



An Coimisiún um
Rialáil Cumarsáide
Commission for
Communications Regulation

Proposed Multi Band Spectrum Award

Preliminary consultation on which spectrum
bands to award

Consultation

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Chapter 1

1 Introduction

- 1.1 In September 2014, the Commission for Communications Regulation (“ComReg”) issued a consultation paper on a proposed award of spectrum rights of use suitable for the provision of wireless broadband (both mobile and fixed broadband) services (“WBB”) (Document 14/101¹). In particular, the radio spectrum bands considered potentially suitable for award at that time were the 700 MHz², 1.4 GHz³, 2.3 GHz⁴, 2.6 GHz⁵ and 3.6 GHz⁶ bands (see paragraph 3.58 of 14/101).
- 1.2 Following that consultation and having regard to the views of interested parties who responded to same⁷, ComReg published an Information Notice indicating that it intended to consider the possible release of rights of use in the 3.6 GHz Band in a separate competitive award process⁸. ComReg proceeded to consult upon and finalise the award of spectrum rights of use in the 3.6 GHz Band⁹. This auction took place in the first half of 2017, and on 1 June 2017 the final results of same were published in Document 17/46¹⁰.
- 1.3 Whilst progressing the 3.6 GHz award process, ComReg was also actively engaged with relevant stakeholders to progress the repurposing of the 700 MHz Band from its current use for digital terrestrial television (“DTT”) services to its use by terrestrial systems capable of providing WBB electronic communications services (“ECS”)¹¹. It has been established that 4 March 2020 is the date by which DTT services are to be migrated from the 700 MHz Band in Ireland, thereby making the band available for use for other services. This development is detailed further in Chapter 3.

¹ Document [14/101](#)

² 700 MHz Band: 694 – 790 MHz.

³ The frequency range discussed in Document 14/101 was the 1.4 GHz “Centre Band” spanning the frequency range 1452-1492 MHz.

⁴ 2.3 GHz Band: 2300 – 2400 MHz.

⁵ 2.6 GHz Band: 2500 – 2690 MHz.

⁶ 3.6 GHz Band: 3400 – 3800 MHz.

⁷ See Document 15/15 – <https://www.comreg.ie/csv/downloads/ComReg1515.pdf>.

⁸ See Document 15/14 – <https://www.comreg.ie/csv/downloads/ComReg1514.pdf>.

⁹ See Documents 15/70, 15/140, 16/22, 16/57 and 16/71 all of which are available on the 3.6 GHz Spectrum Band award webpage at: <https://www.comreg.ie/industry/radio-spectrum/spectrum-awards/3-6ghz-band-spectrum-award/> .

¹⁰ Document 17/46 – <https://www.comreg.ie/publication/results-3-6-ghz-band-spectrum-award-2/>

¹¹ In accordance with Commission Implementing Decision (EU) 2016/687 of 28 April 2016 on the harmonisation of the 694-790 MHz frequency band for terrestrial systems capable of providing wireless broadband electronic communications services and for flexible national use in the Union.

- 1.4 In addition, when consulting upon and finalising its most recent Radio Spectrum Management Strategy Statement¹² and its Electronic Communications Strategy Statement¹³, ComReg noted its intention to continue to develop its award proposals in relation to the 700 MHz, 1.4 GHz, 2.3 GHz, and/or 2.6 GHz bands. As outlined in Chapter 2 of this document, this proposal was positively received and a work plan item was included in ComReg’s Annual Action Plan¹⁴.
- 1.5 ComReg is issuing this preliminary consultation with a view to revisiting and further consulting upon this matter, with particular focus upon the issue of which spectrum bands should be included in the proposed award of spectrum rights of use suitable for the provision of WBB ECS (“Proposed Award”).
- 1.6 ComReg envisages that responses to this preliminary consultation will inform a draft regulatory impact assessment (“RIA”) on which band(s) to award (and how best to assign rights of use in those band(s)) and facilitate the development of more informed and detailed award proposals, which will be set out in a subsequent consultation document.
- 1.7 The remainder of this document is structured as follows:
- **Chapter 2** provides information on spectrum bands potentially suitable for the Proposed Award. It firstly sets out summary background information from relevant ComReg consultations (e.g. Document 14/01) which discussed the potential award of the aforementioned spectrum bands. The chapter also introduces the 2.1 GHz band, and other spectrum bands which might be suitable for the future provision of WBB. The chapter then identifies those bands which merit further discussion in Chapter 3;
 - **Chapter 3** sets out some background information, recent developments (both national and international) and other relevant material in relation to the bands identified at the end of Chapter 2. The chapter then identifies “candidate bands” for assessment in Chapter 4;
 - **Chapter 4** outlines ComReg’s high-level assessment of the candidate bands and preliminary view on what bands should be included in the Proposed Award;
 - **Chapter 5** sets out how to submit comments and the next steps in this process;
 - **Annex 1**: Glossary; and

¹² Documents [15/131](#), [16/49](#) and [16/50](#).

¹³ Documents [16/116](#), [17/30](#) and [17/31](#).

¹⁴ <https://www.comreg.ie/media/2018/04/Annual-Action-Plan-April-2018.pdf>.

- **Annex 2:** Summary of ComReg's statutory functions, objectives and duties relevant to the management of Ireland's radio frequency spectrum.

Chapter 2

2 Information on spectrum bands potentially suitable for WBB

2.1 The objective of this chapter is to assess a broad range of potential bands and identify those bands which appear suitable for more detailed consideration in relation to their potential inclusion in the Proposed Award. To this end, this chapter provides summary information in relation to:

- those ComReg consultation processes where the potential release of spectrum bands suitable for WBB were discussed. This includes relevant information:
 - from Document 14/101 and some relevant responses to same;
 - from the most recent consultation on the Radio Spectrum Management Strategy Statement¹⁵ and the Electronic Communications Strategy Statement¹⁶; and
 - on the 2.1 GHz band which has been flagged in recent ComReg documents¹⁷ for consideration as a potential band for inclusion in the Proposed Award; and
- the spectrum bands that could be used for the provision of future “5G” services. This draws upon, among other things, ComReg’s response to consultation on its 26 GHz Spectrum Award 2018¹⁸ and the Radio Spectrum Policy Group’s (“RSPG”)¹⁹ first and second opinions on the strategic spectrum roadmap for 5G in Europe²⁰.

2.2 First, brief preliminary observations on each of the spectrum bands discussed in this chapter are set out, and then, based on those observations, a list of bands is identified which are suitable for more detailed consideration in Chapter 3.

¹⁵ Document [16/50](#).

¹⁶ Document [17/31](#).

¹⁷ Documents [17/23](#) and [17/30](#).

¹⁸ Document [18/12](#).

¹⁹ The RSPG is a high level advisory group that assists the European Commission (“EC”) in the development of radio spectrum policy.

²⁰ RSPG16-032 and RSPG 18-005 – available on <http://rspg-spectrum.eu/rspg-opinions-main-deliverables/> .

2.1 Spectrum bands for wireless broadband (WBB)

2.1.1 Document 14/101

Summary of award proposal

2.3 In Document 14/101, ComReg set out and consulted upon its preliminary views in relation to a potential award of spectrum rights of use in the 2.6 GHz Band along with, potentially, the 700 MHz²¹, 1.4 GHz²², 2.3 GHz and 3.6 GHz bands in a single award process.

2.4 Informing its proposals, ComReg among other things:

- noted its stated intention, as set out in its Strategy Statement for Electronic Communications 2014-2016 (Document 14/75), to initiate a project to consult on the award of spectrum rights suitable for WBB services (both fixed and mobile);
- identified the 2.6 GHz Band as the key band²³ for the proposed award process noting, among other things, the then imminent availability of this band in April 2016 following the expiry of the existing Microwave Multipoint Distribution System (“MMDS”) licences;
- noted that potential interest in the 2.6 GHz Band was most likely to be in relation to the provision of WBB services;
- noted the benefits of the simultaneous release of spectrum bands which may be substitutable²⁴ or complementary²⁵ to the 2.6 GHz Band, including more efficient assignment and use of spectrum, and the promotion of competition; and

²¹ In relation to the 700 MHz Band, ComReg noted that there were timing availability uncertainties which made the proposed inclusion of the 700 MHz Band in the award process uncertain. Nevertheless, ComReg included the 700 MHz Band in the award process consultation to avoid undue delays in the event that these uncertainties were subsequently addressed. See paragraphs 2.43 and 3.74 of Document [14/101](#).

²² As noted earlier the Document [14/101](#) discussed the 1.4 GHz Centre Band consisting of the frequency range 1452-1492 MHz

²³ Paragraph 1.1 of Document [14/101](#)

²⁴ The terms substitute/substitutable/substitutability in relation to the proposed award process in Document [14/101](#) can be taken as referring to spectrum bands which can serve the same purpose for potential licensees and so those potential licensees are relatively indifferent to switching between those bands.

²⁵ The terms complement/complementary/complementarity in relation to the proposed award process in Document [14/101](#) can be taken as referring to spectrum bands where the value attributed by a potential user to spectrum rights in one band is enhanced by having or winning spectrum rights in another band.

- based on relevant information at the time²⁶, considered a number of other potential WBB spectrum bands before excluding them from further consideration²⁷.

2.5 In undertaking a preliminary assessment of the additional bands under consideration for inclusion in an award process with the 2.6 GHz Band, ComReg had regard to, among other things, the following four criteria:

- degree of harmonisation;
- availability of spectrum;
- propagation characteristics; and
- equipment availability.

2.6 Having applied these criteria, ComReg proposed the 700 MHz, 1.4 GHz, 2.3 GHz and 3.6 GHz bands as being additional bands suitable for further consideration²⁸.

Summary of relevant views received

2.7 Fifteen responses were received to Document 14/101, non-confidential versions of which were published in ComReg Document 15/15.

2.8 The responses received referenced a wide range of issues. A high level summary of the responses relevant to the current issue of which bands to include in the Proposed Award is set out below (this excludes submissions in respect of the 3.6 GHz Band which has since been subject to a separate award process):

²⁶ For example, RSPG 13-521 rev 1 “*The RSPG Opinion on the Strategic Challenges Facing Europe in Addressing the Growing Spectrum Demand for Wireless Broadband*”, dated 13 June 2013, identified a number of potential WBB spectrum bands in the range 400 MHz to 6 GHz. available on <http://rspg-spectrum.eu/rspg-opinions-main-deliverables/>

²⁷ Spectrum bands outside of the 400 MHz – 6 GHz range were discussed in Section 2.3.3 of Document [14/101](#).

- The 10.154 GHz – 10.672 GHz band (“10.5 GHz FWALA Band”) and the 24.549 GHz – 25.781 GHz band (the “26 GHz FWALA Band”) were not identified for further consideration as ComReg had no plans to discontinue the FWALA licensing regime in these bands;
- The 24.773 GHz – 26.453 GHz band (referred to as the “26 GHz Band” in Document [14/101](#)) was not identified for further consideration as this band had not been identified for WBB services at a European level. Note: this band referred to the spectrum assigned on a national basis - by way of a competitive award process, for point-to-point and point-to-multipoint services – licences for which are due to expire in 2018; and
- The 10.0 GHz -10.154 GHz band (“10.1 GHz Band”) was not identified for further consideration as previous consultations indicated “very low interest” in this band.

²⁸ See paragraph 3.58 of Document [14/101](#).

- Digital Europe supported the release of bands to increase the availability of high speed mobile services, and observed that the 700 MHz, 1.4 GHz and 2.3 GHz bands were new bands that could be considered for this purpose.
- Both Huawei and Qualcomm expressed the view that the 700 MHz, 1.4 GHz, 2.3 GHz and 2.6 GHz bands should be included in the proposed award process.
- Eir submitted that the 700 MHz Band, and not the 2.6 GHz Band, should be the focus band for the proposed award, subject to the former's harmonisation at European level and appropriate clearance planning of the existing use.
- RTÉ noted that the proposed award of the 700 MHz Band would cause it, as the main licensee in this band, to incur significant costs in releasing the band for other uses. Accordingly, RTÉ suggested that an appropriate cost-benefit analysis should be undertaken along with the consideration of a compensation mechanism before the band is awarded.
- Three²⁹ and Vodafone³⁰ submitted that at that time it may have been premature to consider the release of the 700 MHz and 1.4 GHz bands.
- Three also submitted that there was widespread uncertainty regarding the use of the 2.3 GHz Band in Europe.
- Eir also considered that the 410 MHz (i.e. 410 – 414 MHz paired with 420–424 MHz) and 870 MHz (i.e. 872- 876 MHz paired with 917 – 921 MHz) bands and the spectrum rights currently used by 26 GHz point-to-point licences were not appropriate for the proposed award and should be considered separately in a timely manner.
- ESB Networks (ESBN) suggested that, in addition to the bands proposed in Document 14/101, the 410 MHz³¹ and the 870 MHz³² bands should be awarded in the same process because, in its view, they are substitutable and/or complementary to the bands proposed in Document 14/101.

²⁹ Three Ireland (Hutchison) Ltd.

³⁰ Vodafone Ireland Ltd.

³¹ In July 2017, ComReg issued a consultation (Document [17/67](#)) on the proposed release of the 410-415.5 / 420-425.5 MHz sub-band. In December 2017, ComReg issued its response to consultation (Document [17/105](#)) and outlined the next steps in this process. This included ComReg's intention to procure services to assist in the design of a suitable spectrum award process and to advise it on an appropriate fee structure.

³² In May 2016, ComReg updated its Short Range Device (SRD) document (Document [02/71R](#)) to exempt short range devices in the 870 - 876 MHz and 915 - 921 MHz bands from licensing, according to the conditions of CEPT Rec 70-03. This action was consulted upon in the Radio Spectrum Management Strategy and was welcomed by ESBN in its response to same. See section 3.7 of Document [16/49](#).

2.1.2 ComReg consultations on its Radio Spectrum Management and Electronic Communications Strategy Statements

Summary of consultation proposals

2.9 In its consultations on its most recent Radio Spectrum Management Strategy Statement and Electronic Communications Strategy Statement (Documents 15/131 and 16/115 respectively), ComReg set out its work plan intention to:

- actively engage with relevant stakeholders to progress the repurposing of the 700 MHz Band so as to obtain clarity on the timing of its availability; and
- further develop award proposals in relation to the 700 MHz, 1.4 GHz, 2.3 GHz and 2.6 GHz bands.

Summary of submissions received to Documents 15/131 and 16/115

2.10 Fourteen responses were received to Document 15/131 and ten responses were received to Document 16/115, non-confidential versions of which were published in Document 15/131s and Document 17/30a, respectively.

2.11 For the purposes of this consultation, a summary of the views received to both consultations relevant to the issue of a potential release of spectrum for WBB is outlined below.

2.12 In the responses to the Radio Spectrum Management Strategy consultation:

- both Three and Vodafone expressed support for ComReg's proposal to progress the repurposing of the 700 MHz Band. Vodafone also observed that the 700 MHz Band is an important band for wide area coverage and data services³³;
- Three submitted that ComReg should continue to clarify its position on the timing of the availability of the other bands (700 MHz, 1.4 GHz, 2.3 GHz and 2.6 GHz) in parallel with its work on the award of the 3.6 GHz Band³⁴; and
- Vodafone submitted that ComReg should accelerate the award process for the 2.6 GHz Band, and that further auctions for the other bands discussed

³³ See section 3.3.2 of Document [16/49](#).

³⁴ See section 3.3.3 of Document [16/49](#).

in Document 14/101 (i.e. 700 MHz, 1.4 GHz, 2.3 GHz) could take place at a later date³⁵.

