence in the 900 MHz band:

- non-Ionising Radiation ("NIR");
- international Roaming Capability;
- access to Emergency Services;
- billing; and
- broadband.

5.133 In Consultations 10/71 and 10/105 ComReg proposed to include these conditions on any future licences in the 800 MHz and 1800 MHz bands. Upon further consideration, ComReg is proposing not to include these conditions in new licences issued pursuant to this assignment process for the reasons as summarised below and detailed in Annex 8.

Non-Ionising Radiation ("NIR")

5.134 While ComReg notes that the majority of respondents were in favour of the inclusion of such a condition, eircom pointed to the fact that the condition already exists in the General Authorisation and therefore including it in new liberalised licences would result in unnecessary duplication. Having given careful consideration to the matter, ComReg considers that the current NIR conditions in the General Authorisation are sufficient and that the General Authorisation is the appropriate legal instrument in which to place this condition.

International Roaming

5.135 ComReg considers that there is no need to impose an international roaming condition in future licences for liberalised spectrum in the 800, 900 or 1800 MHz bands, as market forces should provide a sufficient incentive for licensees to provide such a service.

Access to Emergency Services and Billing

5.136 In the case of access to emergency services obligation ComReg notes that Regulation 20 of the Universal Service and Users' Rights Regulations already provides a clear and direct obligation upon undertakings providing telephone services in the State to provide free access to emergency services and considers this sufficient to meet this requirement. Notwithstanding, ComReg shall at all times reserve the right to lay down criteria pertaining to the accuracy and reliability of caller location information.

5.137 In relation to conditions pertaining to consumer billing, respondents will be aware that ComReg's separate and on-going consultation 10/96 addresses this matter.

Conditions, if any, will be determined and implemented as part of a separate process.

Broadband

5.138 ComReg believes that it is not appropriate to set a QoS obligation for broadband services. With a broadband service, the service provider is clearly known to the consumer and so normal customer service arrangements can be used. This is notably different to the voice market where the quality of service problem could relate to the subscriber network or the called party's network, a matter discussed in greater detail at Annex 8. Consumers would not likely be negatively affected by the absence of licence mandated minimum speeds for mobile broadband because customers have little problem establishing who is responsible if they receive a standard of service that does not meet their QoS expectations and can change their provider accordingly.

5.139 Furthermore, ComReg notes that where broadband services do not perform as advertised there may be remedies available both in contract and pursuant to, inter alia, the Consumer Protection Act 2007.

5.140 ComReg considers that imposing minimum broadband speeds could prevent operators from offering a low cost, low speed option leading to a reduced choice for consumers. This would particularly affect those consumers for whom speed is not a priority.

Chapter 6

Transitional Issues

6.1 This chapter sets out ComReg's preliminary conclusions in respect of the following issues:

- transitional issues that would arise from the time of the proposed joint award until the proposed commencement of liberalised licences in the first temporal lot for the 900 MHz and 1800 MHz bands;
- transitional issues that would arise between the two proposed temporal lots for the 800 MHz, 900 and 1800MHz bands; and
- whether to grant preparatory licences to winners of liberalised spectrum rights in each of the 800 MHz, 900 MHz and 1800 MHz bands.

Transitional issues that would arise from the time of the proposed joint award until the proposed commencement of liberalised licences

6.2 In Consultation 10/71 and Consultation 10/105, ComReg set out its understanding of the timeframes associated with "relocation" and "retuning" activities that may need to be completed by existing GSM licensees to enable commencement of liberalised rights of use in the 900 MHz and 1800 MHz bands in the proposed first temporal lot.

6.3 ComReg did so in light of the analysis undertaken by Red-M/Vilicom on these matters as set out in their reports (ComReg 10/71c and ComReg 10/105b). ComReg notes that two of the potential scenarios that could arise as a result of the auction require consideration:

- scenario 1 – where existing GSM licensees win liberalised rights of use in respect of at least the amount of spectrum in the 900 MHz band as they already hold; and
- scenario 2 – where existing GSM licensees win liberalised rights of use in respect of only 1 2×5 MHz block of 900 MHz spectrum and may need to modify their network accordingly.

ComReg's preliminary conclusion - Scenario 2 – "retuning activities" in the 900 MHz and 1800 MHz bands

6.4 ComReg notes the divergence between the views of interested parties, and between the views of interested parties and Red-M/Vilicom, regarding the likely timeframe for completion of transitional activities relating to Scenario 2. In particular, one incumbent submits that a longer period than that identified by Red-M/Vilicom would be required whereas one potential new entrant to the band submits that a shorter period would be required.

6.5 Whilst ComReg has set out a number of specific observations on these views in Annex 7, ComReg would draw attention to the following general observations in relation to Scenario 2 in the context of the 900 MHz band:

- Red-M/Vilicom's analysis is based on an "average" Irish MNO;
- assuming that ComReg's proposed joint award process is completed by the end of 2011, ComReg recognises that there would now be less time for an operator to complete any necessary transitional activities than was contemplated in Consultations 10/71 and 10/105;
- ComReg notes that the Red-M/Vilicom reports do not fully take account of the ability of an affected operator to avail of other technical and non-technical means of addressing this scenario, the effects of which again cannot be predicted with certainty at this point in time;
- it is important to remember that the likelihood of this scenario arising is unclear, although there are a number of factors which would suggest to ComReg that it is unlikely (noting that Meteor could, in any event, have 900 MHz rights of use until 2015 occupying at least their current bandwidth) including:
- the proposed joint award of spectrum rights in the 800 MHz band (being an additional 6 MHz paired blocks of sub-1GHz spectrum) with the 900 MHz band should reduce bidding pressure on 900 MHz spectrum in the short term; and
- the potential effects of ComReg's proposed 2 × 10 MHz sub-cap for 900 MHz spectrum in the first temporal lot (see Annex 6.1 of this document).

6.6 Having regard to the analysis presented in Annex 7, previous consultation documents, the views of respondents, the reports prepared by its consultants and in light of the foregoing uncertainties, ComReg proposes to adopt a flexible approach to any Scenario 2 occurrence, particularly so as to avoid undue negative effects on consumer services during any transition period. At the same time, ComReg appreciates the likely incentives of an existing GSM 900 MHz licensee facing a Scenario 2 transition to seek to retain existing GSM 900 MHz rights of use for as long as possible under these circumstances (and potentially longer than would be necessary). In light of these likely incentives, ComReg also sees merit in incorporating aspects of H3GI's suggested approach to transitional issues, such as:

- the setting of milestones for specific tasks;
- a sufficiently robust and transparent mechanisms to monitor compliance with milestones;
- appropriate financial measures to dissuade non-compliance with milestones; and
- that the process adopted by ComReg reasonably includes the involvement of affected third parties, having regard to the protection of commercially sensitive information.

ComReg's preliminary conclusion - Scenario 1 – "relocation activities" in the 900 MHz and 1800 MHz bands

6.7 In light of ComReg's proposed "full assignment round" approach to the 900 MHz and 1800 MHz bands (see Annex 6.4), there is a real possibility that one or more existing GSM licensees would be required to "relocate" existing spectrum assignments in one or both spectrum bands.

6.8 ComReg notes that there was relatively little comment and no disagreement with Red-M/Vilicom's assessment of the likely timescales involved for a Scenario 1 transition for the 900 MHz and 1800 MHz bands, singularly and combined.

6.9 At this point in time, ComReg remains confident that there would be sufficient time for Scenario 1 activities to be completed by all existing GSM licensees in both the 900 MHz and 1800 MHz bands between the completion of ComReg's proposed joint award process and proposed commencement of liberalised licences in early 2013. On this basis, and in light of the need to ensure and encourage timely completion of Scenario 1 activities prior to the proposed commencement of liberalised licences in early 2013, ComReg is proposing, in principle, the following mechanisms to achieve this outcome.

ComReg's in principle proposal to ensure and encourage timely completion of Scenario 1 activities

6.10 Having regard to the analysis presented in Annex 7, previous consultation documents, the views of interested parties and the reports prepared by its consultants ComReg proposes to proceed as set out below.

6.11 Following completion of the proposed joint award process, the nature and extent of Scenario 1 relocation activities required to be completed by existing GSM licensees in the 900 MHz and 1800 MHz bands would become clear.