2.13 In the responses to the Electronic Communications Strategy Statement consultation:

- Three submitted that sufficient spectrum to meet future demand in the mobile communications market needs to be released; and
- Vodafone submitted that ComReg should release key spectrum bands which would enhance rural mobile coverage and support capacity and, in this regard, referenced the 2.6 GHz and 700 MHz bands³⁶.

Summary of ComReg's finalised response

2.14 Having taken due account of responses received³⁷, ComReg noted in its response to the submissions to the Electronic Communications Strategy Statement that³⁸:

"...it plans to progress the process, or processes, to award spectrum rights of use in the 700 MHz, 1.4 GHz, 2.3 GHz, 2.6 GHz and other substitutable or complementary bands such as the 2.1 GHz bands (noting that the licences in this band expire in 2022 and 2027 respectively)."

2.15 ComReg also included the following work plan item in its finalised Radio Spectrum Management Strategy Statement and Electronic Communications Strategy Statement³⁹:

"...to significantly progress the process, or processes, to award spectrum rights of use in the 700 MHz, 1.4 GHz, 2.3 GHz and/or 2.6 GHz bands."

³⁵ See section 3.3.3 of Document [16/49](#).

³⁶ See paragraph 32 and 48 of Document [17/30](#).

³⁷ ComReg's consideration of the views of respondents to Documents [15/131](#) and [16/116](#) is set out in Documents [16/49](#) and [17/30](#), respectively.

³⁸ Paragraph 57 of Document [17/30](#).

³⁹ Documents [16/50](#) and [17/31](#), respectively.

2.2 The 2.1 GHz Band

2.16 In Documents 17/23 and 17/30⁴⁰ and in its Annual Action Plan for 2018⁴¹, ComReg noted that the 2.1 GHz Band⁴² could be considered for inclusion in the Proposed Award in light of its suitability for WBB and its substitutability with and/or complementary to one or more of the 700 MHz, 1.4 GHz, 2.3 GHz and 2.6 GHz bands.

2.17 Other relevant factors supporting the potential inclusion of this band include that:

- three of the four 3G licences in this band expire in 2022, bringing the potential availability of this band within or proximate to the expected timeframe of the Proposed Award;
- even if the relevant licences have not yet expired by the time of the Proposed Award, there is the potential, via an “early liberalisation option” as employed by ComReg in its 2012 MBSA⁴³, for the Proposed Award to facilitate the liberalisation of the 2.1 GHz Band for existing licences (in accordance with Decision 2012/688/EU⁴⁴) by way of a market mechanism; and
- any such early liberalisation of the 2.1 GHz Band could bring benefits to consumers by providing existing licensees with the opportunity to make use of existing rights for technologies other than UMTS if they so choose.

2.3 Spectrum bands that could be used for “5G” WBB

2.18 While the final requirements for all aspects of 5G have are yet to be finalised⁴⁵, there is common agreement on the main families of usage scenarios and applications that 5G might support, the three can be identified as follows

⁴⁰ See paragraph 9 of ComReg Information Notice [17/23](#) *Progress update on DTT migration to below the 700 MHz band: International coordination of Ireland's DTT spectrum plan*, and paragraph 57 of Document [17/30](#).

⁴¹ See page 5 of <https://www.comreg.ie/media/2018/04/Annual-Action-Plan-April-2018.pdf>

⁴² This band consists of

- paired FDD spectrum rights in the frequency range 1920 -1980 MHz and 2110 -2170 MHz (“Paired 2.1 GHz Band”); and
- unpaired TDD spectrum rights in the frequency range 1900-1920 MHz (“Unpaired 2.1 GHz Band”).

⁴³ <https://www.comreg.ie/industry/radio-spectrum/spectrum-awards/multi-band-spectrum-award-2012/>

⁴⁴ Decision 2012/688/EU: “Commission implementing decision of 5 November 2012 on the harmonisation of the frequency bands 1 920-1 980 MHz and 2 110-2 170 MHz for terrestrial systems capable of providing electronic communications services in the Union”
<http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32012D0688>

⁴⁵ Noting that the 3GPP have finalised on June 2018 the 5G NR standalone specifications.
<https://www.mobileworldlive.com/featured-content/top-three/3gpp-clears-5g-for-take-off-with-standalone-nr-specs/>

- enhanced WBB connectivity;
- connectivity of millions of devices that would enable massive machine type communications; and
- resilient, instantaneous connectivity, that would enable ultra-reliable and low latency communications.

For the purposes of the Proposed Award, ComReg is considering the spectrum bands that could be used for “5G” in the context of them being suitable for the provision of WBB ECS.

- 2.19 In its response to consultation and decision on the 26 GHz Spectrum Award 2018 (Document 18/12), ComReg set out its views on spectrum that could be used for 5G services⁴⁶. ComReg observed that 5G spectrum award matters generally would be considered as part of the next Radio Spectrum Management Strategy Statement consultation. While the forthcoming Radio Spectrum Management Strategy Statement consultation will consider such matters, information on the potential spectrum bands for 5G WBB may also be relevant to the identification of bands for potential inclusion in the Proposed Award.
- 2.20 For example, for spectrum below 6 GHz, the RSPG’s first (RSPG 16-032) and second (RSPG 18-005) opinions:
- identify the 3.6 GHz Band (which has already been awarded by ComReg) as the primary band for 5G; and
 - identify that 5G will need to be deployed in bands already harmonised below 1GHz, including, in particular, the 700 MHz Band.
- 2.21 In Document 18/12⁴⁷, ComReg noted that spectrum bands already licensed (in particular the 3.6 GHz Band) and spectrum bands identified for potential award (in particular the 700 MHz Band) will be part of the specifications for 5G⁴⁸ that are due to be released by the third Generation partnership Project (“3GPP”) in mid-2018 and that this may delay interest in, and demand for, spectrum in the 24.25 - 27.5 GHz (the “26 GHz Band”) for 5G.
- 2.22 For spectrum above 6 GHz, the RSPG opinions identify three potential spectrum bands suitable for 5G⁴⁹ that are above 24 GHz and, in that connection, note that:

⁴⁶ See section 2.2.

⁴⁷ See paragraphs 2.19 and 2.20.

⁴⁸ Specifically, the specifications will refer to the 5G New Radio (NR) bands.

⁴⁹ In its second RSPG option, the RSPG indicated that the 32 GHz Band should no longer be considered as a priority band for 5G for a variety of reasons available on <http://rspg-spectrum.eu/rspg-opinions-main-deliverables/>

- the 26 GHz Band is the pioneer band for 5G in Europe above 24 GHz;
- the frequency range 40.5-43.5 GHz (the “42 GHz Band”) is a viable option for 5G in the longer term; and
- the frequency range 66-71 GHz could be an important band for 5G, where spectrum access facilitated under a general authorisation (rather than individual rights of use) is currently foreseen.

2.23 Given the position of the RSPG in respect of the 42 GHz Band (i.e. longer term) and 66-71 GHz band (currently identified for access via general authorisation), ComReg is of the view that these bands do not warrant further consideration in relation to the Proposed Award. However, in relation to the 26 GHz Band, further consideration appears warranted in light of its status as a pioneer band for 5G in Europe above 24 GHz and its more advanced status compared to the 42 GHz and 66-71 GHz bands.⁵⁰

2.4 ComReg’s preliminary observations

2.24 In light of the observations set out in sections 2.1 to 2.3 above, ComReg has identified the 700 MHz, 1.4 GHz, 2.1 GHz, 2.3 GHz, 2.6 GHz and 26 GHz bands as warranting further consideration in Chapter 3.

2.25 In terms of other bands discussed in Document 14/101 or by respondents to Document 14/101 and which, in ComReg’s preliminary view, do not warrant further consideration in relation to the Proposed Award, ComReg notes the following:

- the 410 MHz and the 870 MHz bands – ComReg has already taken separate actions in relation to both;
- the 10.1 GHz Band – this is not a harmonised band and, as indicated in Document 14/101, there would likely continue to be “very low interest” in this band; and
- the 10.5 GHz and 26 GHz FWALA Bands – ComReg currently has not indicated any intention to discontinue the current FWALA licensing regime in these bands.

⁵⁰ For example, ComReg observes that the 26 GHz Band is currently being considered for a CEPT technical harmonisation decision, while work in the other mmWave bands is solely focused on compatibility and sharing studies in preparation for WRC-19.

2.26 In the following chapter, background and band specific developments are therefore provided in respect of the following bands: 700 MHz, 1.4 GHz, 2.1 GHz, 2.3 GHz, 2.6 GHz and 26 GHz. This is with a view to identifying candidate bands which are suitable for assessment in Chapter 4 as to whether they should be included in the Proposed Award.

Chapter 3

3 Band Specific Developments

3.1 In this chapter, ComReg firstly sets out for each band:

- some background information on the band; and
- recent developments - both national and international - and other relevant material, having regard to some of the criteria applied by ComReg in Document 14/101 in identifying which bands may be suitable for inclusion in the proposed award process (i.e. degree of harmonisation, availability of spectrum and equipment availability⁵¹).

3.2 It then identifies “candidate bands” for further consideration in Chapter 4.

3.1 700 MHz Band

3.3 The 700 MHz Band consists of 96 MHz of spectrum and spans the frequency range 694 MHz – 790 MHz.

3.4 In light of the various European harmonisation measures relating to this band (outlined in section 3.1.1 below), it is helpful for analytical purposes to identify and define specific portions within the 700 MHz Band as follows:

1. “700 MHz Duplex”: consisting of the paired frequency range 703–733 MHz and 758–788 MHz;
2. “700 MHz Duplex Gap”: in the frequency range 733–758 MHz; and
3. “700 MHz Guard Bands”⁵² comprising:
 - i. the “700 MHz Lower Guard Band”: in the frequency range 694 – 703 MHz; and
 - ii. the “700 MHz Upper Guard Band”: in the frequency range 788 – 791 MHz.⁵³

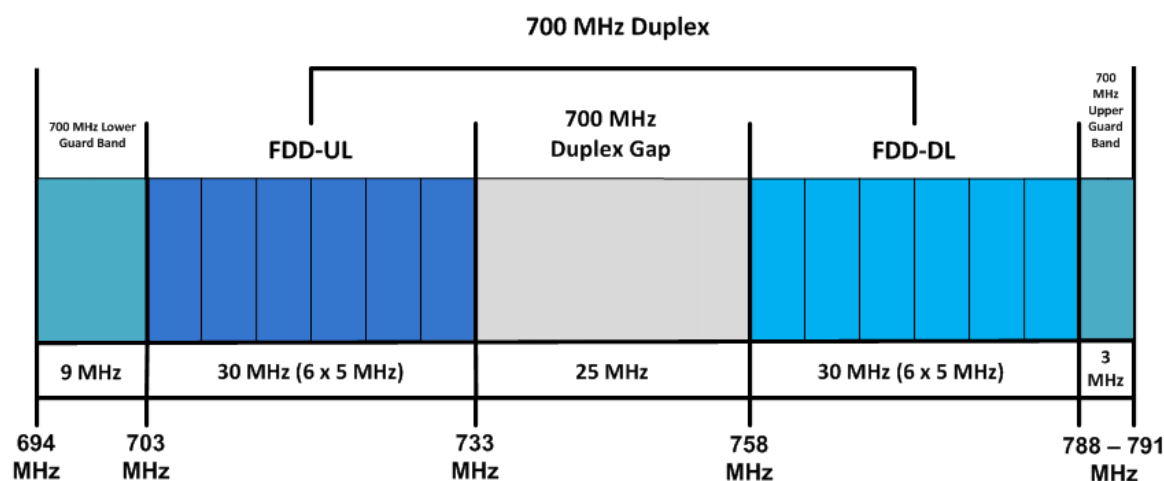
⁵¹ The fourth factor considered by ComReg in Document [14/101](#) (i.e. propagation characteristics) does not require any update for the bands identified in Document 14/101. However, this factor may still be relevant for bands not considered in Document 14/101 when considering which bands to include for award.

⁵² The use of the term guard bands for these specific portions of the 700 MHz Band does not prevent this spectrum from being assigned and used for WBB in accordance with relevant European harmonisation measures.

⁵³ Note that the 1 MHz above 790 MHz is also subject to the 800 MHz EC Decision ([2010/267/EU](#)), where it is identified as a guard band before the lower duplex of the 800 MHz band which starts at 791 MHz.

- 3.5 The 700 MHz Band, broken down into the four specific portions identified above, is illustrated in Figure 1 below.

Figure 1: The 700 MHz Band



3.1.1 700 MHz Band - Degree of Harmonisation

- 3.6 The 700 MHz Band is harmonised at three levels within Europe: (i) by the European Conference of Postal and Telecommunications Administrations (“CEPT”), (ii) by the European Commission (“EC”) and (iii) by the European Parliament and Council, as follows:
- (i) The least restrictive technical conditions (“LRTC”) and frequency arrangements for the introduction of mobile fixed communication networks (“MFCNs”) in the 700 MHz Band are harmonised at CEPT level by way of ECC Decision 15(01) of 6 March 2015⁵⁴.
 - (ii) The above LRTC and frequency arrangements are reflected in EC Implementing Decision (EU) 2016/687 of 28 April 2016⁵⁵ (“700 MHz EC Decision”).
 - (iii) Decision 2017/899 of the European Parliament and Council of 17 May 2017 on the use of the 470-790 MHz frequency band in the EU (“UHF Band EP&C Decision”) which:

⁵⁴ Entitled “Harmonised technical conditions for mobile/fixed communications networks (MFCN) in the band 694-790 MHz including a paired frequency arrangement (Frequency Division Duplex 2x30 MHz) and an optional unpaired frequency arrangement (Supplemental Downlink)”.

⁵⁵ COMMISSION IMPLEMENTING DECISION (EU) 2016/687 of 28 April 2016 on the harmonisation of the 694-790 MHz frequency band for terrestrial systems capable of providing wireless broadband electronic communications services and for flexible national use in the EU.

- a. identifies 30 June 2020 as the date by which Member States shall allow the use of the 700 MHz Band for terrestrial systems capable of providing WBB ECS and only under the harmonised technical conditions set out in the 700 MHz EC Decision identified above⁵⁶; and
- b. provides that, in order to allow the use of the 700 MHz Band in accordance with the above obligation, Member States shall, by 31 December 2017, conclude all necessary cross-border frequency coordination agreements within the Union.⁵⁷

3.7 It should be noted that the 700 MHz EC Decision provides for a different level of harmonisation between the 700 MHz Duplex portion, on the one hand, and the remaining 700 MHz Duplex Gap and 700 MHz Guard Bands portions on the other. This is discussed below.

700 MHz Duplex

3.8 First, Article 3(1)(a) of the 700 MHz EC Decision provides that when Member States designate and make available the 700 MHz Band for use other than high-power broadcasting networks, they shall:

“designate and make available the 703-733 MHz and 758-788 MHz frequency bands [i.e. the 700 MHz Duplex], on a non-exclusive basis, for terrestrial systems capable of providing wireless broadband electronic communications services in compliance with the parameters set out in Sections A.1, B and C of the Annex” [emphasis added]

700 MHz Duplex Gap and 700 MHz Guard Bands

3.9 In contrast, Article 3(1)b of the 700 MHz EC Decision provides that, when Member States designate and make available the 700 MHz Band for use other than high-power broadcasting networks, they shall:

“subject to national decisions and choice, designate and make available the [700 MHz Duplex Gap and 700 MHz Guard Bands] portions of the 700 MHz frequency band, for use in compliance with the parameters set out in Sections A.2 to A.5 of the Annex” [emphasis added]

⁵⁶ Paragraph 1 of Article 1 of the UHF Band EP&C Decision.

⁵⁷ Paragraph 2 of Article 1 of the UHF Band EP&C Decision

3.10 In particular, the 700 MHz EC Decision gives Member States flexibility in terms of the potential uses of the 700 MHz Duplex Gap and 700 MHz Guard Bands (which are not mutually exclusive) as follows⁵⁸:

- Supplemental Downlink (“SDL”): of up to 20 MHz within the frequency range 738-758 MHz (i.e. up to 20 MHz of the 700 MHz Duplex Gap);
- Public Protection and Disaster Relief radio communications⁵⁹ (“PPDR”): where the frequency arrangement could consist of:
 - 2 x 5 MHz in the frequency range 698-703 MHz (i.e. part of the 700 MHz Lower Guard Band) and 753-758 MHz (i.e. part of the 700 MHz Duplex Gap); and/or
 - 2 x 3 MHz in the frequency range 733-736 MHz (i.e. part of the 700 MHz Duplex Gap) and 788 – 791 MHz (i.e. the 700 MHz Upper Guard Band);
- Machine to Machine radio communications⁶⁰ (“M2M”): the frequency arrangement could consist of 733-736 MHz (i.e. part of the 700 MHz Duplex Gap) and 788 – 791 MHz (i.e. the 700 MHz Upper Guard Band); and
- wireless Programme Making and Special Events⁶¹ (“PMSE”): the frequency arrangement could consist, in full or in part, of 694 – 703 MHz (i.e. the 700 MHz Lower Guard Band) and/or 733 – 758 MHz (i.e. the 700 MHz Duplex Gap).

3.11 The various options available at a national level pursuant to Article 3(1)(b) of the 700 MHz Decision are illustrated in Figure 2 below.

⁵⁸ As set in Sections A.2 to A.5 of the Annex to the 700 MHz EC Decision.

⁵⁹ Which is defined in the 700 MHz EC Decision as follows:

“public protection and disaster relief (PPDR) radio communications’ means radio applications used for public safety, security and defence used by national authorities or relevant operators responding to the relevant national needs in regard to public safety and security including in emergency situations.”

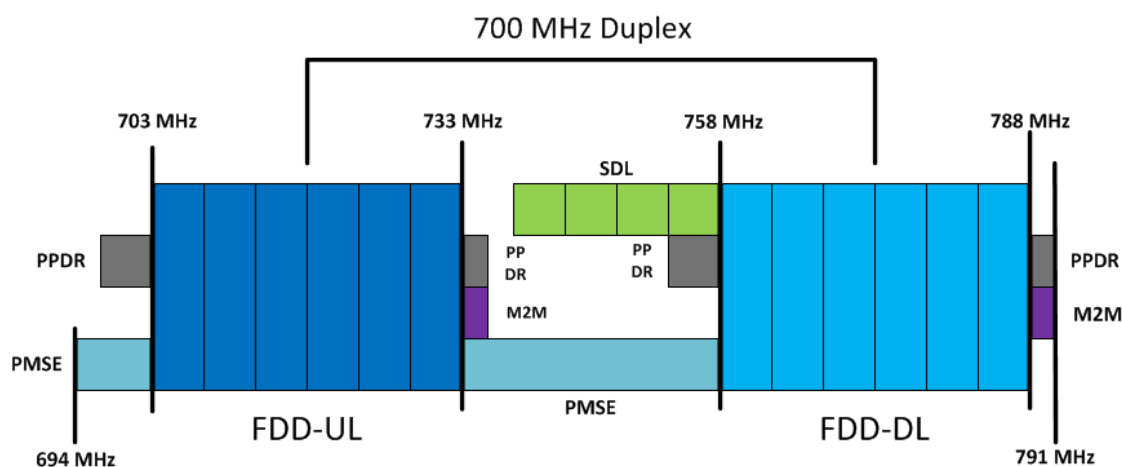
⁶⁰ Which is defined in the 700 MHz EC Decision as follows:

“machine-to-machine (M2M) radio communications’ means radio links for the purpose of relaying information between physical or virtual entities that build a complex ecosystem including the internet of Things; such radio links may be realised through electronic communications services (e.g. based on cellular technologies) or other services, based on licensed or unlicensed use of spectrum.”

⁶¹ Which is defined in the 700 MHz EC Decision as follows:

‘wireless audio PMSE equipment’ means radio equipment used for transmission of analogue or digital audio signals between a limited number of transmitters and receivers, such as radio microphones, in-ear monitor systems or audio links, used mainly for the production of broadcast programmes or private or public social or cultural events.”

Figure 2: The 700 MHz Band showing the national Options for the use of the 700 MHz Guard Bands and 700 MHz Duplex Gap.



3.1.2 700 MHz Band - Spectrum Availability

- 3.12 RTÉ currently holds licences in the UHF band that span the range 470- 790 MHz (i.e. including the 700 MHz Band) which are used for the provision of DTT.
- 3.13 As noted previously, at the same time that ComReg was progressing its consultation and award of spectrum rights in the 3.6 GHz Band, it also engaged with relevant stakeholders to progress the repurposing of the 700 MHz Band. It has now been established that 4 March 2020 is the date by which DTT services are to be migrated from the 700 MHz band in Ireland and the date from which the 700 MHz Band will be available for other services.
- 3.14 ComReg previously set out details of how this date was determined, along with further information on the results of the international coordination process, in its Information Notice of 31 March 2017 (Document 17/23)⁶².
- 3.15 As such, all of the necessary regulatory steps have been taken to enable the clearance of the 700 MHz Band of existing DTT services by 4 March 2020 (and therefore within the 30 June 2020 deadline identified in the UHF Band EP&C Decision), making the band available for consideration for inclusion in the Proposed Award.

⁶² Document [17/23](#)

3.1.3 700 MHz Band - Equipment Availability

700 MHz Duplex

- 3.16 The 3GPP identifies the 700 MHz Duplex as Band 28⁶³ and, as at May 2018, the Global Mobile Supplier Association (“GSA”) identified 1,211 devices as being capable of operating in this band⁶⁴.
- 3.17 By way of comparison, the devices reported by the GSA as being capable of operating in the spectrum bands suitable for WBB already licensed in Ireland, as at May 2018, are set out below:
- 800 MHz (Band 20): 4,558 devices;
 - 900 MHz (Band 8): 3,487 devices;
 - 1800 MHz (Band 3): 7,731 devices;
 - 2100 MHz (Band 1): 6,282 devices; and
 - 3.6 GHz (Bands 42 and 43): 153 devices.

700 MHz Duplex Gap and 700 MHz Guard Bands

- 3.18 The 3GPP identifies the SDL portion of the 700 MHz Band as Band 67. However, at this time, the GSA does not provide any figures for devices capable of operating in Band 67.
- 3.19 ComReg does not currently have detailed information on the number of devices available for PPDR, M2M and PMSE using the frequency arrangements identified in the EC 700 MHz Decision as outlined above. However, ComReg understands there to be a device ecosystem for PMSE as, over the last year, ComReg has issued approximately 1000 short term PMSE licences for usage in the 700 MHz Band.

⁶³ <https://www.ericsson.com/assets/local/policy-makers-and-regulators/180119-3gpp-spectrum-bands.pdf>

⁶⁴ <https://gsacom.com/gambod/>

Unless otherwise stated, the device numbers that are presented in this document are for LTE capable devices i.e. WBB compatible. ComReg notes that there may be other devices that operate in these bands that are not captured here.

3.1.4 700 MHz Band - Other Relevant Developments

Award plans in other Member States

3.20 In light of the UHF Band EP&C Decision, the 700 MHz Band is now a focus band for spectrum awards in many Member States.

3.21 Some Member States have already completed their award of the 700 MHz Duplex, including Germany (June 2015), France (November 2015) and Finland (November 2016).

3.22 Whilst not all Member States have identified award proposals for the 700 MHz Band at this juncture, a number (as well as EEA Member State Switzerland) have indicated intentions to award the band over the coming years:⁶⁵

- Italy (September 2018);
- Switzerland (2H 2018);
- Denmark (Q3 2018);
- Sweden (Q4 2018);
- Slovenia (2018);
- Netherlands (2019);
- Czech Republic (2019-2020);
- Austria (not before Q2 2019); and
- UK (2020).

3.2 1.4 GHz Band (including extension bands)

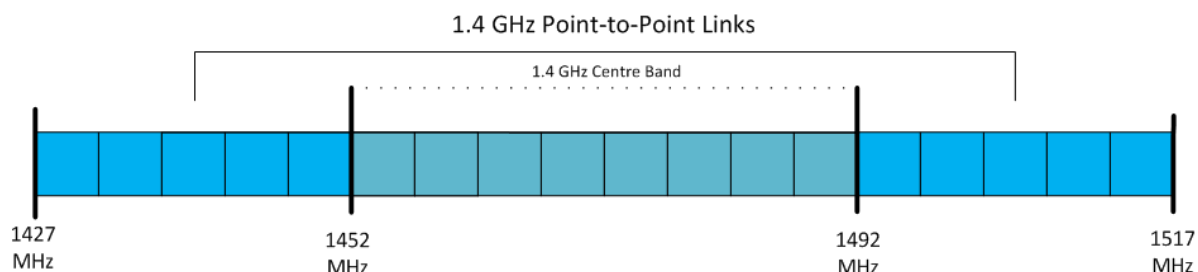
3.23 At the time of Document 14/101, the 1.4 GHz Band consisted of 40 MHz in the frequency range 1452 – 1492 MHz (hereinafter “1.4 GHz Centre Band”).

3.24 Subsequent international developments, as detailed below, have identified extensions to the 1.4 GHz Centre Band, namely 1427-1452 MHz and 1492 – 1517 MHz (together the “1.4 GHz Extension Bands”) which consist of an additional 50 MHz of spectrum.

⁶⁵ Source: Cullen International as at 25 April 2018. <http://www.cullen-international.com/>

- 3.25 For the purposes of this paper, the 1.4 GHz Band now spans a total of 90 MHz of spectrum in the frequency range 1427 – 1517 MHz (the “1.4 GHz Band”), comprising the 1.4 GHz Centre Band and 1.4 GHz Extension Bands as illustrated below.

Figure 3: The 1.4 GHz Band, including the 1.4 GHz Extension Bands



3.2.1 1.4 GHz Band - Degree of harmonisation

1.4 GHz Centre Band

- 3.26 As outlined in Document 14/101, ECC Decision (13)03⁶⁶ harmonises the use of the 1.4 GHz Centre Band for terrestrial Mobile/Fixed Communications Networks Supplemental Downlink (MFCN SDL), with flexibility for individual countries to adapt to specific national circumstances, and defines the applicable LRTC for the use of the band by MFCN SDL within CEPT.
- 3.27 The above LRTC and frequency arrangements are reflected in EU Decision (EU) 2015/750 of 8 May 2015 on the harmonisation of the 1.4 GHz Centre Band for terrestrial systems capable of providing WBB ECS in the EU (“1.4 GHz EC Decision”).

1.4 GHz Extension Bands

- 3.28 The 1.4 GHz Extension Bands were globally identified at WRC-15 (November 2015) for International Mobile Telecommunications (“IMT”).
- 3.29 On 16 March 2017, the EC issued a further mandate to CEPT to develop harmonised technical conditions for the 1.4 GHz Extension Bands for their use for terrestrial WBB ECS in the EU. In response to this mandate, CEPT issued CEPT Report 065.
- 3.30 Based on this work, on 17 November 2017, ECC Decision (17)06 harmonised the use of the 1.4 GHz Extension Bands for MFCN SDL.

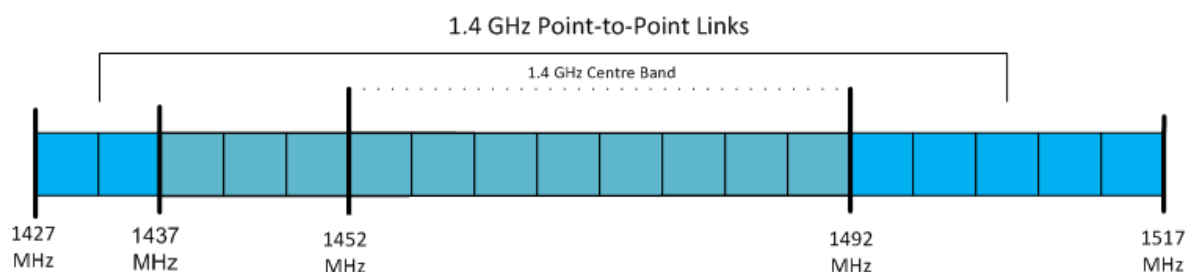
⁶⁶ As amended 3 July 2015.

- 3.31 Subsequently, on 26 April 2018, the EC issued Implementing Decision (EU) 2018/661, which amends the 1.4 GHz EC Decision (which, as noted above, had only previously related to the 1.4 GHz Centre Band) to now cover the entire 1.4 GHz Band (i.e. 1427 – 1517 MHz) and harmonises its use for terrestrial systems capable of providing ECS in the EU.

3.2.2 1.4 GHz Band Spectrum Availability

- 3.32 The 1.4 GHz Centre Band is presently unused.
- 3.33 The 1.4 GHz Extension Bands, however, are licensed (under SI 370 of 2009⁶⁷) to a variety of users (including broadcasters, ESB, the Fire Service, County Councils and other state bodies) for low-bandwidth⁶⁸ point-to-point links. There are currently⁶⁹ 103 such annually renewable licences in the 1.4 GHz Extension Bands. The currently licensed point-to-point links span the ranges 1427-1437 and 1492 – 1517 MHz. This potentially leaves 55 MHz of spectrum from 1437 - 1482 MHz available, noting however that guard bands/restricted blocks may also be required to ensure coexistence between any MFCN SDL deployments in the centre part of the band and the point-to-point links at the lower end and upper end of the band.⁷⁰

Figure 4: The 1.4 GHz Band showing spectrum occupied by existing point-to-point radio link licences



3.2.3 1.4 GHz Band Equipment availability

- 3.34 The 3GPP identifies the 1.4 GHz Centre Band as Band 32⁷¹ and, as of May 2018, 41 devices capable of operating in Band 32 were identified by the GSA.^{72,73}

⁶⁷ See also Guidelines to Applicants for Radio Links Licences (Doc [09/89R2](#)).

⁶⁸ Typically ranging from 250kHz to 1MHz.

⁶⁹ As at June 2018.

⁷⁰ See, for example, [CEPT Report 202](#) which, amongst other things, considers compatibility studies between SDL and adjacent channel coordinated and uncoordinated fixed links.

⁷¹ <https://www.ericsson.com/assets/local/policy-makers-and-regulators/180119-3gpp-spectrum-bands.pdf>

⁷² <https://gsacom.com/gambod/>

⁷³ Increasing from 11 devices since July 2017.

- 3.35 The GSA does not, at this juncture, report on the availability of devices capable of operating in the 1.4 GHz Extension Bands.

3.2.4 1.4 GHz Band other developments

Award plans in other Member States

- 3.36 Three Member States have completed awards for the 1.4 GHz Centre Band: the UK (May 2008⁷⁴), Germany (June 2015⁷⁵) and Italy (September 2015⁷⁶).
- 3.37 Some Member States have indicated plans to release some or all of the 1.4 GHz Band, including⁷⁷:
- Austria: a spectrum release plan of December 2016 indicates plans to award its 1.4 GHz Centre Band in 2019;
 - Belgium: a consultation took place in 2017 to award the entire 1.4 GHz Band;
 - Czech Republic: a proposal has been made to award the 1.4 GHz Centre Band in 2021;
 - Denmark: a consultation was conducted on potential interest in the 1.4 GHz Band, with respondents mostly suggesting that the entire band should be awarded at the same time as soon as the harmonised technical conditions have been agreed internationally. According to ENS' Spectrum Strategy⁷⁸, the entire 1.4 GHz Band could be awarded after 2018;
 - France: no plans at this time. However, ARCEP does not consider assigning available spectrum in the short term and would prefer to have the entire 1.4 GHz Band available for award;
 - Spain: the Ministry of Energy Tourism and the Digital Agenda, in its 5G Plan 2018-2020, foresees an award of the 1.4 GHz Centre Band in 2018. According to the Ministry, the current use by low-capacity fixed links and State defence are to be preserved until 1 Jan 2020;
 - Sweden: there is a proposal to award the entire 1.4 GHz Band in 2019 or later; and

⁷⁴ Qualcomm's licence varied in May 2015 to allow SDL and traded with Ofcom's consent in September 2015 to H3G and Vodafone (20 MHz Each)

⁷⁵ Germany has identified that availability of the 1.4 GHz Extension Bands is not foreseeable due to their current military use.