6.12 At that point, ComReg proposes to discuss with existing GSM licensees and all winners of liberalised 900 MHz and 1800 MHz rights of use how best to complete such activities in a timely and orderly manner - with a view to the establishment and publication of a relocation "Project Plan" that would clearly identify project milestones and related deliverables.[140] Whilst ComReg would hope that all affected parties would be able to come to agreement on such matters, ComReg recognises that there may be inconsistent incentives between that of existing GSM licensees and new entrants to the 900 MHz and 1800 MHz bands and that such differences may frustrate such an agreement being made. In such circumstances, ComReg would envisage itself (and/or its advisor/s) playing a mediating role, at first instance, and would also reserve the right to make a final and binding decision on any disputed matters that could not be mediated.

6.13 Furthermore, to encourage and ensure the timely achievement of agreed/determined project milestones, ComReg also envisages the Project Plan identifying liquidated damages payable by parties where such parties fail to discharge their obligations in accordance with the milestones set out in the proposed Project Plan. At this stage,

[140] Clearly, ComReg would protect genuinely confidential information provided by all parties during this process.

ComReg would envisage that such liquidated damages would relate to the loss of spectrum usage fees (SUFs) that would otherwise have been obtained by ComReg from liberalised use of the affected spectrum blocks if the delays had not occurred. In light of ComReg's proposed advanced commencement of certain 900 MHz blocks, such liquidated damages could also relate to the loss of advanced commencement SUFs resulting from non-compliance with the project plan milestones.

6.14 ComReg would envisage prospective bidders seeking to participate in the proposed joint award process agreeing to comply with a final decision in respect of the project plan and to the regime of liquidated damages.

6.15 Whilst it is ComReg's intention to set out more details of this proposal in the draft information memorandum relating to the proposed joint award, ComReg would, of course, welcome any views from interested parties on this proposal at this time.

6.16 In addition, ComReg considers that, where appropriate to facilitate transition activities, it should retain its discretion to consider requests to vary an existing GSM licence by the holder of that licence and from other parties.

6.17 The measures described above would be without prejudice to ComReg's other powers, functions and rights set out in the legislation described in Annex 1.

Transitional issues that would arise between the two proposed temporal lots

ComReg's preliminary conclusion - proposed constraint on assignment options to ensure contiguous spectrum assignments across temporal lots where same quantum of spectrum for the 800 MHz, 900 MHz and 1800 MHz bands

6.18 In Consultation 10/71 and Consultation 10/105, ComReg set out its proposal, and reasons for same, to impose a constraint on assignment options to ensure contiguous spectrum assignments across temporal lots where same quantum of spectrum for the 800 MHz, 900 MHz and 1800 MHz bands.

6.19 Having regard to the analysis presented in Annex 7 and previous consultation documents, the analysis and recommendations of DotEcon, and the views of interested parties received on its proposal, ComReg's preliminary conclusion is that a constraint whereby only assignment options that ensured contiguous spectrum assignments across the proposed two temporal lots for bidders winning the same amount of spectrum rights in these temporal lots would be presented to bidders. Factors informing this preliminary conclusion include that:

- whilst it is recognised that such a constraint would, by definition, reduce the number of available options presented to a bidder, the overall value in having options of choosing non-continuous spectrum assignments across the two temporal lots is not apparent;
- indeed, any disadvantage associated with such a constraint would, in ComReg's opinion, be offset by the benefits to an individual bidder (by removing the possibility of relocation activities between temporal lots)

and other winners in the band by removing the potential delay to availability of spectrum rights in the second temporal lot that could otherwise occur;

- such a constraint would also reduce the complexity of options at the assignment stage;
- accordingly, the imposition of such a constraint would be justified in terms of, *inter alia*, economic efficiency and encouraging efficient spectrum use; and
- these factors are supported by the analysis and recommendation of DotEcon and the views received from interested parties.

ComReg's preliminary conclusion - potential constraint on assignment options applying to only those involving partial relocation where operators win a different quantum of spectrum in different temporal lots

6.20 In Consultation 10/105, ComReg considered whether a potential constraint could be applied to assignment options such that only those options involving partial relocation (by excluding those involving full relocation) would be presented to bidders winning different amount of spectrum rights between temporal lots for the 800 MHz, 900 MHz and 1800 MHz bands. In that regard, DotEcon noted that such a constraint would only be worth considering if:

- the cost to an operator of relocating its frequencies within a band is not constant (that is, there are additional cost savings through a partial, as opposed to a full, relocation); and
- these perceived additional benefits outweigh the cost of reducing assignment options for other bidders (i.e. bidders with the same number of blocks in the two proposed time slices).

6.21 In addition, ComReg noted that:

- Red-M/Vilicom's study of relocation activities in the 1800 MHz band (ComReg Document 10/105b) suggests that there is unlikely to be any significant cost difference between a partial and full relocation in the 1800 MHz band; and
- Red-M/Vilicom's study of relocation activities in the 900 MHz band suggests that there may be some preference for a partial rather than a full relocation.

6.22 On this basis, ComReg proposed not to apply the potential constraint for the 1800 MHz band and noted that it was not presently minded to implement same for the 800 MHz and 900 MHz bands.

6.23 Having regard to the analysis presented in Annex 7 and previous consultation documents, the analysis and recommendations of DotEcon and the views of interested parties, ComReg's preliminary decision is that no such constraint should be implemented for the 800 MHz, 900 MHz and 1800 MHz bands. Factors informing this preliminary conclusion include that:

- although Red-M/Vilicom's study of relocation activities in the 900 MHz band suggests that there may be some preference for a partial rather than a full relocation, the submissions of interested parties on this issue, being in this case mobile operators who would be particularly knowledgeable on this matter, would indicate that any benefit of the potential constraint would be significantly outweighed by the cost of the reduction in the choices and flexibility available to bidders in the auction process;
- the potential constraint could be complex to define in a robust manner, could reduce the transparency of the award process and create the risk of inefficient outcomes; and,
- these factors are informed by the views received from interested parties and the analysis and recommendation of DotEcon and Red-M/Vilicom.

ComReg's preliminary conclusion - proposal to not delay availability of spectrum blocks in the second temporal lot to make allowance for any transition arrangements

6.24 In Consultation 10/71 and 10/105, ComReg noted that there is the possibility for a situation to arise where some transition activities may be required by winners of liberalised spectrum between the two temporal lots (for instance, where an operator has won rights to use 2× 10 MHz of 900 MHz spectrum in the period between 2013-2015 and rights to 2× 10 MHz of 800 MHz spectrum from 2015-2030).

6.25 Having regard to the analysis presented in this Annex and previous consultation documents, the analysis and recommendations of DotEcon and the views of interested parties, ComReg's preliminary conclusion is that it should not delay availability of spectrum blocks in the proposed second temporal lot to make allowance for these transition arrangements to be completed. That is, affected parties would be required to fully address such issues during the first temporal lot.

6.26 Factors informing this preliminary conclusion include that:

- winners of liberalised rights who are required to complete such transition activities have, in effect, created this situation for themselves as a result of their bidding strategies;
- in this context, it would not appear appropriate for other winners of liberalised spectrum to be adversely affected by these choices;
- there should, in any event, be sufficient time between the commencement of the first temporal lot and the proposed commencement of the second temporal lot with which to prepare for and complete any such transitional arrangements; and
- these factors are informed by the views received from interested parties.

ComReg's preliminary conclusion – proposed memorandum of understanding to facilitate industry-led approach to not delay availability of spectrum blocks in the second temporal lot to make allowance for any

transition arrangements to be completed for the 900 MHz and 1800 MHz band

6.27 In Consultation 10/71 and Consultation 10/105, ComReg set out:

- its preference for affected parties to co-ordinate and co-operate on a voluntary basis to effectively and efficiently address any transitional issues in the first instance, with regulatory intervention by ComReg as a last resort. This reflected ComReg's belief that affected parties should be incentivised and indeed better placed to manage and address these issues;
- its proposal that a pre-condition of entry to the proposed joint award would be that all prospective participants would be required to:
  - enter into a memorandum of understanding (MOU) under which they would agree to use best efforts to co-operate with other licensees and ComReg in addressing any transitional issues arising; and
  - in the event of a demonstrated failure to come to a voluntary arrangement with other affected parties, to agree to ComReg's determination on such matters; and,
- that it would consider requested variations to liberalised licences as necessary to address such transitional issues on a case-by-case basis.

6.28 ComReg's preferred approach remains that of facilitating an industry-led approach to dealing with transitional issues.

6.29 However, ComReg now believes that its MOU proposal is redundant in light of its proposal to encourage and ensure timely completion of Scenario 1 relocation activities prior to proposed commencement of liberalised licences in early 2013 (and any Scenario 2 retuning activities) in the 900 MHz and 1800 MHz bands.

6.30 In addition, ComReg proposes to consider requested variations to liberalised licences as necessary to address genuine transitional issues on a case-by-case basis.

ComReg's Preliminary Conclusion

Proposed grant of preparatory Wireless Telegraphy licences for winners of liberalised spectrum rights in the 800 MHz, 900 MHz and 1800 MHz bands

6.31 In Consultations 10/71 and 10/105, ComReg proposed to grant preparatory licences to winners of liberalised spectrum rights in the 800 MHz and 900 MHz bands, and in the 1800MHz band, respectively. Specifically, ComReg proposed that all such winners would be issued with a licence under the Wireless Telegraphy Act, 1926 which would enable holders to install networks and associated equipment but which would not allow any wireless telegraphy transmissions. ComReg proposed that such licences would be granted as soon as practicable following completion of the proposed joint award and would operate until the commencement date of new liberalised-use licences. Furthermore, ComReg stated its intention, during this period, to consider and grant, where possible, 'test licences' to facilitate the testing of these networks and equipment.

6.32 ComReg notes the substantial support from interested parties to this proposal and also notes that the reasons put forward by these parties, and by DotEcon, would accord with those put forward by ComReg.

6.33 On the basis of the reasons put forward by ComReg, interested parties and DotEcon in support of the proposed issue of preparatory licences, noting that no outstanding concerns remain, ComReg's preliminary conclusion is that:

- all winners of liberalised rights of use in the proposed joint spectrum award would be issued with a "preparatory licence" under the Wireless Telegraphy Act, 1926 as soon as practicable following completion of the proposed joint award;
- such licences would enable recipients to install networks and associated equipment but would **not** allow any wireless telegraphy transmissions in any of the relevant bands;
- during this period, however, ComReg would consider and grant, where possible, 'test licences' to facilitate the testing of these networks and equipment; and.
- preparatory licences would operate until commencement of the licensee's liberalised 800 MHz, 900 MHz and/or 1800 MHz licence/s.

Chapter 7

Possibility of Advanced Commencement of Liberalised Licences

Introduction

7.1 As discussed in Chapter 4, ComReg is proposing that liberalised-use licences for the 800 MHz, 900 MHz and 1800 MHz bands (hereafter referred to also as "liberalised licences") would commence on 1 Feb 2013. This chapter considers whether it would be possible to issue liberalised licences in any of the relevant bands earlier than this date and, if so, what form such a proposal should take.

7.2 In considering whether such a proposal should be implemented, a number of important factors should be taken into account, including:

- ComReg's objective that liberalisation occurs as early as possible, given the potential benefits of same to consumers and market participants[141];
- ComReg's obligation to ensure that competition in the relevant markets is not distorted as a result of liberalisation, in accordance with the Amending GSM Directive; and
- in light of existing GSM spectrum assignments in the 900 MHz and 1800 MHz bands, the transitional activities likely to be required by existing licence holders to enable this spectrum to be made available for liberalised use.

ComReg's Previous Proposals for Advanced Commencement of Liberalised Licences

7.3 In Consultations 10/71 and 10/105, ComReg proposed that all liberalised licences issued in the joint award of the 800, 900 and 1800 MHz bands would commence on the same date.

7.4 In light of, amongst other things, respondents' views, notably in response to Consultation 10/71, ComReg noted in section 3.2 of Consultation 11/11 that its broader spectrum release proposal could, in principle, be modified so as to provide for the potential for earlier liberalisation[142] of the 900 MHz band, on assumptions including that:

- all transitional activities required to be completed by all existing licensees in the 900 MHz band be completed prior to both 31 January 2013 and 800 MHz availability;

[141] Facilitating earlier access to liberalised spectrum for winning bidders could mean, all other things being equal, that advanced high-speed data services would be made available in Ireland using these frequency bands earlier than would otherwise be the case. The benefits associated with liberalisation of the bands in question, particularly sub- 1GHz spectrum, have been set out in detail in previous consultation documents.

[142] In previous consultations, ComReg has used the term "earlier liberalisation" to discuss the possibility of issuing liberalised licences before 1 February 2013. In this document, the term "advanced commencement" of liberalised licences is used to indicate this possibility. This is to distinguish this possibility from the "early liberalisation option" as discussed in Chapter 4 and Annex 6.6.

- all holders of rights of use in respect of the 800, 900 and 1800 MHz bands (whether the rights are then current or contingent or prospective) approving of, or at a minimum, not being in a position to show that they would suffer any disadvantage as a result of, such earlier liberalisation; and,
- appropriate spectrum fees being determined for the period relating to the earlier 900 MHz liberalised rights of use.

7.5 Consultation 11/11 noted that as these matters would be informed by the outcome of the proposed auction (in particular, whether there could be a licensee with only 800 MHz liberalised rights of use) and events subsequent to that (being the speed at which all transitional activities could be completed by existing GSM 900 MHz licensees), ComReg was of the view that it would not be possible to conclusively state at that point in time whether and, if so when, earlier availability of liberalised 900 MHz rights would occur.

7.6 In Consultation 11/29 ComReg re-affirmed its view that it remained open to evaluating the potential for earlier liberalisation once the results of the proposed auction were known. ComReg's subsequent correspondence of the 28 April 2011 with H3GI (as published in ComReg Document 11/37) reiterated this view and noted that ComReg was continuing to carefully consider this particular aspect of the broader release process.

7.7 In addition, although not specifically proposed in earlier consultation documents, ComReg notes that it would be appropriate to consider the advanced commencement of liberalised licences for all spectrum bands in the proposed award prior to February 2013.

Consideration of Advanced Commencement on a per band Spectrum Band Basis

7.8 ComReg has previously set out its in principle view that advanced commencement could occur where there was agreement between winners of liberalised spectrum rights across the three spectrum bands.

7.9 Upon further consideration of this matter, there would appear to be merit in exploring advanced commencement on a **per-band** basis. In that regard, ComReg would make the following observations:

- tying the 3 spectrum bands by requiring agreement between operators in different bands could create perverse incentives for the winners of spectrum-use rights in one band to frustrate the advanced commencement of liberalised licences in another band. For example, an operator could choose to obtain 800 MHz spectrum rights only (knowing that it would be available for use only from 1 February 2013) and, following completion of the proposed auction, claim that the commencement of liberalised 900 MHz spectrum rights earlier than 1 February 2013 would adversely affect it and/or distort competition);
- furthermore, in the context of ComReg's auction proposals (where bidders would be given the opportunity to express their relative valuations of blocks in the different spectrum bands), it would seem unreasonable to delay the advanced commencement of rights in one band based upon the considerations of

a licensee in another band, where the advantages/disadvantages of advanced commencement in a particular band would likely have been factored by bidders into their pricing strategies. In other words, if ComReg were to make clear the ability to obtain advanced commencement on a per band (or per block basis), bidders could take this into consideration and adjust their bids accordingly;

- while the spectrum bands in the award process are both substitutable and complementary (as discussed in Chapter 3 and Annex 3), they currently have different characteristics. For example, there is more equipment currently available for use in the 900 MHz band than in the 800 MHz band, and thus the 900 MHz band may prove to be the most sought after band in the proposed auction (particularly in the first temporal lot);
- for the reasons set out in Chapter 4 and Annex 6.1 ComReg is proposing to introduce a sub-cap in the 900 MHz band. This would, amongst other things, ensure that there would be at least 4 winners of liberalised spectrum rights in the 900 MHz band in the first temporal lot and would, in turn, minimise the risk of distortions to competition arising from advanced commencement of some or all of the 900 MHz band (for instance).

7.10 In addition, to the extent that it is possible, similar arguments could also be made for consideration of advanced commencement of liberalised spectrum in each of the bands on a **per block** basis as:

- bidders could consider any differences between blocks in the assignment round of the auction and factor this into their bids as appropriate;
- the potential timing difference between the start date of one block and another would be 13 months or less (on the assumption that the proposed auction is commenced in Q4/2011 and all liberalised licences in the three spectrum bands would commence in February 2013); and
- if one or more blocks had an earlier commencement date, this should incentivise all the remaining licensees to complete their transition activities as speedily as possible in order to have its block(s) considered for advanced commencement.