⁷⁶ With licences coming into force on 1 January 2016. Germany has identified that the 1.4 GHz Extension Bands is not foreseeable due to its current military use

⁷⁷ Source: [Cullen International](#).

⁷⁸ ENS is the regulator with responsibility for management of the radio frequency spectrum in Denmark.

- Switzerland: there is a proposal to award the entire 1.4 GHz Band in H2/2018.

3.38 ComReg is not aware of plans in other Member States to award the 1.4 GHz Band.

3.39 Considering the above, ComReg notes that while some Member States have or plan to release the 1.4 GHz Centre Band (e.g. UK, Austria, Spain, Czech Republic), other Member States are now waiting to release the entire 1.4 GHz Band (e.g. Sweden, Switzerland, France, Denmark and Belgium).

3.3 2.1 GHz Band

3.40 The frequency range 1900-1920 MHz, 1920-1980 MHz and 2110- 2170 MHz (“the 2.1 GHz band”) consists of 140 MHz of spectrum and is currently licensed in Ireland for the provision of Universal Mobile Telecommunications System (“UMTS” or “3G”) services. These licences were issued following competitions in 2002 and 2007 and included two parts:

- paired FDD spectrum rights in the frequency range 1920 -1980 MHz and 2110 -2170 MHz (“Paired 2.1 GHz Band”); and
- unpaired TDD spectrum rights in the frequency range 1900-1920 MHz (“Unpaired 2.1 GHz Band”).

3.41 The 2.1 GHz Band has comparable propagation characteristics to the 2.3 GHz and 2.6 GHz Bands

3.3.1 2.1 GHz Band - Degree of harmonisation

Unpaired 2.1 GHz Band

3.42 In light of the limited use of the Unpaired 2.1 GHz Band for the provision of 3G services across Europe (including Ireland)⁷⁹, on 10 October 2012 the EC issued a mandate to CEPT to assess and identify uses other than mobile ECS delivered through terrestrial cellular networks and to define the LRTC.⁸⁰ In November 2012 the ECC amended ECC Decision (06)01, relating to the harmonisation of the Paired and Unpaired 2.1 GHz Bands, to remove the Unpaired 2.1 GHz Band due to its very limited use in Europe.

⁷⁹ RSCOM 12-05 - Available of [EU CIRCABC](#) website under Radio Spectrum Committee (RSC).

⁸⁰ RSCOM 12-17 rev3 - Available on [EU CIRCABC](#) website under Radio Spectrum Committee (RSC).

- 3.43 In response to the above mandate, CEPT issued CEPT Report 52 which lead to the development of ECC Decision (15)02 harmonising the Unpaired 2.1 GHz Band for the use of broadband Direct Air-to-Ground Communications (DA2GC) systems.
- 3.44 In light of ECC Decision (15)02 and recalling that the purpose of the Proposed Award is to award spectrum rights of use suitable for the provision of WBB, ComReg is of the preliminary view that the Unpaired 2.1 GHz Band should not be considered for inclusion in the Proposed Award. This band will not therefore be considered further.

Paired 2.1 GHz Band

- 3.45 As noted above, the Paired 2.1 GHz Band is harmonised at a CEPT/ECC level, originally by means of various ERC decisions⁸¹. These were replaced by ECC Decision (06)01 in March 2006 harmonising the utilisation of the spectrum for UMTS/3G service which was amended in November 2012 to harmonise the Paired 2.1 GHz Band for MFCN including IMT systems.
- 3.46 Also in November 2012, the EC adopted a decision on the harmonisation of the Paired 2.1 GHz Band for terrestrial systems capable of providing ECS in the EU (Decision 2012/688/EU) (the “2.1 GHz EC Decision”).⁸²

3.3.2 Paired 2.1 GHz Band - spectrum availability

- 3.47 Spectrum rights in the Paired 2.1 GHz Band are currently licensed to Three, Vodafone and Meteor Mobile Communications Ltd (“Meteor”) as follows:
- Three holds two licences in the 2.1 GHz Band, referred to hereafter as the “A Licence” (which expires on 24 June 2022) and the “B Licence” (which expires on 1 October 2022)⁸³;

⁸¹ Specifically

- ERC/DEC/(97)07 on the frequency bands for the introduction of the Universal Mobile Telecommunications System (UMTS);
- ERC/DEC/(99)25 on the harmonised utilisation of spectrum for terrestrial Universal Mobile Telecommunications Systems (UMTS) operating in the bands 1900-1980 MHz, 2100-2170 MHz and 2110-2170 MHz; and
- ERC/DEC/(00)01 extending ERC/DEC/(97)07 on the frequency bands for the introduction of terrestrial Universal Mobile Telecommunications System (UMTS).

Available on [ECO Document Database](#)

⁸² Decision 2012/688/EU: "Commission implementing decision of 5 November 2012 on the harmonisation of the frequency bands 1 920-1 980 MHz and 2 110-2 170 MHz for terrestrial systems capable of providing electronic communications services in the Union" <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32012D0688>

⁸³ Three also holds spectrum rights for an additional 5 MHz block in the Unpaired 2.1 GHz Band as part of its B Licence. Vodafone and Meteor previously held an equivalent 5 MHz block in the Unpaired 2.1 GHz Band, which were returned to ComReg on 11 March 2011 and 28 February 2013, respectively.

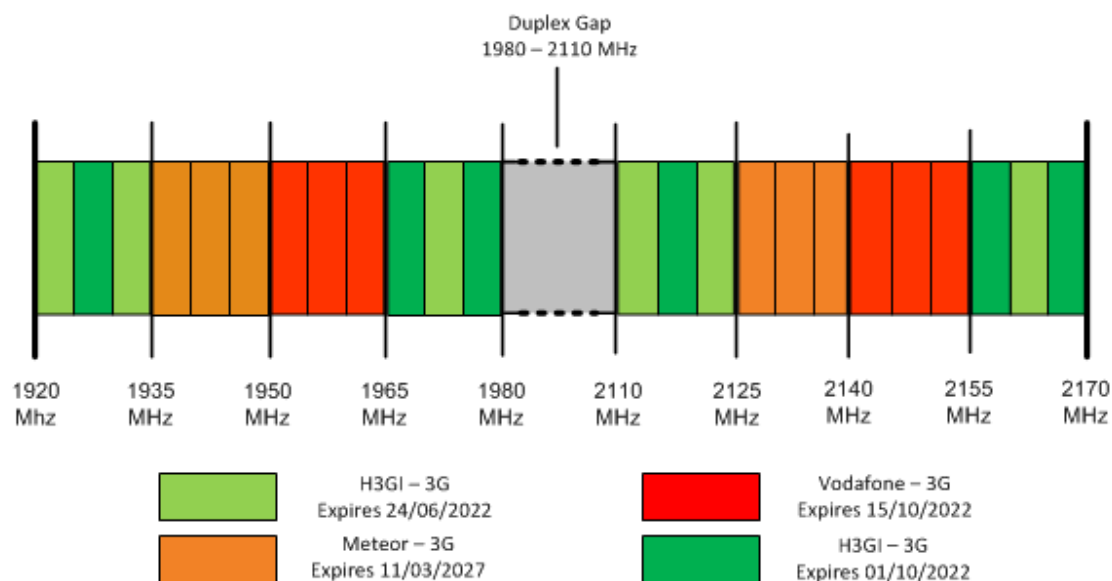
- Meteor holds one licence which expires on 11 March 2027; and
- Vodafone holds one licence which expires on 15 October 2022.

3.48 The above information is captured in Table 1 and Figure 5 below along with information on the frequencies assigned to each licensee.

Table 1: Details of the current licences in the Paired 2.1 GHz Band

Licensee	Frequencies Assigned	Expiry Date
Meteor Mobile Communications Ltd	1935-1940 / 2125-2130 MHz 1940-1945 / 2130 – 2135 MHz 1945-1950 / 2135-2140 MHz	11 March 2027
Three Ireland Hutchison Limited	<u>A Licence:</u> <ul style="list-style-type: none"> • 1920-1925 / 2110-2125 MHz • 1970-1975 / 2160-2165 MHz • 1930-1935 / 2120-2125 MHz <u>B Licence</u> <ul style="list-style-type: none"> • 1965–1970 / 2155–2160 MHz • 1925-1930 / 2115-2120 MHz • 1975-1980 / 2165-2170 MHz 	<u>A Licence</u> 24 June 2022 <u>B Licence</u> 1 October 2022
Vodafone Ireland Limited	1950-1955 / 2140-2145 MHz 1955-1960 / 2145 – 2150 MHz 1960-1965 / 2150-2155 MHz	15 October 2022

Figure 5: The Paired 2.1 GHz Band showing spectrum assigned under current licences



3.49 In summary, the majority (2 x 45 MHz) of the Paired 2.1 GHz Band becomes available in 2022 (following the expiry of Three’s and Vodafone’s respective licences), while the remaining 2 x 15 MHz becomes available in 2027 (following the expiry of Meteor’s licence).

3.3.3 Paired 2.1 GHz Band - Equipment availability

3.50 The Paired 2.1 GHz Band has been widely used for the provision of 3G services across Europe for many years. As such, the device ecosystem for 3G services in this band is extensive.

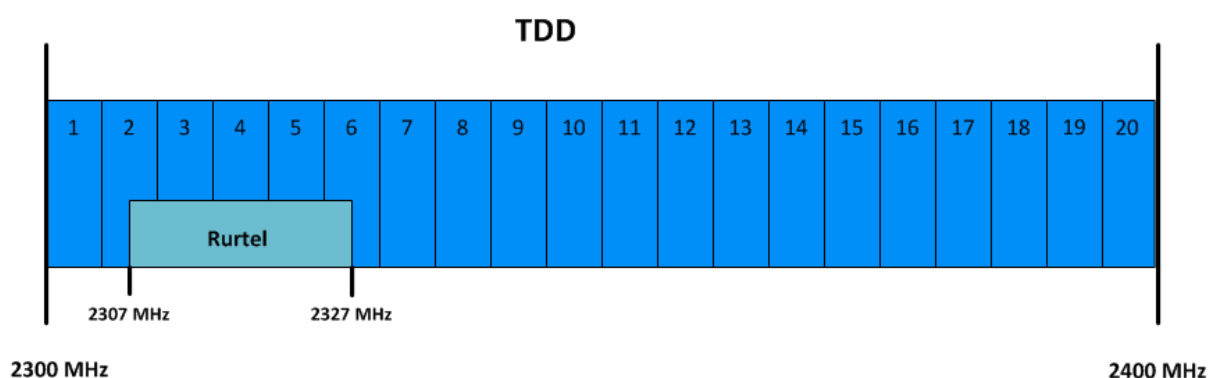
3.51 The 3GPP identifies the Paired 2.1 GHz Band as Band 1⁸⁴ and, as of May 2018, 6,282 LTE capable devices were identified by the GSA as being capable of operating in this band.⁸⁵

3.4 2.3 GHz Band

3.52 The 2.3 GHz Band consists of 100 MHz in the frequency range 2300-2400 MHz and is depicted in Figure 6 below.

3.53 The only existing licensee in the band is Eir, which uses its spectrum rights to provide its Rurtel service (see further below).

Figure 6: The 2.3 GHz Band



3.4.1 2.3 GHz Band - Degree of harmonisation

3.54 The frequency arrangement and the LRTC for the 2.3 GHz Band are harmonised at CEPT level by ECC Decision (14)02 (“2.3 GHz ECC Decision”), which was informed by CEPT Report 55.

⁸⁴ <https://www.ericsson.com/assets/local/policy-makers-and-regulators/180119-3gpp-spectrum-bands.pdf>

⁸⁵ <https://gsacom.com/gambod/>

- 3.55 There are a variety of uses made of the 2.3 GHz Band in the CEPT countries⁸⁶ and, as such, one of the purposes of the 2.3 GHz ECC Decision was to provide harmonised regulatory conditions for the use of the band for MFCN, while also allowing Member States to maintain the use of the band by incumbent services as required at a national level.
- 3.56 At an EU level, the EC drafted an implementing decision based on CEPT Report 55. However, the adoption of this decision was deferred until after WRC-15, and the matter has not yet been revisited by the EC's Radio Spectrum Committee.

3.4.2 2.3 GHz Band - Spectrum Availability

- 3.57 The 2.3 GHz Band is largely unused in Ireland.
- 3.58 The existing user of the band is Eir for its Rurtel service, which is a point-to-multipoint system used to provide fixed telephony services in rural areas as part of Eir's Universal Service Obligation (USO). ComReg understands that the current customers of the Rurtel service do not have access to an alternative fixed telephony service.
- 3.59 There are currently 45 licences issued to Eir in the 2.3 GHz Band under S.I. 370 of 2009 (Radio Links) and all licences are within the frequency range 2307-2327 MHz. The geographic extent of the licences are limited to parts of counties Kerry, Galway and Donegal. As of January 2018, there were a low number [redacted] of customers receiving the Rurtel service and this number is declining.
- 3.60 The 2.3 GHz Band is also occasionally used for wireless cameras licensed on a secondary basis⁸⁷.

3.4.3 2.3 GHz Band - Equipment availability

- 3.61 While the 2.3 GHz Band is not widely used for WBB services in Europe at this time, such usage is extensive in other markets (i.e. Asia, Australia and Africa). In this regard, the GSA has identified 3,779 devices as being capable of operating in the band as of May 2018.

⁸⁶ Including:

- telemetry (both terrestrial and aeronautical telemetry);
- other governmental use (e.g. Unmanned Aircraft Systems (UAS));
- PMSE applications (SAP/SAB video links); and
- radio amateur, as a secondary service.

⁸⁷ There are also a number of other bands which are available for Wireless Cameras as identified in ComReg Document 08/08r6 - <https://www.comreg.ie/media/2016/05/ComReg0808-R6.pdf>, specifically: 1980 – 2010 MHz, 2010 – 2025 MHz, 2025 – 2110 MHz, 2170 – 2200 MHz, 2200 – 2300 MHz 10.3 – 10.5 GHz U6 (6.425 – 7.125 GHz) and L7 (7.125 – 7.425 GHz).

3.4.4 2.3 GHz Band - Other developments

Award plans in other Member States

- 3.62 A variety of uses are made of the 2.3 GHz Band in other Member States. In relation to award plans for use for MFCN, the UK is the first Member State to award spectrum rights in the 2.3 GHz Band for MFCN, having awarded 40 MHz earlier this year⁸⁸.
- 3.63 Member States which have issued statements in relation to the potential award of the 2.3 GHz Band for MCFN include:
- Denmark – which plans to award the entire 2.3 GHz Band in H2/2018;
 - Sweden – which indicated that it may consider a possible award after 2018;
 - Austria – which indicated that it may award the band after 2020 depending on demand and availability of spectrum;
 - Germany – which indicated that it has no plans to change from its existing military use;
 - Hungary – which indicated that the band could be awarded together with the 700 MHz Band in 2019; and
 - France and Spain – which, due to existing military use, have indicated that their respective bands could be used under a Licensed Shared Access (“LSA”) arrangement.
- 3.64 ComReg notes that interest is growing in the award of the 2.3 GHz Band amongst Member States, e.g. in Denmark, Sweden and Hungary where awards are planned to occur within the next 2 years. Notably, some countries that have traditionally reserved the band for military use are also considering its release, e.g. in the UK, where military use of the band was removed to allow for an award of 40 MHz in 2018, and France and Spain where LSA is being considered.

3.5 2.6 GHz Band

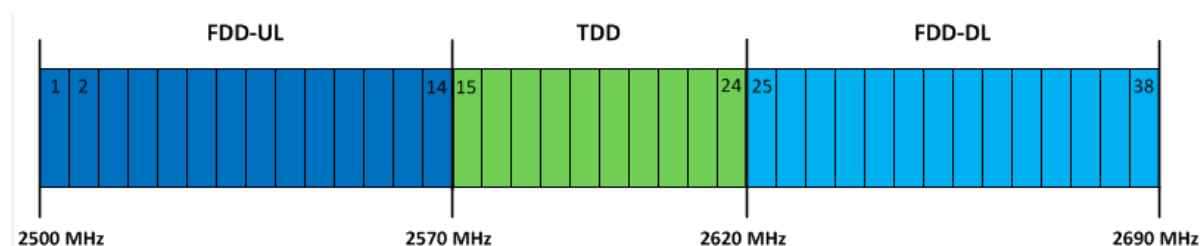
- 3.65 The 2.6 GHz Band consists of 190 MHz in the frequency range 2500 – 2690 MHz and is a well-established band in Europe for MFCN/ECS.

⁸⁸ This release was part of a programme where the Ministry of Defence (MOD) in the UK would move out of this band. See paragraph 2.1 of https://www.ofcom.org.uk/data/assets/pdf_file/0030/81579/info-memorandum.pdf

3.5.1 2.6 GHz - Degree of harmonisation

- 3.66 The LRTC for the 2.6 GHz Band is harmonised at both a CEPT and EU level by ECC Decision (05)05 and EC Decision 2008/477/EC of 13 June 2008 (“2.6 GHz EC Decision”), respectively.
- 3.67 The primary band plan, as indicated in ECC Decision (05)05 for the band is illustrated in Figure 7 below and comprises:
- a 2 x 70 MHz paired arrangement in the frequency ranges 2500-2570 MHz and 2620-2690 MHz (“2.6 GHz FDD Duplex”); and
 - a 50 MHz unpaired arrangement in the frequency range 2570-2620 MHz (“2.6 GHz Duplex Gap”) – which can be used for TDD or other modes compatible with the 2.6 GHz EC Decision technical conditions.

Figure 7: The 2.6 GHz Band showing the primary band plan



- 3.68 The 2.6 GHz EC Decision alternatively allows the use of the 2.6 GHz FDD Duplex sub-bands (i.e. 2500-2570 MHz and 2620-2690 MHz), in part or in full for TDD⁸⁹ where any such use (which is to be decided at a national level) is required to be in equal parts in both the upper part of the band starting at 2690 MHz (extending downwards) and the lower part of the band starting at 2570 MHz (extending downwards).
- 3.69 Further additional harmonisation measures in relation to the 2.6 GHz Band are set out in the Article 6(2)⁹⁰ of the EU RSPD Decision.⁹¹

⁸⁹ Or other modes compatible with the 2.6 GHz EC Decision technical conditions

⁹⁰ “In order to promote wider availability of wireless broadband services for the benefit of citizens and consumers in the Union, Member States shall make the bands covered by Decisions 2008/411/EC (3,4-3,8 GHz), 2008/477/EC (2,5- 2,69 GHz), and 2009/766/EC (900-1 800 MHz) available under terms and conditions described in those decisions. Subject to market demand, Member States shall carry out the authorisation process by 31 December 2012 without prejudice to the existing deployment of services, and under conditions that allow consumers easy access to wireless broadband services.”

⁹¹ DECISION No 243/2012/EU of the European Parliament and of the Council of 14 March 2012 establishing a multiannual radio spectrum policy programme.
<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012D0243&from=EN>

3.5.2 2.6 GHz - Spectrum Availability

3.70 Existing licences issued in the 2.6 GHz Band for MMDS expired in full on 18 April 2016.

3.5.3 2.6 GHz - Equipment availability

3.71 The device ecosystem for the 2.6 GHz Band is very mature as it is used extensively in different configurations throughout the world. The 3GPP identify the 2.6 GHz FDD Duplex as Band 7 and the 2.6 GHz Duplex Gap as Band 38. In other markets (e.g. Asia, Australia) where TDD is used across the entire 2.6 GHz Band, the 3GPP identify such use of the band as Band 41⁹². The GSA reports the number of devices based on the above-described bands as follows:

- 6,974 devices – May 2018 (Band 7) – FDD;
- 2,906 devices – May 2018 (Band 38) – TDD; and
- 2,755 Devices – May 2018 (Band 41) – TDD.

3.5.4 2.6 GHz - Other developments

Award plans in other Member States

3.72 The 2.6 GHz Band has been awarded for MFCN/ECS in the majority of Member States. However, not all Member States have awarded the entire band. For example, Italy currently uses the 2.6 GHz Duplex Gap for military use, while France has not awarded any spectrum in the 2.6 GHz Duplex Gap (although a consultation on 22 April 2018 contained a proposal to award 40 MHz of the 2.6 GHz Duplex Gap⁹³).

3.73 ComReg also notes that the Radio Communications Agency in the Netherlands allowed the possibility of awarding a larger amount of TDD spectrum in the 2.6 GHz Duplex Gap⁹⁴. This resulted in the award of 55 MHz for TDD, 5 MHz more than the 50 MHz identified in the primary band plan. As a result the paired spectrum assigned was reduced by 2 x 5 MHz i.e. 10 MHz in total, 5 MHz in the upper part of the band starting at 2690 MHz (extending downwards), and 5 MHz in the lower part of the band starting at 2570 MHz (extending downwards).

⁹² Band 41 is defined by 3GPP as the frequency range 2496 -2690 MHz

⁹³ https://www.arcep.fr/uploads/tx_gspublication/consult-attrib-freqc-2-6GHz-thd-mobile-pro-mars2018.pdf

⁹⁴ Source Cullen International

3.6 26 GHz Band

3.74 As noted in Chapter 2, there is growing interest in use of the 26 GHz Band for the provision of 5G services, in particular for the provision of line-of-sight type communications and the opportunity to deploy dense networks. For example, the RSPG in its second opinion on 5G stated:

“The 700 MHz band can be used to provide wide area coverage, the 3.6 GHz band can be used to provide high capacity and coverage, using both existing macro cells and small cells. The 26 GHz band is likely to be deployed in areas with very high demand, for example transport hubs, entertainment venues, industrial or retail sites and similar. Because of its characteristics, the 26 GHz band will not be used to create wide area coverage.”

3.6.1 26 GHz Band - Degree of harmonisation

3.75 While there are no harmonisation decisions as yet in relation to the 26 GHz Band, in December 2016 the EC issued a mandate to CEPT to develop channelling arrangements and common and minimal LRTC for spectrum use in the 26 GHz Band.

3.76 In response to this mandate, CEPT developed draft CEPT Report 68, along with a draft ECC Decision, on the harmonised technical conditions for MFCN in the 26 GHz Band. While currently in draft form, ComReg expects these documents to be finalised by the ECC in the coming months and that subsequently the EC will look to develop an implementing decision on foot of these documents.

3.77 ComReg also understands that there may be an obligation in the current draft of the European Electronic Communications Code (EECC) Directive which would oblige Member States to allow the use of some of the 26 GHz Band for WBB by end-2020.

3.6.2 26 GHz Band - Spectrum Availability

3.78 In the Radio Frequency Plan for Ireland⁹⁵, the national usage in the 26 GHz Band is currently listed in respect of a number of services including:

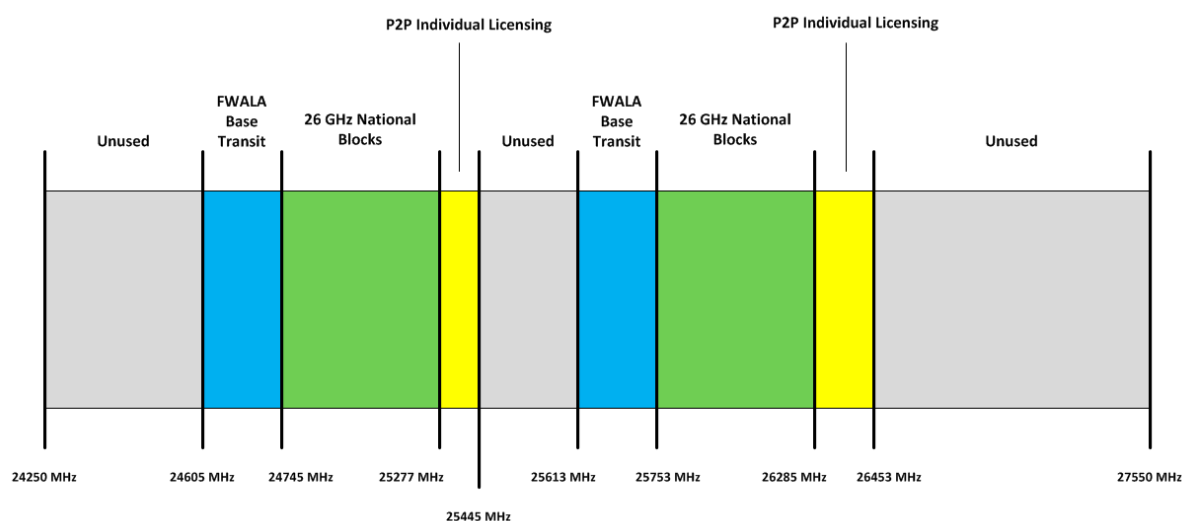
- Fixed Wireless Access Local Area - licensed under SI 79 of 2003 as amended, in the frequency ranges 24,605 – 24,745 MHz / 25,613 – 25,753 MHz;

⁹⁵ <https://www.comreg.ie/industry/radio-spectrum/radio-frequency-plan-for-ireland/>

- Individual P2P licences - licensed under SI 370 of 2009, in the frequency ranges 25,277 – 25,445 MHz / 26,285 – 26,453 MHz; and
- ComReg also recently announced the results of its award of spectrum rights of use for 26 GHz National Block Licences in the frequency range 24,745 – 25,277 MHz / 25,753 – 26,285 MHz (see Document 18/53). Licences, which may be issued on foot of this award process under S.I. 158 of 2018, will run for 10 years from their commencement date.

3.79 Despite the existence of the above licences, there remains 1,508 MHz of unused spectrum in the 26 GHz Band in the ranges 24,250 – 24,549 MHz / 25,445 – 25,557 MHz / 26,453 – 27,550 MHz, as indicated in Figure 8 below.

Figure 8: The 26 GHz Band



3.6.3 26 GHz Band - Equipment availability

3.80 ComReg is not aware of any devices for WBB capable of operating in the 26 GHz Band.

3.6.4 26 GHz Band - Other developments

Award plans in other Member States

3.81 No Member State has awarded rights of use in the 26 GHz Band for the provision of WBB or 5G services.

3.82 While the majority of Member States have not identified award proposals for the 26 GHz Band, some have started to consider its future use, including:⁹⁶

- Italy – AGCOM consulted until 4 April 2018 on the rules regarding the allocation procedures and usage requirements for the 26 GHz Band;
- France – ARCEP identified the 26 GHz Band as a candidate band for 5G, but also observed that research on shared use of the band with existing licensees is needed;
- Slovakia – it has been indicated that the 26 GHz Band will be used for 5G services, but following the expiry of existing licences in July 2021;
- Spain – a ministerial order specifies:
 - the primary use of the 26 GHz Band for ECS; and
 - that the 26 GHz Band must be freed from current use by 31 December 2021.
- Sweden – PTS plans to restructure the 26 GHz Band to enable 5G deployment; and
- the UK – in September 2017, Ofcom consulted on the potential to make the 26 GHz Band available for 5G.

3.7 List of Candidate Bands for further assessment

3.83 In light of the above, ComReg considers the following “Candidate Bands” as being suitable for more detailed assessment in the following chapter:

- 700 MHz;
- 1.4 GHz;
- Paired 2.1 GHz;
- 2.3 GHz;
- 2.6 GHz; and
- 26 GHz.

⁹⁶ Source: [Cullen International](#) 25 April 2018.

Chapter 4

4 Preliminary assessment of the Candidate Bands

- 4.1 This chapter sets out ComReg's preliminary assessment of whether the Candidate Bands identified at the end of Chapter 3 should be included in the Proposed Award.
- 4.2 It does so in the order of the bands firstly proposed in Document 14/101 (i.e. 2.6 GHz, 700 MHz, 1.4 GHz, and 2.3 GHz) and then the additional bands (Paired 2.1 GHz and 26 GHz) and, substantively, by reference to the four criteria identified in Document 14/101 and other relevant factors and material.
- 4.3 In that regard, and given the significance of the issue of whether to hold a single or sequential award process for complementary and/or substitutable spectrum bands which are currently available (or would be available in the near term) to the following discussion, the relevant section from Document 14/101 is extracted below for reference⁹⁷. Readers are also referred to the accompanying DotEcon report (Document 14/102) and section 2.1 in particular.

“2.3.1 Single versus sequential award processes

2.25 It may be beneficial when awarding the 2.6 GHz band to award other bands under the same process. Such an approach would introduce efficiencies over and above running multiple single band awards for other spectrum bands which are also available, or may become available in the near term, and which may be used for similar services to the 2.6 GHz band.

2.26 As noted by DotEcon in its report accompanying this document, when designing an award process it is desirable to ensure that:

- interested parties have some visibility of future planned releases of spectrum, which would allow them to plan for their spectrum needs accordingly;*
- operators have an opportunity to acquire in advance the spectrum they may need to meet future demand for their services (to promote investment);*
- opportunities for speculative acquisition of spectrum are minimised; and*
- unnecessarily fragmented assignments are avoided.*

⁹⁷ Section 2.3.1 of Document [14/101](#), pp15-16.

2.27 However, these benefits are unlikely to be achieved by offering different bands sequentially without providing clarity around future releases, as this could lead to many bidders acquiring small amounts of spectrum in each band rather than obtaining larger contiguous blocks in fewer bands.

2.28 Importantly, the release of spectrum bands which may be substitutable or complementary to the 2.6 GHz band for interested parties can lead to a more efficient use of spectrum and promote competition. As noted by DotEcon, demand interdependencies may give rise to strong economic efficiency reasons for combining bands into an integrated award process. This may reduce the risk for bidders and provide maximum opportunity for different types of bidders (with potentially different intended uses and technologies).”

4.1 2.6 GHz Band

4.4 In Document 14/101, the 2.6 GHz Band was identified as a key band for the proposed award process for reasons including:

- that it is a harmonised band, with the 2.6 GHz EC Decision requiring that all Member States designate and subsequently make available on a non-exclusive basis the 2.6 GHz Band for terrestrial systems capable of providing ECS⁹⁸;
- that it was widely used in other Member States for the provision of WBB including International Mobile Telecommunications (IMT); and
- the then imminent availability of the 2.6 GHz Band in April 2016 following the expiry of the existing MMDS licences.

4.5 ComReg notes that the above reasons remain valid, and, in light of the information provided in Chapter 3, some aspects have, if anything, become more pertinent given, for example, the continued immediate availability of the band and the wide-spread availability of equipment on the market.

4.6 ComReg also notes the support for the award of this band in responses received to Documents 14/101, 15/131 and 16/115.

4.7 Therefore, **ComReg is of the preliminary view that the 2.6 GHz Band should be included in the Proposed Award.**

⁹⁸ European Commission [Decision 2008/477/EC](#) (the 2.6 GHz EC Decision), adopted on 13 June 2008.