7.11 The following sections of this Chapter set out ComReg's consideration of advanced commencement on a per-band/block basis as follows:

- background – timeframes for relocation activities in the 900 MHz and 1800 MHz bands;
- identification of advanced commencement opportunities in each of the 800 MHz, 900 MHz and 1800 MHz bands;
- consideration of potential competition issues with the opportunities so identified; and
- detailed consideration of specific aspects of advanced commencement.

Background – timeframes for relocation activities in the 900 MHz and 1800 MHz bands.

7.12 In light of the fact that there are existing GSM spectrum assignments in the 900 MHz and 1800 MHz bands and that, as a result of ComReg's full assignment round

proposals, there would likely be relocation activities required of these licensees before spectrum in these bands could be used on a liberalised basis, there is an obvious link between the nature and time for relocation activities in these bands to be completed and the potential for some (or all) of liberalised rights in these bands to made available earlier than February 2013.

7.13 As noted in Chapter 6, ComReg engaged Red-M/Vilicom to provide details of the process steps, estimated timeframes and estimated costs for relocation activities in the 900 MHz and 1800 MHz bands. Readers are referred to: ComReg Document 10/71c, ComReg Document 10/105b and ComReg Document 11/57.

7.14 In summary, based on this analysis, ComReg understands the minimum time required to complete a relocation in the 900 MHz and 1800 MHz bands would be:

- 5 Months for a relocation in the 900 MHz band;
- 4 Months for a relocation in the 1800 MHz band;
- 6 Months for a simultaneous relocation project for the 900 MHz and 1800 MHz band; and
- 9 months for a sequential relocation project for the 900 MHz and 1800 MHz band. In this case, the 900 MHz band would be complete after 5 months and the 1800 MHz band would be complete after 9 months.

7.15 ComReg again notes that interested parties did not disagree with these findings.

7.16 It should be noted that the above timeframes are based upon the premise that the existing GSM licensees can relocate all of their existing spectrum assignment into a single contiguous spectrum location. While the Red-M/Vilicom reports recognise that relocation into non-contiguous spectrum assignments is also possible, it was noted that this is a slightly more complex case and cost or time estimates for this case were not provided. In any event, given an operator's ability and incentive to obtain contiguous spectrum assignments, the following discussion is based upon the premise that existing GSM licensees would relocate existing GSM 900 MHz and 1800 MHz spectrum assignments into a single contiguous spectrum assignment.

Identification of advanced commencement opportunities in each of the 800 MHz, 900 MHz and 1800 MHz bands

7.17 This section considers whether discrete auction outcome scenarios can be defined where advanced commencement for one or more blocks in each of the 800 MHz, 900 MHz and 1800 MHz band would be possible, on the basis that such advanced would not result in additional and/or inefficient relocation activities other than those already considered by Red-M/Vilicom in their reports.

The 800 MHz Band

7.18 The 800 MHz band is currently used for the provision of analogue terrestrial television broadcast services. Analogue terrestrial television is expected to be switched off by the end of 2012. Given the proposed 1 February 2013 commencement date for liberalised licences, there would appear to be little scope for advanced commencement 800 MHz spectrum blocks, unless analogue terrestrial

television is switched-off earlier[143], which, on the basis on information currently available does not appear likely.

The 1800 MHz Band

7.19 As shown below, the 1800 MHz band consists of 2 × 75 MHz of spectrum (i.e. 15 blocks of 2 × 5 MHz) and there are currently:

- 3 GSM assignments of 2 × 14.4 MHz; and
- 6 fully unassigned blocks (Blocks A, B, C, D, E and O).

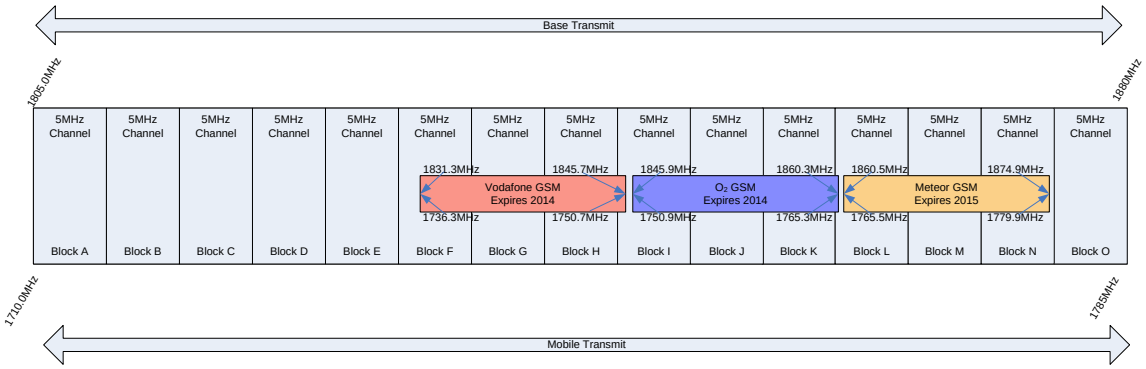

Figure 9. Current GSM assignments in the 1800 MHz band

7.20 Whilst the currently unassigned blocks would appear to be obvious candidates for advanced commencement, ComReg's proposal for an overall spectrum cap of 2 × 50 MHz across the three bands means that there are numerous auction outcome scenarios possible in the 1800 MHz band. As a result, it is difficult to identify discrete outcome scenarios prior to the proposed auction where advanced commencement of one or more blocks would not impact upon the relocation activities of existing GSM licensees.

7.21 That said, ComReg recognises it could identify block/s not required for relocation activities following the outcome of the proposed auction and, in this regard, ComReg sets out its proposal for obtaining advanced commencement of such blocks below.

The 900 MHz Band

7.22 As shown below, the 900 MHz band consists of 2 × 35 MHz of spectrum (i.e. 7 blocks of 2 × 5 MHz) and there are currently:

- 3 existing GSM assignments of 2 × 7.2 MHz; and
- 2 fully unassigned blocks in the 900 MHz band, (Blocks A and B).

[143] The saorview website (http://www.saorview.ie/what-is-saorview/what-is-aso/) states that ASO will happen in late 2012. Minister Rabbitte (DCENR) commented in May 2011 that he would *"be discussing with my Government colleagues practical measures to assist in the switch over which, as was announced last autumn, is due to take place in Q4 2012"* - Press release: Minister Rabbitte publishes Major Report on TV Viewing Methods in Ireland - 16 May 2011.

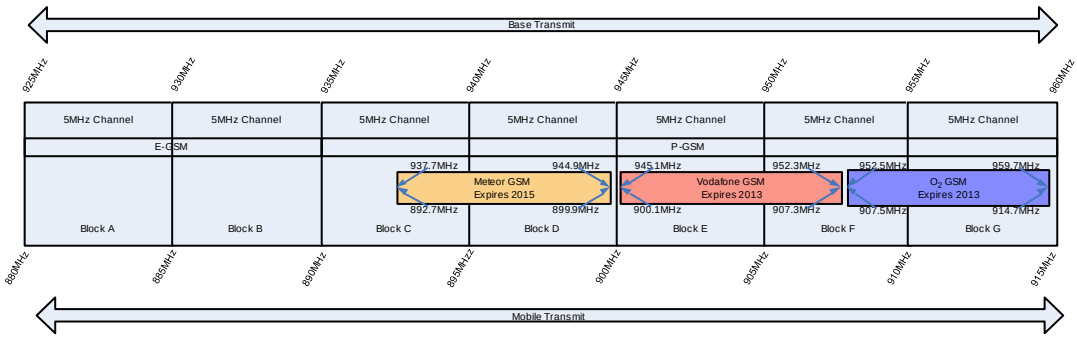

Figure 10. Current GSM assignments in the 900 MHz band

7.23 Considering ComReg's proposal for a 900 MHz spectrum cap of 2 × 10 MHz in the first temporal lot, this means that the number of auction outcome scenarios is greatly reduced compared to the 1800 MHz band and, importantly, the maximum spectrum that any one bidder could obtain (2 × 10 MHz) could be fully accommodated within the 2 currently unassigned blocks A and B.

7.24 Given this context, ComReg has identified two auction outcome scenarios where the advanced commencement of one or more blocks would not result in additional and/or inefficient relocation activities other than those already considered by Red-M/Vilicom in their reports. These two scenarios are outlined below.