4.2 700 MHz Band (700 MHz Duplex, 700 MHz Duplex Gap and 700 MHz Guard Bands)

4.8 As noted in Chapter 3:

- the 700 MHz Band consists of a number of different portions: the 700 MHz Duplex, the 700 MHz Duplex Gap and the 700 MHz Guard Bands⁹⁹; and
- the 700 MHz EC Decision provides for a different level of harmonisation between the 700 MHz Duplex portion, on the one hand, and the remaining 700 MHz Duplex Gap and 700 MHz Guard Bands portions on the other.

700 MHz Duplex

4.9 For the 700 MHz Duplex, Article 3(1)(a) of the 700 MHz EC Decision is clear on the harmonisation of this band for terrestrial systems capable of providing WBB ECS.

4.10 In Document 14/101, ComReg noted, at the time, that there was uncertainty around the availability of the 700 MHz Duplex and its proposed inclusion in that award should only be considered if it became available.

4.11 In the intervening period, circumstances have materially changed and the following pertinent factors, as described in Chapters 2 and 3, would support the inclusion of the 700 MHz Duplex in the Proposed Award:

- the 700 MHz Duplex has been harmonised for providing WBB ECS (see Section 3.1.1);
- it has now been established that **4 March 2020** is the date on which the 700 MHz Duplex will be available in Ireland (see Section 3.1.2); and
- as of May 2018, the GSA identified 1,211 devices capable of operating using 700 MHz Duplex radio spectrum (see Section 3.1.3).

4.12 In addition, the 700 MHz Duplex is an important band for the deployment of cost-efficient networks and wide area coverage of WBB services¹⁰⁰, due to its favourable (sub-1 GHz) propagation characteristics, and almost global harmonisation (which creates significant economies of scale in terms of equipment development and cost-savings for the deployment of same).

⁹⁹ The 700 MHz Guard Bands include the 700 MHz Lower Guard Band and the 700 MHz Upper Guard Band.

¹⁰⁰ For example, see recitals 2 and 3 to the 700 MHz EC Decision, and the responses to the consultation on the draft Radio Spectrum Management Strategy (Document [15/131](#)) as outlined in Chapter 2.

- 4.13 These characteristics also mean that rights of use in the 700 MHz Duplex are likely to be a good complement to rights of use in the 2.6 GHz Band and, by awarding these bands together, would provide potential users the opportunity to acquire a desired mix of coverage and capacity spectrum rights, which may promote competition by providing greater opportunities for new entry.
- 4.14 ComReg also notes considerable support from respondents to Document 14/101 for the award of this band. Whilst some reservations were expressed about the premature nature of the band at the time of Document 14/101, ComReg notes subsequent submissions by these interested parties in response to Documents 15/131 and/or 16/115 and the developments in the band identified above.
- 4.15 In light of the above, **ComReg is of the preliminary view that 700 MHz Duplex should be included in the Proposed Award.**

700 MHz Duplex Gap and 700 MHz Guard Bands

- 4.16 For the 700 MHz Duplex Gap and 700 MHz Guard Bands, Article 3(1)b of the 700 MHz EC Decision gives Member States flexibility in terms of adopting different uses for these bands.
- 4.17 While SDL for WBB communications is one potential option, other options are available, specifically PPDR, PMSE and/or M2M. To date, no national policy decision has been taken in relation to the specific use of the 700 MHz Duplex Gap in Ireland and, in particular, in respect of PPDR. ComReg also recalls that the GSA has not identified any WBB devices capable of operating in Band 67.
- 4.18 In light of the above, and conscious of not prejudicing the discretion afforded the State under the 700 MHz EC Decision¹⁰¹, **ComReg is of the preliminary view that the 700 MHz Duplex Gap and 700 MHz Guard Bands should not be included in the Proposed Award.**
- 4.19 At the same time, and in light of its potential use for SDL for WBB, ComReg will, in its forthcoming Radio Spectrum Strategy Statement Consultation, address the issue of engaging with stakeholders with a view to obtaining greater clarity on national policy on the use of the 700 MHz Duplex Gap in Ireland.

4.3 1.4 GHz Band (1.4 GHz Centre Band and 1.4 GHz Extension Bands)

- 4.20 As discussed in Chapter 3, the 1.4 GHz Band consists of the 1.4 GHz Centre Band and the 1.4 GHz Extension Bands.

¹⁰¹ ComReg also notes the situation in Sweden in this regard.

4.21 In Document 14/101, ComReg considered that the 1.4 GHz Centre Band should be included in the proposed award process due to:

- the potential for it to be used for mobile broadband using SDL;
- its availability for award; and
- the fact that it is harmonised and expected availability of equipment indicated a potential for market demand.

4.22 As noted in Chapter 3, the 1.4 GHz Extension Bands were recently harmonised for terrestrial systems capable of providing ECS in the EU – increasing the size of the 1.4 GHz Band to encompass 90 MHz of spectrum from 1427 MHz – 1517 MHz. ComReg notes that:

- whilst the 1.4 GHz Centre Band is presently available for release in Ireland, a substantial portion (35 MHz) of the 1.4 GHz Extension Bands is licensed to a variety of users and, therefore, currently unavailable (see section 3.2.2);
- whilst there are 41 devices capable of operating in the 1.4 GHz Centre Band, there do not appear to be any devices currently capable of operating in the 1.4 GHz Extension Bands (see section 3.2.3); and
- whilst some Member States have indicated plans to release some or all of the 1.4 GHz Band (see section 3.2.4), due to the work plan at a global level to extend the band and the updated 1.4 GHz EC Decision of April 2018 others have indicated that they will wait until the whole 90 MHz becomes available¹⁰².

4.23 Noting the above, ComReg observes that the 1.4 GHz Band could be awarded in one of two ways:

- (i) include the 1.4 GHz Centre Band as part of the Proposed Award and award the 1.4 GHz Extension Bands in a subsequent award (“Option 1”);
or
- (ii) do not include the 1.4 GHz Centre Band in the Proposed Award and award the entire 1.4 GHz Band in a future award once the 1.4 GHz Extension Bands becomes available for re-assignment (or once there is sufficient clarity and certainty over same) (“Option 2”).

¹⁰² Sweden, Switzerland, France, Denmark and Belgium.

- 4.24 Based on the available information, ComReg is of the preliminary view that Option 2 is likely to be more consistent with its statutory objectives and duties and, in particular, encouraging the efficient use and ensuring the effective management of the radio spectrum, for the reasons outlined below.
- 4.25 First, ComReg recognises that Option 2 would clearly involve some delay to the award of the 1.4 GHz Centre Band which would reduce (by 40 MHz) the amount of downlink-suitable spectrum that could otherwise be made available in the Proposed Award.
- 4.26 At the same time, ComReg observes that the potential effects of any such delay may be offset due to:
- the substantial amount of spectrum that is being identified for inclusion in the Proposed Award in this document (as discussed later in this chapter, ComReg is of the preliminary view to include 470 MHz of spectrum in the Proposed Award, with 350 MHz being additional spectrum that is currently not used for WBB¹⁰³); and
 - that this quantum includes at least 150 MHz of TDD spectrum¹⁰⁴, which may be sufficient to meet demands for downlink capacity between this proposed award and the future award of the 1.4 GHz Band under Option 2¹⁰⁵.
- 4.27 Second, in the context of ComReg proposing a joint award of sufficiently complementary and/or substitutable spectrum bands (the benefits of such an approach which were discussed in Documents 14/101 and 14/102, and in the 2012 MBSA process), it is difficult to reconcile this approach with Option 1, which would entail the sequential award of substitutable spectrum rights within the same band. In particular, ComReg is mindful that participation by, and the bidding strategies of, participants in any first award of the 1.4 GHz Centre Band could be highly dependent on said participants' expectations about what might happen in any subsequent award of the 1.4 GHz Extension Bands. In that context, ComReg recognises that such uncertainties around price, assignment of spectrum in any later award and other relevant matters could expose bidders to uncertainty that could otherwise have been avoided, potentially unduly distorting bidder behaviour and resulting in an inefficient assignment outcome in one or both awards.

¹⁰³ Noting that the award of the proposed additional 350 MHz of spectrum would result in a 46 % increase in harmonised spectrum for the provision of WBB.

¹⁰⁴ This could be up to 290 MHz depending on the assignment of the 2.6 GHz Band. In addition, ComReg has already released 350 MHz of TDD spectrum in the 3.6 GHz Band in 2017.

¹⁰⁵ The use of TDD spectrum provides operators the flexibility to adjust its uplink-downlink ratio to account for more downlink capacity once any uplink requirements are satisfied in line with traffic asymmetry. This flexibility is not available with FDD.

- 4.28 Third, the 700 MHz EC Decision provides flexibility for Member States to make up to 20 MHz of the 700 MHz Duplex Gap available for SDL (which has yet to be determined at national level but remains a possibility). ComReg observes that Option 2 would provide the potential for a joint award of SDL-type spectrum rights in the 1.4 GHz Band and the 700 MHz Duplex Gap, and the potential benefits from same, in the event that Ireland adopts the use of SDL in respect of the 700 MHz Duplex Gap.
- 4.29 Fourth, given that the 1.4 GHz Extension Bands are split across two 25 MHz blocks either side of the 1.4 GHz Centre Band, ComReg observes that Option 1 could result in the 1.4 GHz Band ultimately being fragmented if rights holders are not able to obtain contiguous assignments across the 1.4 GHz Band at the end of both awards. This is unlikely to be in the best interests of ensuring the efficient use of spectrum.
- 4.30 Fifth, and recalling that the latest EC 1.4 GHz Decision was issued in April of this year and noting the apparent current lack of equipment availability for the 1.4 GHz Extension Bands, ComReg observes that Option 2 would provide time for the development of a device ecosystem for these bands¹⁰⁶, as well as greater visibility over the assignment and subsequent use of the 1.4 GHz Band in other jurisdictions. In ComReg's view, greater visibility over such matters may assist in terms of the development of the most appropriate assignment process/licensing framework for the band (and potentially the 700 MHz Duplex Gap) and provide prospective users with greater visibility over these matters in the context of their participation in any award.
- 4.31 In light of the above, **ComReg's preliminary view is that the 1.4 GHz Band (both the 1.4 GHz Centre Band and the 1.4 GHz Extension Bands) should not be included in the Proposed Award.**
- 4.32 At the same time, ComReg recognises that the above preliminary view assumes that there will be no resulting undue delay in the award of the 1.4 GHz Centre Band under Option 2. In that regard, and recognising that the following matters are relevant to this issue, ComReg will address same in its forthcoming Radio Spectrum Strategy Statement Consultation, which is expected to issue in the coming weeks:
- engaging with stakeholders with a view to obtaining greater clarity on national policy on the use of the 700 MHz Duplex Gap in Ireland and, in particular, for PPDR; and

¹⁰⁶ And for the 1.4 GHz Centre Band also, recalling that, as at May 2018, there are only 41 devices identified for this band, which is substantially lower than the amount of devices identified by the GSA for each of the 700 MHz Duplex, 2.1 GHz, 2.3 GHz and 2.6 GHz bands (see Chapter 3).

- the current and future use of the 1.4 GHz Band (including the 1.4 GHz Extension Bands).

4.4 2.3 GHz Band

4.33 In Document 14/101, ComReg considered that the 2.3 GHz Band should be included in the proposed award process because:

- it has similar propagation characteristics to the 2.6 GHz Band;
- it was likely to be harmonised under similar technical conditions to the unpaired portion of the 2.6 GHz Band;
- there was a strong potential for the band to be used for WBB services in Europe; and
- it would increase the availability of unpaired (TDD) spectrum to mitigate the negative effects of the development in asymmetric traffic flows.

4.34 ComReg observes that these factors have not changed materially in the intervening period.

4.35 While the band is harmonised at CEPT level, an implementing EC Decision on technical harmonisation has yet to be adopted due to the challenges that a number of Member States have in making the band available.¹⁰⁷ Generally speaking, the lack of an EC technical harmonisation decision for a spectrum band reduces the level of legal certainty for said band and also the incentives for equipment manufactures to produce relevant consumer equipment (e.g. handsets). In the present case, however, the lack of an implementing EC Decision is unlikely to delay the deployment of services in the 2.3 GHz Band, should it be assigned, given significant deployments in this band outside of Europe and a strong device ecosystem for this band (see Section 3.4.3).

4.36 In relation to the existing use of the 2.3 GHz Band in Ireland, and the potential for same to impede the efficient assignment of rights of use in this band, ComReg notes that the existing use is quite limited with a low number [8] of Rurtel customers in Kerry, Galway and Donegal (see Section 3.3.3). ComReg also observes that there would be a number of options available in order to provide for the efficient assignment of the remaining rights of use in the Proposed Award. For example, 2.3 GHz rights of use could be assigned as national licences with possibly a limited number of temporary coordination zones corresponding to the

¹⁰⁷ For example, in March 2015, when the Radio Spectrum Committee discussed the future of the band, Germany submitted a sceptical opinion on the draft decision. Germany argued that European Commission must not adopt any implementing decision that would impact the current use of the band for military or PPDR.

areas and frequencies covered by Eir's existing Rurtel licences.

- 4.37 In addition, ComReg notes that a number of Member States have already awarded or initiated plans in relation to the potential award of the 2.3 GHz Band (see Section 3.4.4). For example, in the UK, O2 (Telefónica) was assigned 40 MHz of spectrum in the 2.3 GHz Band in April 2018 and it has announced that it will roll out services using this spectrum to more than 1,000 sites by the end of 2018.¹⁰⁸
- 4.38 Spectrum rights in the 2.3 GHz Band may be seen by prospective users as a sufficiently close substitute to rights of use in the 2.6 GHz Band and also sufficiently complementary to rights of use in the 700 MHz Duplex¹⁰⁹, which would further support its inclusion in the Proposed Award on that basis.
- 4.39 **ComReg is, therefore, of the preliminary view that the 2.3 GHz Band should be included in the Proposed Award.**

4.5 Paired 2.1 GHz Band

- 4.40 The Paired 2.1 GHz Band was not considered for inclusion in Document 14/101. However, the expiry of three of the four existing licences in 2022 potentially makes the Paired 2.1 GHz Band suitable for reassignment as part of the Proposed Award.
- 4.41 In the context of the four criteria identified in Document 14/101, ComReg observes that:
- the Paired 2.1 GHz Band is harmonised for the provision of ECS in the EU;
 - there is a total of 2 x 60 MHz potentially available in the Paired 2.1 GHz Band, increasing the possibility of accessing a relatively large amount of contiguous spectrum (see further below);
 - the Paired 2.1 GHz Band is currently used alongside the 800 MHz and 900 MHz bands to provide mobile services and could be considered complementary to the 700 MHz Duplex, given the similarities between the 700 MHz Duplex and 800/900 MHz bands;
 - the Paired 2.1 GHz Band has comparable usage and propagation characteristics to the 2.3 GHz and 2.6 GHz Bands; and

¹⁰⁸<https://www.techradar.com/news/o2-to-rollout-23ghz-spectrum-at-1000-sites> .

¹⁰⁹ Recalling again the benefits of awarding complementary and/or substitutable rights together, such as providing potential users the opportunity to acquire a desired mix of coverage and capacity spectrum rights, and providing greater opportunities for new entry.

- the device ecosystem for the Paired 2.1 GHz Band for 3G services is extensive, and over 6,282 LTE-capable devices are identified by the GSA¹¹⁰ as being capable of operating in this band.

4.42 The above factors indicate that rights of use in the Paired 2.1 GHz Band are likely to be considered by prospective users as a sufficiently close substitute to rights of use in the 2.3 GHz and/or 2.6 GHz bands, and sufficiently complementary to rights of use in the 700 MHz Duplex, so as to merit a joint award with the latter three bands.