Scenario 1: An existing 900 MHz licensee wins rights of use to Blocks A and B

7.25 Under this scenario:

- an existing 900 MHz licensee would be able to relocate its existing spectrum assignment of 2 × 7.2 MHz to blocks A and B in one relocation move;
- the remaining 5 blocks in the band would, in ComReg's view, provide sufficient space for the remaining two GSM 900 MHz licensees to relocate, if necessary, based on the results of the proposed assignment round, without incurring any additional relocation activities other than those considered in the Red-M/Vilicom reports;
- Red-M/Vilicom's analysis indicates that the existing 900 MHz licensee winning rights of use to blocks and A B could complete its relocation in 5 months (and this relocation would provide the starting point for other relocation activities required in the band).

7.26 ComReg also considered the scenario where an existing GSM 900 MHz licensee won a paired 5 MHz block only (i.e block A or B). ComReg does not believe that advanced commencement should occur in this scenario because:

- such a scenario would firstly involve the existing GSM licensee winning block A or B being required to carry out retuning activities (i.e. reducing its spectrum holding from 2 × 7.2 MHz to 2 × 5 MHz) activities in advance of its relocation activities and this is likely to result in the existing GSM licensee incurring additional costs; and
- it is unlikely that an existing GSM licensee would, in these circumstances, be in a position to fully avail of liberalised rights in the new licence as it would be

likely to require the full 5 MHz spectrum assignment to service existing GSM customers.

Scenario 2: A new entrant to the 900 MHz band wins rights of use to Block A.

7.27 Under this scenario:

- the new entrant to the 900 MHz band ("new entrant") would not be required to carry out any relocation activities;
- the remaining 6 blocks would, in ComReg's view, provide sufficient space for the three existing GSM 900 MHz licensees to relocate without incurring any additional relocation activities other than those considered in the Red-M/Vilicom report (10/105b); and
- as such, Block A could be made available for use by the new entrant immediately following completion of the proposed auction.

7.28 ComReg also considered the scenario where the same new entrant also won rights of use to Block B (and alternatively where a different new entrant won rights of use to Block B). ComReg does not believe that advanced commencement for Block B should occur in this scenario because Block B is likely to be required in the short term to enable efficient completion of transitional activities of existing GSM 900 MHz licensees. That said, following the outcome of the proposed auction, ComReg recognises that it may be possible to consider Block B for advanced commencement and the process for same is discussed in below.

Conclusion

7.29 In light of the above analysis, ComReg has identified two auction outcome scenarios prior to completion of the proposed auction where advanced commencement of certain blocks in the 900 MHz band would be possible without resulting in additional and/or inefficient relocation activities other than those already considered by Red-M/Vilicom in their reports. These are:

- **Scenario 1:** An existing 900 MHz licensee wins rights of use to Blocks A and B; and
- **Scenario 2:** A new entrant to the 900 MHz band wins rights of use to Block A (or Blocks A and B). In this scenario, advanced commencement date would be possible for Block A.

7.30 ComReg also recognises that, following completion of the proposed auction, it would have greater clarity over whether advanced commencement would be possible in respect of (a) one or more blocks in the 1800 MHz band and (b) Block B for the 900 MHz band where the right of use to this block is won by a new entrant to the 900 MHz band. ComReg sets out proposals for obtaining advanced commencement of such blocks below.

Competition and other aspects of potential advanced commencement

7.31 As noted above, ComReg is obliged to ensure that its implementation of the GSM Amendment Directive does not create distortions to competition in the relevant markets concerned. In that regard, it is recognised that some interested parties may consider that the advanced commencement of spectrum rights in some spectrum

bands over others and/or some spectrum blocks in a band over others in the same band may give rise to such distortions.

7.32 ComReg notes that DotEcon considers, in section 5.2 of ComReg Document 11/58, the potential competition effects of potential advanced commencement in the 900 MHz band (and ComReg's proposed issue of preparatory licences). In summary, DotEcon states where one or more bidders would not be able to benefit from advanced commencement, this would not necessarily have a negative effect on competition and, where it may affect competition, this effect is likely to be small because, amongst other things:

- the maximum time lag that may exist between 900 MHz licences that benefit from advanced commencement and those that do not will in any case be relatively short. In that regard, DotEcon notes:
  - Under the current proposal, liberalised spectrum in both the 800 MHz and 900 MHz bands is due to be available for liberalised use from February 2013. At present, this is circa 18 months away;
  - Before spectrum in either the 800 MHz or 900 MHz band will become available for liberalised use, an award process has to be planned and implemented and this will reduce significantly the time remaining between now and February 2013 when 800 MHz spectrum is expected to become available; and
- in addition, ComReg's proposed issue of preparatory licences means that a bidder wining 900 MHz spectrum in the first time slice but not able to avail of advanced commencement, would be able to be ready to provide services from the beginning of its licence in February 2013.

7.33 In addition, whilst some interested parties may seek to make out that Scenario 1 could be of greater benefit to an existing GSM 900 MHz licensee than Scenario 2 to a new entrant to the 900 MHz band (in terms of the number of blocks that could be made available for advanced commencement), ComReg would note that this view would not take into account the fact that an existing GSM licensee would likely be required, under Scenario 1, to use one of the blocks to service existing GSM customers. That is, the legacy customers of existing GSM licensees means that, in reality,

7.34 ComReg has carefully considered the potential competition effects of advanced commencement scenarios 1 and 2 above, including DotEcon's analysis in respect of same, and is currently of the view that the potential for significant distortions to competition to arise is likely to be very small. This position reflects the reasons put forward by DotEcon.

7.35 Furthermore, ComReg considers that the benefits of advanced commencement would likely outweigh the very small potential for competition distortions, the former including that:

- other things being equal, advanced data services would be made available in Ireland earlier than might otherwise be the case with the consumer and operator benefits that this would entail;

- advanced commencement by one operator would likely incentivise timely and efficient transitional activities by other winners of liberalised spectrum rights;
- advanced commencement (together with ComReg's proposed issue of preparatory licences) would insure against delays of availability of 800 MHz spectrum. In this regard, DotEcon notes that while there is no reason to consider at this point that availability of 800MHz spectrum will be delayed, due to circumstances beyond its control, ComReg is not in a position to guarantee its availability by January 2013. Therefore, there is value in ensuring that advanced data services will be provided in Ireland as soon as possible and regardless of availability of 800 MHz spectrum.

7.36 In light of the foregoing, ComReg considers that the possibility of advanced commencement of certain blocks in the 900 MHz band, as identified in Scenarios 1 and 2 above, should be facilitated.

Detailed consideration of specific aspects of advanced commencement

7.37 This section considers the following aspects of advanced commencement under Scenarios 1 and 2 above:

- advanced commencement date for licences in the 900 MHz band;
- the expiry of an existing GSM licence in order to obtain an advanced commencement licence under Scenario 1;
- spectrum fees associated with the advanced commencement date; and
- the assignment round of the proposed auction.

Proposed advanced commencement date under Scenario 1 and 2

7.38 ComReg recognises that, following completion of the proposed auction, the time required by a winner under Scenario 1 and 2 to make actual use of liberalised spectrum rights in the 900 MHz band is largely idiosyncratic. For example:

- an existing GSM licensee under Scenario 1 would not be able to make actual liberalised use of block A and/or B until it had (a) relocated its from its current position in the band (which Red-M/Vilicom's analysis indicates could be completed in 5 months, and (b) deployed UMTS or other advanced operator equipment etc. ComReg notes that there are likely to be significant differences between existing GSM licensees on these aspects depending on the nature of infrastructure deployed by them; and
- whilst a new entrant to the 900 MHz band under Scenario 2 would not be required to complete any relocation activities, it would not be in a position to make actual use until it had deployed UMTS or other advanced operator equipment. Again, ComReg notes that there are likely to be significant differences between new entrants to the 900 MHz band (for example, between H3GI and a complete new entrant to the mobile market).

7.39 One option for ComReg could be to discount such idiosyncrasies and propose that advanced commencement licences under both Scenario 1 and 2 would commence

immediately following completion of the proposed auction (with proposed advanced commencement fees to start from same date). It is recognised, however, that such an approach could be seen by existing GSM licensees to be disadvantageous to them relative to new entrants to the 900 MHz band as they would effectively be paying for liberalised spectrum rights which they could not use due to the need to complete relocation activities which new entrants would not be required to undertake.

7.40 At the same time, ComReg recognises that treating scenario 1 and 2 differently (for example, Scenario 1 licences commencing following completion of relocation activities and Scenario 2 licences commencing immediately following proposed auction) could be seen by new entrants to the 900 MHz band to be disadvantageous to them relative to existing GSM licensees because existing GSM licensees could use the 5 month relocation period to also deploy UMTS and other advanced equipment without any advanced commencement spectrum fee being charged (and the advantage that existing GSM licensees would have in terms of deployed base stations etc) in contrast to a new entrant to the 900 MHz band who would be paying for that right from immediately following the proposed auction.

7.41 In light of the potential disadvantages associated with these approaches, ComReg proposes the following:

- advanced commencement licences in the 900 MHz band (and corresponding proposed advanced commencement spectrum fees) under scenario 1 and 2 would not commence until 5 months following the proposed auction. This time period reflects ComReg's understanding of the time likely to be required by an existing GSM licensee to relocate from its pre-existing location in the band to Blocks A and B. During this time, existing GSM licensees and new entrants to the 900 MHz band alike (and all other winners of liberalised rights of use under ComReg's preparatory licence proposal for that matter) could prepare for liberalised use commencement (e.g. deploy UMTS and other advanced equipment); and
- if, following the proposed auction, an existing GSM licensee, under Scenario 1, or a new entrant to the 900 MHz band, under Scenario 2, was in a position to commence liberalised use earlier than 5 months following the propose auction[144], then ComReg would consider an application from these parties for earlier advanced commencement (subject to an existing GSM licensee meeting the proposed steps in the following section (relating to the expiry of existing GSM licence) and the applicant paying proposed advanced commencement fees relating to this earlier period (see below regarding ComReg's proposal for advanced commencement fees).

7.42 Subject to views from interested parties on its advanced commencement proposals, ComReg intends to set out the actual proposed advanced commencement date in the forthcoming draft Information Memorandum.

[144] For instance, if an existing GSM licensee, under Scenario 1, was able to complete its relocation activities faster than the 5 months or a new entrant to the 900 MHz band considered that it had deployed enough operator equipment with which to commence commercial operations.

Expiry of an existing GSM licence in order to obtain an advanced commencement licence under Scenario 1

7.43 In ComReg's view, the advanced commencement of a liberalised 900 MHz licence under Scenario 1 for an existing GSM licensee require the surrender of said licensees' existing GSM 900 MHz licence because otherwise it would be possible for the licensee to occupy two positions in the 900 MHz band and thus frustrate the transition activities of other licensees in the 900 MHz band and/or the advanced liberalisation of other blocks post auction[145].

7.44 To give effect to this position, ComReg proposes the following:

- licensing regulations for liberalised licences would provide that a liberalised licence would not commence until spectrum rights to blocks licensed pursuant to legacy GSM licenses in the band are surrendered by that licensee; and
- to obtain a liberalised licence on an advanced commencement basis, the existing GSM 900 MHz licensee would be required to agree to the foreshortening of their existing GSM licence (in accordance with relevant provisions set out in the licensing regulations relating to foreshortening, including refunds of spectrum fees).

7.45 In addition, to encourage and ensure the timely achievement of relocation activities by the existing GSM licensee under Scenario 1, ComReg envisages including such activities in the proposed transition project plan discussed in Chapter 6 (and corresponding milestones/ liquidated damages).

Additional spectrum fees for advanced commencement

7.46 ComReg proposes that spectrum fees would apply to the advanced commencement element of liberalised licences issued in the 900 MHz (and potentially 1800 MHz band).

7.47 Whilst ComReg's minimum price proposal for liberalised licences in the 800 MHz, 900 MHz and 1800 MHz bands in Temporal Lot 1 and 2 include a spectrum access element, ComReg does not consider it necessary for an additional spectrum access element to apply in respect advanced commencement liberalised licences. In that regard, ComReg notes that the proposed assignment stage of the proposed auction would allow bidders to incorporate and determine the equivalent "access" element for advanced commencement blocks in the 900 MHz band.

7.48 In ComReg's view, the appropriate spectrum fee for the advanced commencement element of liberalised licences should be the additional spectrum usage fees (SUFs) for each day a liberalised licence commences earlier than the proposed commencement date for Temporal Lot 1, based on the proposed applicable SUFs for the spectrum band and quantum of spectrum in question (see Chapter 4). In

[145] The reports from Red-M/Vilicom have stated that the preferred operator procedure would be to relocate in full to a single contiguous spectrum location. DotEcon has also commented on the merits of contiguous spectrum. ComReg would therefore expect all GSM 900 MHz licensees to follow this approach. Following this approach would eliminate the possibility of an operator straddling two positions in the 900 MHz band at the same time.

light of ComReg's proposal for the advanced commencement date for the 900 MHz band (as set out above), this would mean:

- additional daily 900 MHz SUFs payable from 5 months following the proposed auction; or
- earlier if the winner of the advanced commencement licence applies for and is granted advanced commencement earlier than the 5 month period.

In principle advanced commencement proposal for all liberalised spectrum blocks in the 900 MHz and 1800 MHz bands (and potentially 800 MHz band) – following outcome of proposed auction

7.49 As stated above, once the outcome of the proposed auction is known, ComReg would be in a position to consider if spectrum blocks in the 900 MHz and 1800 MHz bands (and potentially the 800 MHz band[146]) (other than those identified Scenario 1 and 2 for the 900 MHz band) could be made available for commencement earlier than 1 February 2013 (being the proposed commencement date of licences in Temporal Lot 1).

7.50 In respect of the 900 MHz and 1800 MHz bands, it is worth reiterating that whether this is possible and for which blocks such advanced commencement may be possible will depend on the nature and extent of transitional activities required to be completed in these bands before liberalised use can occur and, of course, the speed with which these activities are actually completed. In this regard, ComReg refers readers to its in principle proposal to ensure and encourage timely completion of Scenario 1 activities (as set out in Chapter 6 above).

7.51 Noting that it is impossible to predict the outcome of such matters at this time, ComReg nevertheless sees merit in setting out its in principle proposal to allow winners of liberalised spectrum rights in the 900 MHz and 1800 MHz band (and potentially 800 MHz band) to apply to ComReg to for commencement of their liberalised rights of use earlier than the proposed commencement date of Temporal Lot 1. It is proposed that the additional spectrum fees associated with earlier commencement a daily pro-rata of the proposed applicable SUFs for the spectrum band and quantum of spectrum in question for each day a liberalised licence commences earlier than the proposed commencement date of Temporal Lot 1.

7.52 In considering whether to grant such advanced commencement, ComReg would take into account a number of factors, including:

- whether the applicant had met its milestones in a timely manner as set out in the proposed Transitional Project Plan (as discussed in Chapter 6). For example, whether an existing GSM licensees could demonstrate that existing spectrum holdings had been relocated to the correct location;
- whether the spectrum block/s to which the application applied would reasonably be required for transitional activities which had yet to occur in the spectrum band;

[146] If ASO occurs earlier than presently expected.

- for existing GSM licensees: whether they agreed to foreshortening of existing GSM licence; and
- whether the application included payment of the additional spectrum fees identified above.

Chapter 8

Draft Decision

8.1 This chapter sets out, in draft form, a decision document based on the preliminary conclusions arrived at by ComReg in the preceding chapters.