4.43 That being said, ComReg recognises that the benefits of including the Paired 2.1 GHz Band (in any joint award of the 2.3 GHz and 2.6 GHz Bands) will be affected by the ability of the Proposed Award to appropriately address the issues arising from the different expiry dates of the four existing 3G licences (three of which expire at different dates in 2022 and the fourth in 2027).

4.44 In that regard, ComReg recalls that similar timing issues arose in respect of the assignment of the 900 MHz and 1800 MHz bands in the 2012 MBSA and observes that it should be possible to apply a similar approach in respect of any inclusion of the Paired 2.1 GHz Band in the Proposed Award. For example, this could include the potential use of:

- measures to align the expiry dates of the three licences expiring in 2022 - which would reduce the staggered availability of the band to two dates (e.g. a common date in 2022 and 11 March 2027)¹¹¹;
- on foot of the above, two or more “time periods” for new rights in the Paired 2.1 GHz Band, so as to accommodate the staggered availability of spectrum in this band in 2022 and 2027;
- an “early liberalisation option” to allow some or all the existing licensees the option to convert, via the Proposed Award, its respective existing rights of use into new “liberalised” rights of use; and
- “relocation” rebates to provide for any additional relocation expenses that would be incurred by existing licensee/s earlier than expected, noting that such earlier relocation may be necessary in order to enable the assignment of contiguous spectrum rights.

4.45 Whilst ComReg recognises that an alternative approach would be to assign the Paired 2.1 GHz Band in a separate award after the Proposed Award, it also recalls the potential inefficiencies that could arise from any sequential award of

¹¹⁰ As at May 2018

¹¹¹ Which could include short-term interim licences such that the three licences expiring in 2022 would co-terminate on 15 October 2022 (i.e. the latest expiry date in 2022).

the Paired 2.1 GHz Band, such as:

- bidders acquiring small amounts of spectrum in each band, rather than focusing on obtaining larger contiguous blocks in some bands, the former of which may be more costly for operators; and
- removing the ability of bidders to shift demand between substitutable rights during the award process on the basis of changing relative prices and, instead, exposing bidders to greater uncertainty about the price at which substitutable spectrum may differ across awards.

4.46 On balance, and recalling that similar timing issues facing the Paired 2.1 GHz Band in the present proposed award were satisfactorily addressed in the 2012 MBSA, **ComReg is of the preliminary view that the Paired 2.1 GHz Band should be included in the Proposed Award.**

4.6 26 GHz Band

4.47 In Document 14/101, the 26 GHz Band was not considered to be suitable for inclusion as it had not then been identified for WBB services at a European level. In the intervening period, however, the 26 GHz Band has been positioned as a pioneer millimetre wave (“mmWave”) band for the launch of 5G services in Europe (see Section 3.6).

4.48 It is expected that 5G spectrum needs will likely encompass a range of existing and new bands, which potentially span a wide section of the radio spectrum, including the sub-6 GHz bands and the mmWave bands above 6 GHz. The EC, in its mandate to CEPT, notes: *“5G terrestrial wireless systems are likely to operate both in existing EU harmonised frequency bands below 6 GHz and in pioneer frequency bands above 6 GHz (mmWave).”*¹¹²

4.49 In the context of the four criteria identified in Document 14/101, ComReg observes that:

- the EC is expected to develop an implementation decision for the 26 GHz Band on foot of the current work by CEPT in the coming year;
- there is a significant amount of unused spectrum in the 26 GHz Band in the ranges 24,250-24,549 MHz, 25,445 – 25,557 MHz and 26,453 – 27,550 MHz;
- there do not appear to be any devices for WBB available for the band;

¹¹² Mandate to CEPT to develop harmonised technical conditions for spectrum use in support of the introduction of next-generation (5G) terrestrial wireless systems in the Union, p2.

- the propagation characteristics of the 26 GHz Band are substantially different from that of the sub-1 GHz bands (e.g. 700 MHz) and the typical capacity bands used for WBB (i.e. 1800 MHz, 2.1 GHz, 2.3 GHz, 2.6 GHz)¹¹³; and
- in light of these substantially different propagation characteristics, there are likely to be considerable differences in (a) the use cases for the 26 GHz Band compared to the services likely to be provided using the sub-6 GHz bands and/or (b) the potential users of the 26 GHz Band. These matters are discussed in further detail below.

4.50 In relation to the currently expected use cases for 26 GHz WBB deployments, ComReg notes that:

- the RSPG Second Opinion identifies the 26 GHz Band as the pioneer band for 5G in Europe above 24 GHz, providing ultra-high capacity for innovative new services and, in this regard, the RSPG considers that:
 - *“Member States should make a sufficiently large portion of the 26 GHz Band (e.g. 1 GHz) available for 5G by 2020, in response to market demand, taking into account that 5G deployment in this frequency range is expected to be used for local coverage”*; and
 - *“The 26 GHz Band is likely to be deployed in areas with very high demand, for example transport hubs, entertainment venues, industrial or retail sites and similar...”* [emphasis added]
- DotEcon and Axon in their advice to BEREC¹¹⁴ consider that 5G networks’ use of mmWave bands to support eMBB services will be limited to:
 - dense network deployment for public networks in urban environments where very high frequency mmWave bands will be needed to support capacity requirements; and
 - provision of eMBB services within privately-owned but ‘quasi-public’ spaces (such as shopping malls or large stadia);
- The preliminary results of an ongoing study, commissioned by the EC and conducted by Plum/iDate, to assess the prospects for the use of the mmWave frequency bands for 5G¹¹⁵, include that:

¹¹³ <https://ec.europa.eu/digital-single-market/en/news/study-workshop-using-mm-waves-bands-deployment-5g-ecosystem-union>

¹¹⁴ Study on Implications of 5G Deployment on Future Business Models. A report by DotEcon Ltd and Axon Partners Group. <https://www.dotecon.com/publications/study-on-implications-of-5g-deployment-on-future-business-models-a-report-for-berec/>

¹¹⁵ <https://ec.europa.eu/digital-single-market/en/news/study-workshop-using-mm-waves-bands-deployment-5g-ecosystem-union>

- the use of mmWave bands for WBB will be limited to specific applications and very dense areas on a small cell basis;
- mmWave bands will only be used where technically- and economically-justified and the extent of rollout will be different from the rollout of sub-6 GHz bands;
- European mobile operators will primarily use the sub-6 GHz frequency bands, and especially the 700 MHz and 3.6 GHz bands for 5G, up until 2025;
- mmWave bands between 2020 and 2025 are likely to represent less than 1% of the total “5G market” in terms of subscriptions; and
- the amount of spectrum available in sub-6 GHz bands will provide a lot of capacity before mmWave bands are needed.

4.51 In relation to the potential users of the 26 GHz Band, ComReg notes the following observations from DotEcon and Axon in their report for BEREC:

- 5G has the potential to change business models for MNOs compared to the current marketplace, where MNOs have offered largely standardised services and differentiation has been limited to pricing plans;
- this potentially generates new roles for intermediaries in the value chain, positioned downstream of MNOs, and there may also be opportunities for new players upstream of traditional mobile networks;
- spectrum award designers should be aware of these possibilities for upstream entry, rather than assume that the only buyers of spectrum will be incumbent MNOs; and
- spectrum rights should be packaged to allow entry, for example by allowing bidders to assemble smaller blocks, to give flexibility over the amount of spectrum acquired.

4.52 In light of the available information, it would appear to ComReg that:

- close substitutes for rights of use in the 26 GHz Band by which to provide “5G” services are more likely to be other mmWave bands¹¹⁶, rather than the sub-6 GHz Candidate Bands - meaning that bidders would be unlikely to adapt their valuations and consequent demand for spectrum across the sub-6 GHz Candidate Bands in response to changes in the price of 26

¹¹⁶ As noted in section 3.6, the RSPG, in its second opinion on 5G, has identified the 42 GHz Band as a priority in terms of studies for second stage mmWave 5G bands and the 66-71 GHz Band as having the potential as a primary European band for 5G services under a general authorisation. ComReg will continue to monitor WRC 19 and all relevant developments with regard to demand for, and/or designation of, spectrum for 5G.

GHz rights of use and vice versa; and

- complementarities between rights of use in the 26 GHz Band and the sub-6 GHz Candidate Bands are unlikely to be sufficiently strong, as the value of the latter is unlikely to be enhanced by winning spectrum rights in 26 GHz Band. In particular, the sub-6 GHz Candidate Bands have particular WBB services and business models/use cases in mind, and the award of any sub-6 GHz Candidate Bands with the 26 GHz Band is unlikely to result in the provision of those services more effectively or at lower cost given the likely different use cases.

4.53 In addition, and recalling the current lack of equipment availability for the 26 GHz Band, ComReg observes a separate, subsequent process to award the 26 GHz Band would provide time for:

- the development of equipment for use in the band;
- greater visibility over the assignment, and likely uses and users, of the 26 GHz Band in other jurisdictions; and
- greater visibility over developments in relation to other mmWave bands and, in particular, the 42 GHz and 66-71 GHz bands identified by the RSPG in its second opinion on 5G.

4.54 In ComReg's view, greater visibility over such matters would assist in terms of the development of the most appropriate assignment process/licensing framework for the band, and prospective users in their participation in any award of the 26 GHz Band.

4.55 Therefore, **ComReg is of the preliminary view that the 26 GHz Band should not be considered for inclusion in this award process**, and instead be assigned under a separate, subsequent award process, the timing and other particulars of which would be determined via separate consultation and in light of relevant developments.

4.7 Summary of Preliminary Assessment

4.56 In light of the above, ComReg is of the preliminary view that the following bands should be included in the Proposed Award:

- 700 MHz Duplex;
- Paired 2.1 GHz;
- 2.3 GHz; and
- 2.6 GHz.

- 4.57 This would mean that a total of 470 MHz of spectrum would be included in the Proposed Award (with 350 MHz being additional spectrum that is currently not used for WBB) which would result in a 46% increase in harmonised spectrum available for the provision of WBB.
- 4.58 Notwithstanding its preliminary views as set out above, ComReg will conduct a subsequent draft RIA on which bands to award, which will be informed by, among other things, responses received from interested parties to this consultation.

Chapter 5

5 Submitting Comments and Next Steps

5.1 Submitting Comments

- 5.1 The four week period for comment will run until 12 noon on Monday 30 July 2018, during which time ComReg welcomes written comments on any of the matters raised in this paper.
- 5.2 It would make the task of analysing responses easier if comments were referenced to the relevant section / paragraph number in each chapter and annex in this document.
- 5.3 Please also set out your reasoning and all supporting information for any views expressed.
- 5.4 Responses must be submitted in written form (post or email) to the following recipient, clearly marked —Submissions to ComReg 18/60:

Mr. Joseph Coughlan
Commission for Communications Regulation
One Dockland Central
Guild Street
Dublin 1
D01 E4X0.
Ireland

Email: marketframeworkconsult@comreg.ie

- 5.5 We request that electronic submissions be submitted in an unprotected format so that they can be included in the ComReg submissions document for electronic publication.
- 5.6 ComReg appreciates that respondents may wish to provide confidential information if their comments are to be meaningful. In order to promote openness and transparency, ComReg will publish all respondents' submissions to this consultation as well as all substantive correspondence on matters relating to this document, subject to the provisions of its guidelines on the treatment of confidential information¹¹⁷. In that regard, respondents are requested to provide both a confidential and non-confidential version of their submission to the consultation, and reasons as to why they consider any particular material to be confidential. Alternatively, respondents are requested to place confidential material in a separate annex to their response, again providing reasons in that annex as to why this particular material is confidential.

5.2 Next Steps

- 5.7 Following receipt and due consideration of submissions in response to this consultation, and any other relevant material, ComReg intends to proceed with the development of more informed and detailed award proposals, and to publish a response to this consultation and further consultation in that regard.
- 5.8 While ComReg cannot provide further clarity on the overall timelines at this juncture, as this will depend on the nature of responses received among other things, ComReg will endeavour to issue its response to this consultation and further consultation by the end of 2018 / early 2019.

¹¹⁷ Document 05/24 - Response to Consultation - Guidelines on the treatment of confidential information - March 2005.

Annex 1: Glossary

A1.1 Definitions

- A 1.1 The definitions in this glossary shall apply to this document as a whole.
- A 1.2 Where a term in this glossary is defined by reference to a definition in a section or paragraph and an explanation of that term is provided in this glossary, the latter explanation is for convenience only and reference should be made to the appropriate part of the document for the definitive meaning of that term in its appropriate context.
- A 1.3 Any reference to any provision of any legislation shall include any modification re-enactment or extension thereof.
- A 1.4 Terms defined in this consultation paper shall, unless the context otherwise requires or admits, have the meaning set out below:

3.6 GHz Band	The radio frequency spectrum in the range 3 400 MHz to 3 800 MHz.
2.6 GHz EC Decision	Refers to EC Decision 2008/477/EC. See section A1.3 below for further details
700 MHz band	The frequency range 694 – 790 MHz
800 MHz band	The frequency range 790 – 862 MHz
900 MHz band	The frequency range 880 – 915 MHz paired with 925 – 960 MHz
1.4 GHz band	The frequency range 1 452 – 1 492 MHz
1 800 MHz band	The frequency range 1 710 – 1 785 MHz paired with 1 805 – 1 880 MHz
2.1 GHz band	The frequency range 1 900 – 1 980 and 2 110 – 2 170 MHz
2.3 GHz band	The frequency range 2 300 – 2 400 MHz
2.6 GHz band	The frequency range 2 500 – 2 690 MHz

26 GHz Band	The frequency range 24.25 - 27.5 GHz
Capacity band	A spectrum band whose propagation characteristics when used for mobile and similar services where user equipment is fitted with low gain antennas, render it unsuitable for its use to serve wide geographical areas, and may be more suitable for urban deployment as hot spots or high capacity infill.
Complementarity	The term can be taken as referring to spectrum bands where the value attributed by an interested party to spectrum in one band is enhanced by having or winning rights of use of spectrum in another band in relation to the Proposed Award.
Coverage band	A spectrum band whose propagation characteristics when used with low gain antennas, render it suitable to serve wide geographical areas, such as the deployment of macro cells for wide area services.
General Authorisation	An authorisation for an undertaking to provide an electronic communications network or service under and in accordance with Regulation 4 of the Authorisation Regulations.
2012 MBSA	2012 MBSA or the MBSA Process refers to the Multi-Band Spectrum Award process whose final results were announced in ComReg Document 12/131 on 5 December 2012
NGA	Next Generation Access
NRA	National Regulatory Authority
RIA	Regulatory Impact Assessment, an analysis of the likely effect of, and necessity of, a proposed new regulation or regulatory change. Such assessments are carried out in accordance with Document 07/56a - Guidelines on ComReg's approach to Regulatory Impact Assessment - August 2007.
Spectrum right of use	Authorisation to use certain radio frequencies subject to such conditions and restrictions as may be prescribed in a licence or

	by any Regulations made by ComReg under section 6 of the Act of 1926.
Substitutability	The term can be taken as referring to spectrum bands which can serve the same purpose for interested parties and so those parties are relatively indifferent to switching between those bands in relation to the Proposed Award.
WBB	Wireless broadband

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

3GPP	The 3 rd Generation Partnership Project
ComReg	Commission for Communications Regulation
CEPT	Conférence européenne des Administration des postes et des télécommunications. In English, European Conference of Postal and Telecommunications Administrations
DCENR	Department of Communications, Energy and Natural Resources
EC	European Commission
ECC	Electronic Communications Committee (of CEPT)
ECO	European Communications Office
EU	European Union
ITU	International Telecommunication Union
RSPG	Radio Spectrum Policy Group

A1.3 Primary and Secondary Legislation

S.I.	Statutory Instrument
2002 Act	The Communications Regulation Act 2002 (No. 20 of 2002), as amended ¹¹⁸
Authorisation Regulations	European Communities (Electronic Communication Networks and Services) (Authorisation) Regulations 2011 (S.I. No 335 of 2011)
Directive 2002/77/EC	A European Commission Directive on competition in the markets for electronic communications networks and services
EC Decision 2008/477/EC	European Commission Decision on the harmonisation of the 2500-2690 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Community
EC Decision 2009/766/EC	European Commission 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
EC Decision 2011/251/EU	European Commission Decision, 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.
EC Decision 2014/276/EU	European Commission Decision on amending Decision 2008/411/EC on the harmonisation of the

¹¹⁸ Includes the Communications Regulation (Amendment) Act 2007 and the Communications Regulation (Premium Rate Services and Electronic Communications Infrastructure) Act 2010.