1. DEFINITIONS AND INTERPRETATION

In this Decision, save where the context otherwise admits or requires:

"Advanced Commencement Date" means a date earlier than the proposed commencement date of Temporal Lot 1, from which a particular Liberalised-Use Licence commences;

"Authorisation Regulations" means the European Communities (Electronic Communications Networks and Services) (Authorisation) Regulations, 2011 (S.I. No. 335 of 2011);

"Communications Regulation Act 2002" means the Communications Regulation Act, 2002, (No. 20 of 2002), as amended;

"ComReg" means the Commission for Communications Regulation, established under section 6 of the Communications Regulation Act, 2002;

"Existing GSM Licensee" means a person with GSM 900 MHz and/or 1800 MHz rights of use existing on the day before the commencement of the auction described in section 3.3 of this Decision;

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

"GSM Amendment Regulations" means the European Communities (Public Pan-European Cellular Digital Land-Based Mobile Communications) Regulations 2010 (S.I. No. 195 of 2010), made under section 3 of the European Communities Act 1972 (No. 27 of 1972) for the purpose of giving effect to Directive 87/372/EEC, as amended by Directive 2009/114/EC;

"Liberalised-Use Licences" means licences of the type set out in draft form in Annex 8 to ComReg Document 11/60 and described in [Regulation XX] of the Liberalised-Use Licence Regulations;

"Liberalised-Use Licence Regulations" means the Wireless Telegraphy [(……)] Regulations as set out in draft form in [Annex XX] to ComReg Document 11/YY [FORTHCOMING DRAFT INFORMATION MEMORANDUM];

"Minister" means the Minister for Communications, Energy and Natural Resources;

"New Entrant" means a person who is not an Existing GSM Licensee;

"Preparatory Licence" means licences granted under the Wireless Telegraphy Act 1926 as set out in draft form in [Annex XX] to ComReg Document 11/YY [FORTHCOMING DRAFT INFORMATION MEMORANDUM] and described in [Regulation XX] of the Preparatory Licence Regulations;

"Preparatory Licence Regulations" means the Wireless Telegraphy [(……)] Regulations as set out in draft form in [Annex XX] to ComReg Document 11/YY [FORTHCOMING DRAFT INFORMATION MEMORANDUM]

"RIA" means Regulatory Impact Assessment;

"Wireless Telegraphy Act 1926" means the Wireless Telegraphy Act, 1926, as amended.

2. DECISION-MAKING CONSIDERATIONS

2.1 ComReg has made this Decision having regard to:

(i) the contents of, and the materials and reasoning referred to in, as well as the materials provided by respondents in connection with, the below-listed ComReg documents:

a. 08/57;

b. 09/14;

c. 09/99;

d. 10/59;

e. 10/71;

f. 10/105;

g. 11/11;

h. 11/29;

i. 11/60;

j. 11/YY [FORTHCOMING DRAFT INFORMATION MEMORANDUM]; and

k. 11/ZZ [FINAL RESPONSE TO CONSULTATION AND DECISION DOCUMENTS];

(ii) the consultants' reports commissioned, and the advice obtained, by ComReg in relation to the subject-matter of the documents and materials listed above;

(iii) the powers, functions, objectives and duties of ComReg, including, without limitation those under and by virtue of:

a. the Communications Regulation Act 2002, and, in particular, sections 10, 12 and 13 thereof;

b. the applicable Policy Directions made by the Minister under Section 13 of the Communications Regulation Act 2002;

c. the Framework Regulations, and, in particular, Regulations 13, 16 and 17 thereof;

d. the Authorisation Regulations, and, in particular, Regulations 9, 10, 11, 12 and 18(1)(c) thereof;

e. Regulation 6(1) of the Access Regulations;

f. the GSM Amendment Regulations;

g. Decision 2009/766/EC of 16 October, 2009, on the harmonisation of the 900 MHz and 1,800 MHz frequency bands for terrestrial systems capable of providing pan-European electronic communications services in the Community;

h. Decision 2010/267/EU of 6 May, 2010, on harmonised technical conditions of use in the 790-862 MHz frequency band for terrestrial systems capable of providing electronic communications services in the European Union; and

i. Sections 5 and 6 of the Wireless Telegraphy Act, 1926,

and noting that it has

a. given all interested parties the opportunity to express their views and make their submissions in accordance with Regulation 11 of the Authorisation Regulations and Regulation 12 of the Framework Regulations; and

b. evaluated the matters to be decided, in accordance with its obligations pursuant to, *inter alia*, ComReg's RIA Guidelines (ComReg Document 07/56a) and the RIA Guidelines issued by the Department of An Taoiseach in June, 2009.

3. DECISION

ComReg hereby decides:

3.1. subject to obtaining the consent of the Minister to the making by it of the Preparatory Licence Regulations and the Liberalised-Use Licence Regulations, to make those regulations under section 6 of the Wireless Telegraphy Act 1926, prescribing relevant matters in relation to Preparatory Licences and Liberalised-Use Licences, including prescribing the form of the licences concerned, their duration and the conditions and restrictions subject to which they are granted.

3.2. under section 5 of the Wireless Telegraphy Act 1926, and pursuant to the Preparatory Licence Regulations and the Liberalised-Use Licence Regulations as made following the obtaining of ministerial consent, to grant a limited number of Preparatory Licences, and Liberalised-Use Licences and individual rights of use in respect of spectrum in the 800, 900 and 1800 MHz frequency bands, respectively.

3.3. to select those to whom the Liberalised-Use Licences and rights of use will be granted (hereafter referred to as "Eligible Parties") by means of a competitive selection procedure comprising of a combinatorial clock auction which will more particularly be described in [FORTHCOMING DRAFT INFORMATION MEMORANDUM], in which (without prejudice to the terms of the Information Memorandum), parties wishing to become Eligible Parties will bid for assignments and rights of use of spectrum in the 800, 900 and/or 1800 MHz frequency bands, in an auction process incorporating, *inter alia*, the following elements:

3.3.1. two temporal lots in which rights of use of spectrum in the 800, 900 and 1800 MHz frequency bands will be granted, *viz*:

3.3.1.1 Temporal Lot 1: which is currently intended to commence on 1 February 2013 (or, where applicable, the Advanced Commencement Date) and which shall run until 12 July 2015; and

3.3.1.2 Temporal Lot 2: From 13 July 2015 to 12 July 2030.

3.3.2 multiple combinatorial clock rounds, in each round of which the auctioneer will set the price for each type of lot, and bidders will bid, subject to detailed activity rules to be set out in the Information Memorandum, for packages of lots of spectrum at that price, until supply exceeds demand at the round price.

3.3.3 a single, sealed bid, supplemental round following the combinatorial clock rounds, in which bidders will be entitled, again subject to detailed rules to be set out in [FORTHCOMING DRAFT INFORMATION MEMORANDUM], to submit a bid price of their choosing, in respect of packages of spectrum. An algorithm will be provided in the Information Memorandum, which will allow a bidder who had won lots in the combinatorial clock rounds, to calculate the minimum price that it would need to bid to be guaranteed to win those lots in the supplemental round. A second price rule will then be applied to calculate the price actually payable by winners in the auction.

3.3.4 an assignment round in which bidders will bid for the location of their lots in the relevant frequency bands and part of which round is described further in section 3.3.11 below.

3.3.5 a constraint whereby only assignment options that ensured contiguous spectrum assignments across Temporal Lot 1 and 2 for Eligible Bidders winning the same amount of spectrum rights in Temporal Lot 1 and 2 would be presented to Eligible Bidders.

3.3.6 the possibility of a Liberalised-Use Licence for the 900 MHz frequency band being granted in which the rights of use of certain spectrum would commence earlier than the proposed commencement date for Temporal Lot 1 identified above where an Existing GSM Licensee won rights to blocks A and B or where a New Entrant won rights to block A in the 900 MHz assignment round.

3.3.7 the possibility of a Liberalised-Use Licence, or Liberalised-Use Licences for the 1800 MHz frequency band being granted in which the rights of

use of spectrum would commence earlier than the proposed commencement date for Temporal Lot 1 identified above which would be determined following the outcome of the proposed 1800 MHz assignment round.

3.3.8 the ability for an Existing GSM Licensee with GSM rights of use which are intended to continue after the proposed commencement date for Temporal Lot 1 to relinquish its existing GSM 900 MHz and/or 1800 MHz spectrum rights contingent on it winning at least the same quantum of liberalised 900 MHz and/or 1800 MHz spectrum rights in the same Time Slice ("Early Liberalisation Option"). Where such an Existing GSM Licensee availed of the Early Liberalisation Option for its existing GSM 900 MHz and/or 1800 MHz spectrum rights, a rebate would be provided to the Existing GSM Licensee.

3.3.9 auction spectrum caps of:

- 2 × 50 MHz in the 800 MHz, 900 MHz and 1800 MHz frequency bands;
- 2 × 20 MHz in the 800 MHz and 900 MHz frequency bands; and
- 2 x 10 MHz in the 900 MHz band, for Temporal Lot 1.

3.3.10 an ability on the part of bidders to switch their bidding demand between the 800 MHz, 900 MHz and 1800 MHz frequency bands through an auction activity rule based on a system of eligibility points whereby twice as many eligibility points would be assigned to the 800 MHz and 900 MHz lots as against the 1800 MHz lot category and where such eligibility points would not be transferrable between Temporal Lot 1 and 2. Further detail on the activity rules will be set out in [FORTHCOMING DRAFT INFORMATION MEMORANDUM]

3.3.11 an assignment round in which, amongst other things, all GSM 900 MHz and 1800 MHz frequency rights existing in Time Slice 1 will be included and where, amongst other things, all such rights holders will be required to participate to determine the location of these existing GSM frequency rights in Temporal Lot 1. Where an Existing GSM Licensee does not avail of the Early Liberalisation Option in Temporal Lot 1 and does not win spectrum rights in Temporal Lot 2 compensation will be provided for the relocation costs it incurs further to the assignment round. Where an Existing GSM Licensee does not avail of the Early Liberalisation Option in Temporal Lot 1 and wins spectrum rights in Temporal Lot 2 compensation will be provided only for the additional "time value of

money" costs (but not for relocation costs themselves) to Existing GSM Licensee having regard to the following factors:

- an appropriate Weighted Average Cost of Capital (WACC);
- changes in the relocation costs for the time period between when these costs are actually incurred and when they would have incurred in the future if there had been no assignment round; and
- pro-rata to the quantum of time involved.

3.3.12 minimum price for licences with liberalised rights of use to 800, 900 and 1800 MHz spectrum bands as follows:

- for a Liberalised-Use Licence in Temporal Lot 1:
  - the reserve price would be €3.34 million with Spectrum Usage Fees (SUFs) of €1.21 million per annum for each 2 × 5 MHz lot of liberalised rights of use in respect of 800 MHz or 900 MHz spectrum;
  - the reserve price would be €1.67 million with SUFs of €0.60 million per annum for each 2 × 5 MHz lot of liberalised rights of use in respect of 1800 MHz spectrum;
  - SUFs would be subject to a simple form of indexation reflecting the annual rate of inflation using the CPI published by the Central Statistics Office; and
- for a Liberalised-Use Licence in Temporal Lot 2:
  - the reserve price would be €8.48 million with SUFs of €1.21 million per annum for each 2 × 5 MHz lot of liberalised rights of use in respect of 800 or 900 MHz spectrum;
  - the reserve price would be €4.24 million with SUFs of €0.60 million per annum for each 2 × 5 MHz lot of liberalised rights of use in respect of 1800 MHz spectrum; and
  - SUFs would be subject to a simple form of indexation reflecting the annual rate of inflation using the CPI published by the Central Statistics Office

3.3.13 additional SUFs for each day a Liberalised-Use Licence commences earlier than the proposed commencement date for Temporal Lot 1, based on the applicable SUFs identified above.

3.3.14 an agreement on the part of all Eligible Parties - if successful in winning any liberalised rights of use in the 900 MHz and 1800 MHz frequency bands - to participate in the establishment and implementation of a Project Plan that would identify project milestones and related deliverables concerning transitional activities required to be completed by Eligible Parties prior to the commencement of Liberalised-Use Licences in Temporal Lot 1, including agreement to the payment of

liquidated damages where an Eligible Party fails to discharge their obligations in accordance with the milestones set out in the Project Plan.

3.4 upon application properly being made to it by Eligible Parties within the terms of the Liberalised-Use Licence Regulations as made following the obtaining of ministerial consent, and on payment of the Fees prescribed thereby, to grant Liberalised-Use Licences to Eligible Parties, under section 5 of the Wireless Telegraphy Act 1926 for the period, and subject to the conditions and restrictions (including conditions as to revocation), prescribed in the such Liberalised-Use Licence Regulations, including, as appropriate, the schedules to the Liberalised-Use Licences as set out in [Annex XX] to ComReg Document [11/xx] [FORTHCOMING DRAFT INFORMATION MEMORANDUM].

3.5 upon application properly being made to it by Eligible Parties within the terms of the Preparatory Licence Regulations as made following the obtaining of ministerial consent, to grant Preparatory Licences to Eligible Parties, under section 5 of the Wireless Telegraphy Act 1926 for the period, and subject to the conditions and restrictions (including conditions as to revocation), prescribed in the such Preparatory Licence Regulations, including, as appropriate, the schedules to the Preparatory Licences as set out in [Annex XX] to ComReg Document [11/xx] [FORTHCOMING DRAFT INFORMATION MEMORANDUM].

4. STATUTORY POWERS NOT AFFECTED

4.1. Nothing in this Decision shall operate to limit ComReg in the exercise of discretions or powers, or the performance of functions or duties, or the attainment of objectives under any primary or secondary legislation applicable to ComReg from time to time.

ALEX CHISHOLM

CHAIRPERSON

THE COMMISSION FOR COMMUNICATIONS REGULATION

THE DAY OF 2011

Annex aa – Draft Liberalised-Use Licence Regulations and Draft Preparatory Licence Regulations [FORTHCOMING DRAFT INFORMATION MEMORANDUM]

Annex bb – Draft Liberalised-Use Licence [FORTHCOMING DRAFT INFORMATION MEMORANDUM] and Draft Schedules [Annex 8 of COMREG DOCUMENT 11/60]

Annex cc – Draft Preparatory Licence and Draft Schedules [FORTHCOMING DRAFT INFORMATION MEMORANDUM]

Chapter 9

Submitting Comments and Next Steps

9.1 All input and comments are welcome; however, it would make the task of analysing responses easier if comments were referenced to the relevant section of each chapter and annex from this document.

9.2 Please also set out your reasoning and all supporting information for any views expressed.

9.3 The period for comment will run until 5 pm on 30 September 2011, during which time ComReg welcomes written comments on any of the issues raised in this paper.

9.4 Although this response to consultation and draft Decision has raised issues of a complex nature, ComReg notes the significant amount of detail already in the public domain (through ComReg's consultation process and publication of all non-confidential material received over the period of this consultation process) and therefore considers that the period for comment provides sufficient time for interested parties to revert. Consequently, any extension to this deadline is unlikely.

9.5 In order to promote further openness and transparency ComReg will publish all respondents' submissions to this response to consultation, subject to the provisions of ComReg's guidelines on the treatment of confidential information[147].

9.6 We would request that electronic submissions be submitted in an unprotected format so that they can be appended into the ComReg submissions document for publishing electronically.

9.7 ComReg appreciates that many of the issues raised in this paper may require respondents to provide confidential information if their comments are to be meaningful. As it is ComReg's policy to make all responses available on its website and for inspection generally, respondents to consultations are again requested clearly to identify confidential material, and to place confidential material in a separate annex to their response, also providing supporting reasoning as to why such material is confidential in this annex.

9.8 In anticipation of receiving correspondence on matters relating to this document, ComReg hereby gives notice that it will publish all material correspondence received in this regard. Such information will be subject to the provisions of ComReg's guidelines on the treatment of confidential information[148].

Next Steps

9.9 All submissions which are received will be published (redacted as necessary in order to take account of any confidential or commercially sensitive information).

[147] Document 05/24 - Response to Consultation - Guidelines on the treatment of confidential information - March 2005.
[148] Ibid.

9.10 When it has concluded its review of all of the submissions received, and other relevant material, ComReg's intention would be then to proceed to put together and publish its final Decision on this matter.

9.11 ComReg also intends to publish a draft information memorandum and a draft SI in advance of publishing its final Decision. The draft information memorandum will outline in detail the processes and procedures ComReg currently envisages it will employ when implementing its broader spectrum-release proposals as referred to in this draft Decision and the draft S.I. will be the enabling instrument. Interested parties will be welcome to comment on the draft Information memorandum and Draft S.I. when they are published. ComReg will have due regard to all comments received before putting together and publishing its final information memorandum. ComReg also intends to hold workshops with interested parties as well as running a trial auction(s) to familiarise interested parties with the auction software.

9.12 ComReg notes that any material changes made in ComReg's final RIA and final Decision may require subsequent changes to be made to the draft Information Memorandum and ComReg reserves the right to do so, if required.

9.13 ComReg remains very conscious of the desirability of completing this spectrum award process in a timely fashion, and it remains ComReg's intention to complete by year-end the proposed competitive process for the selection of parties to whom rights of use for the radio frequencies concerned are to be granted. However, ComReg notes that this is a relatively challenging timescale for all concerned and further that it cannot commit to this timetable, nor give precise dates for intervening publications, in advance of receiving and analysing submissions now invited to this consultation.

9.14 Separately, ComReg will be publishing shortly its response to consultation and spectrum management strategy statement along with the responses received to Consultation 11/28.