	3400-3800 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Community.
European Parliament and Council Decision 243/2012/EU	European Parliament and Council Decision establishing a multi-annual radio spectrum policy programme.
ECC Decision (13)03	Electronic Communications Committee decision to harmonise the use of the frequency band 1452-1492 MHz for Mobile/Fixed Communications Networks Supplemental Downlink (MFCN SDL).
ECC Decision ECC/DEC(14)02	Electronic Communications Committee decision to harmonised technical and regulatory conditions for the use of the band 2300-2400 MHz for Mobile/Fixed Communications Networks (MFCN).
Framework Regulations	European Communities (Electronic Communications Networks and Services) (Framework) Regulations 2011 (S.I. No 333 of 2011)
Specific Regulations	Specific Regulations has the same meaning as set out in Regulation 2 of the Framework Regulations

A1.4 Glossary of Technical Terms

3G	Third Generation Mobile System (e.g. UMTS)
BEM	Block Edge Mask
CPI	Consumer Price Index
DTT	Digital Terrestrial Television
ECN	Electronic Communications Networks
ECS	Electronic Communications Service as defined under the Framework Regulations
FDD	Frequency Division Duplex
FWA	Fixed Wireless Access
FWALA	Fixed Wireless Access Local Area
GHz	Gigahertz (1 000 000 000 Hertz)
Guard-band	An unused spectrum bandwidth separating channels to prevent interference
GSA	The Global mobile Suppliers Association - an organisation which represents suppliers of equipment and services to the mobile industry
GSM	Global System for Mobile Communications
GSMA	GSM Association - – an organisation which represents mobile operators
Hertz	Unit of Frequency
kHz	Kilohertz (1 000 Hertz)

LTE	Long Term Evolution of 3G
LTE Advanced / LTE+	An evolution of LTE, having the capability to provide 4G services.
MFCN	Mobile/fixed communications networks
MHz	Megahertz (1 000 000 Hertz)
MNO	Mobile Network Operator
MVNO	Mobile Virtual Network Operator (a licensed mobile operator with no spectrum assignment and with or without network infrastructure)
SDL	Supplementary Downlink
TDD	Time Division Duplex
TD-LTE	Time Division – Long Term Evolution
UMTS	Universal Mobile Telecommunications System.
WDMDS	Wideband Digital Mobile Data Services
WRC	World Radiocommunications Conference

Annex 2: Legal Framework and Statutory Objectives

- A 2.5 The Communications Regulation Acts 2002-2011¹¹⁹ (the “2002 Act”), the Common Regulatory Framework (including the Framework and Authorisation Directives¹²⁰ as transposed into Irish law by the corresponding Framework and Authorisation Regulations¹²¹), and the Wireless Telegraphy Acts 1926 to 2009¹²² set out, amongst other things, powers, functions, duties and objectives of ComReg that are relevant to the management of the radio frequency spectrum in Ireland and to this preliminary consultation.
- A 2.6 Apart from licensing and making regulations in relation to licences, ComReg’s functions include the management of Ireland’s radio frequency spectrum in accordance with ministerial Policy Directions under section 13 of the 2002 Act, having regard to its objectives under section 12 of the 2002 Act, Regulation 16 of the Framework Regulations and the provisions of Article 8a of the Framework Directive. ComReg is to carry out its functions effectively, and in a manner serving to ensure that the allocation and assignment of radio frequencies is based on objective, transparent, non-discriminatory and proportionate criteria.
- A 2.7 This annex is intended as a general guide as to ComReg’s role in this area, and not as a definitive or exhaustive legal exposition of that role. Further, this annex restricts itself to consideration of those powers, functions, duties and objectives of ComReg that appear most relevant to the matters at hand and generally excludes those not considered relevant (for example, in relation to postal services, premium rate services or market analysis). For the avoidance of doubt, however, the inclusion of particular material in this

¹¹⁹ The Communications Regulation Act 2002, the Communications Regulation (Amendment) Act 2007, the Communications Regulation (Premium Rate Services and Electronic Communications Infrastructure) Act 2010 and the Communications Regulation (Postal Services) Act 2011.

¹²⁰ Directive No. 2002/21/EC of the European Parliament and of the Council of 7 March 2002 (as amended by Regulation (EC) No. 717/2007 of 27 June 2007, Regulation (EC) No. 544/2009 of 18 June 2009 and Directive 2009/140/EC of the European Parliament and Council of 25 November 2009) (the “Framework Directive”) and Directive No. 2002/20/EC of the European Parliament and of the Council of 7 March 2002 (as amended by Directive 2009/140/EC) (the “Authorisation Directive”).

¹²¹ The European Communities (Electronic Communications Networks and Services) (Framework) Regulations 2011 (S.I. No. 333 of 2011) and the European Communities (Electronic Communications Networks and Services) (Authorisation) Regulations 2011 (S.I. No. 335 of 2011) respectively.

¹²² The Wireless Telegraphy Acts 1926 to 1988 and Sections 181 (1) to (7) and (9) and Section 182 of the Broadcasting Act 2009.

annex does not necessarily mean that ComReg considers same to be of specific relevance to the matters at hand.

A 2.8 All references in this annex to enactments are to the enactment as amended at the date hereof, unless the context otherwise requires.

A2.1 Primary Objectives and Regulatory Principles under the 2002 Act and Common Regulatory Framework

A 2.9 ComReg's primary objectives in carrying out its statutory functions in the context of electronic communications are to:

- promote competition¹²³;
- contribute to the development of the internal market¹²⁴;
- promote the interests of users within the Community¹²⁵;
- ensure the efficient management and use of the radio frequency spectrum in Ireland in accordance with a direction under section 13 of the 2002 Act¹²⁶; and
- unless otherwise provided for in Regulation 17 of the Framework Regulations, take the utmost account of the desirability of technological neutrality in complying with the requirements of the Specific Regulations¹²⁷ in particular those designed to ensure effective competition¹²⁸.

A2.1.1 Promotion of Competition

A 2.10 Section 12(2)(a) of the 2002 Act requires ComReg to take all reasonable measures which are aimed at the promotion of competition, including:

¹²³ Section 12 (1)(a)(i) of the 2002 Act.

¹²⁴ Section 12 (1)(a)(ii) of the 2002 Act.

¹²⁵ Section 12(1)(a)(iii) of the 2002 Act.

¹²⁶ Section 12(1)(b) of the 2002 Act. Whilst this objective would appear to be a separate and distinct objective in the 2002 Act, it is noted that, for the purposes of ComReg's activities in relation to electronic communications networks and services ("ECN" and "ECS"), Article 8 of the Framework Directive identifies "*encouraging efficient use and ensuring the effective management of radio frequencies (and numbering resources)*" as a sub-objective of the broader objective of the promotion of competition.

¹²⁷ The 'Specific Regulations' comprise collectively the Framework Regulations, the Authorisation Regulations, the European Communities (Electronic Communications Networks and Services) (Access) Regulations 2011 (S.I. No. 334 of 2011), the European Communities (Electronic Communications Networks and Services) (Universal Service and Users' Rights) Regulations 2011 (S.I. 337 of 2011) and the European Communities (Electronic Communications Networks and Services) (Privacy and Electronic Communications) Regulations 2011 (S.I. No. 336 of 2011).

¹²⁸ Regulation 16(1)(a) of the Framework Regulations.

- ensuring that users, including disabled 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; and
- encouraging efficient use and ensuring the effective management of radio frequencies and numbering resources.

A 2.11 In so far as the promotion of competition is concerned, Regulation 16(1)(b) of the Framework Regulations also requires ComReg to:

- ensure 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.

A 2.12 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. Regulation 9(11) further provides that ComReg must ensure that competition is not distorted by any transfer or accumulation of rights of use for radio frequencies, and, for this purpose, ComReg may take appropriate measures such as mandating the sale or the lease of rights of use for radio frequencies.

A2.1.2 Contributing to the Development of the Internal Market

A 2.13 Section 12(2)(b) of the 2002 Act requires ComReg to take all reasonable measures which are aimed at contributing to the development of the internal market, including:

- removing remaining obstacles to the provision of ECN ECS and associated facilities at Community level;
- encouraging the establishment and development of trans-European networks and the interoperability of transnational services and end-to-end connectivity; and
- co-operating with electronic communications national regulatory authorities in other Member States of the Community and with the Commission of the Community in a transparent manner to ensure the development of consistent regulatory practice and the consistent application of Community law in this field.

A 2.14 In so far as contributing to the development of the internal market is concerned, Regulation 16(1)(c) of the Framework Regulations also requires ComReg to co-operate with the Body of European Regulators for Electronic Communications (“BEREC”) in a transparent manner to ensure the development of consistent regulatory practice and the consistent application of EU law in the field of electronic communications.

A2.1.3 Promotion of Interests of Users

A 2.15 Section 12(2)(c) of the 2002 Act requires ComReg, when exercising its functions in relation to the provision of electronic communications networks and services, to take all reasonable measures which are aimed at the promotion of the interests of users within the Community, including:

- ensuring that all users have access to a universal service;
- ensuring a high level of protection for consumers in their dealings with suppliers, in particular by ensuring the availability of simple and inexpensive dispute resolution procedures carried out by a body that is independent of the parties involved;
- contributing to ensuring a high level of protection of personal data and privacy;
- promoting the provision of clear information, in particular requiring transparency of tariffs and conditions for using publicly available ECS;
- encouraging access to the internet at reasonable cost to users;
- addressing the needs of specific social groups, in particular disabled users; and
- ensuring that the integrity and security of public communications networks are maintained.

A 2.16 In so far as promotion of the interests of users within the EU is concerned, Regulation 16(1)(d) of the Framework Regulations also requires ComReg to:

- address the needs of specific social groups, in particular, elderly users and users with special social needs, and
- promote the ability of end-users to access and distribute information or use applications and services of their choice.

A2.1.4 Regulatory Principles

A 2.17 In pursuit of its objectives under Regulation 16(1) of the Framework Regulations and section 12 of the 2002 Act, ComReg must apply objective, transparent, non-discriminatory and proportionate regulatory principles by, amongst other things:

- promoting regulatory predictability by ensuring a consistent regulatory approach over appropriate review periods;
- ensuring that, in similar circumstances, there is no discrimination in the treatment of undertakings providing ECN and ECS;
- safeguarding competition to the benefit of consumers and promoting, where appropriate, infrastructure-based competition;
- 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, while ensuring that competition in the market and the principle of non-discrimination are preserved;
- taking due account of the variety of conditions relating to competition and consumers that exist in the various geographic areas within the State; and
- imposing ex-ante regulatory obligations only where there is no effective and sustainable competition and relaxing or lifting such obligations as soon as that condition is fulfilled.

A2.1.5 BEREC

A 2.18 Under Regulation 16(1)(3) of the Framework Regulations, ComReg must:

- having regard to its objectives under section 12 of the 2002 Act and its functions under the Specific Regulations, actively support the goals of BEREC of promoting greater regulatory co-ordination and coherence; and
- take the utmost account of opinions and common positions adopted by BEREC when adopting decisions for the national market.

A2.1.6 Other Obligations under the 2002 Act

A 2.19 In carrying out its functions, ComReg is required, amongst other things, to:

- seek to ensure that any measures taken by it are proportionate having regard to the objectives set out in section 12 of the 2002 Act;¹²⁹
- have regard to international developments with regard to ECN and ECS, associated facilities, postal services, the radio frequency spectrum and numbering¹³⁰; and
- take the utmost account of the desirability that the exercise of its functions aimed at achieving its radio frequency management objectives does not result in discrimination in favour of or against particular types of technology for the provision of ECS.¹³¹

A2.1.7 Policy Directions¹³²

A 2.20 Section 12(4) of the 2002 Act provides that, in carrying out its functions, ComReg must have appropriate regard to policy statements, published by or on behalf of the Government or a Minister of the Government and notified to the Commission, in relation to the economic and social development of the State. Section 13(1) of the 2002 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, in the interests of the proper and effective regulation of the electronic communications market, the management of the radio frequency spectrum in the State and the formulation of policy applicable to such proper and effective regulation and management, to be followed by ComReg in the exercise of its functions. Section 10(1)(b) of the 2002 Act also requires ComReg, in managing the radio frequency spectrum, to do so in accordance with a direction of the Minister under section 13 of the 2002 Act, while Section 12(1)(b) requires ComReg to ensure the efficient management and use of the radio frequency spectrum in accordance with a direction under Section 13.

A 2.21 The Policy Directions which are most relevant in this regard include the following:

Policy Direction No.3 on Broadband Electronic Communication Networks

A 2.22 ComReg shall in the exercise of its functions, take into account the national objective regarding broadband rollout, viz, the Government wishes to

¹²⁹ Section 12(3) of the 2002 Act.

¹³⁰ Section 12(5) of the 2002 Act.

¹³¹ Section 12(6) of the 2002 Act.

¹³² ComReg also notes, and takes due account of, the Spectrum Policy Statement issued by the Department of Communications Energy and Natural Resources in September 2010.

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.

Policy Direction No.4 on Industry Sustainability

A 2.23 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.

Policy Direction No.5 on Regulation only where Necessary

A 2.24 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.

Policy Direction No.6 on Regulatory Impact Assessment

A 2.25 ComReg, before deciding to impose regulatory obligations on undertakings in the market for electronic communications or for the purposes of the management and use of the radio frequency spectrum or for the purposes of the regulation of the postal sector, shall conduct a Regulatory Impact Assessment in accordance with European and International best practice and otherwise in accordance with measures that may be adopted under the Government's Better Regulation programme.

Policy Direction No.7 on Consistency with other Member States

A 2.26 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.

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

A 2.27 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.

General Policy Direction No.1 on Competition (2004)

A 2.28 ComReg shall focus on the promotion of competition as a key objective. Where necessary, ComReg shall implement remedies which counteract or remove barriers to market entry and shall support entry by new players to the market and entry into new sectors by existing players. ComReg shall have a particular focus on:

- market share of new entrants;
- ensuring that the applicable margin attributable to a product at the wholesale level is sufficient to promote and sustain competition;
- price level to the end user;
- competition in the fixed and mobile markets; and
- the potential of alternative technology delivery platforms to support competition

A2.2 Other Relevant Obligations under the Framework and Authorisation Regulations

A2.2.1 Framework Regulations

A 2.29 Regulation 17 of the Framework Regulations governs the management of radio frequencies for ECS. Regulation 17(1) requires that ComReg, subject to any directions issued by the Minister pursuant to Section 13 of the 2002 Act and having regard to its objectives under Section 12 of the 2002 Act and Regulation 16 of the Framework Regulations and the provisions of Article 8a of the Framework Directive, ensure:

- the effective management of radio frequencies for ECS;
- that spectrum allocation used for ECS and issuing of general authorisations or individual rights of use for such radio frequencies are based on objective, transparent, non-discriminatory and proportionate criteria; and
- ensure that harmonisation of the use of radio frequency spectrum across the EU is promoted, consistent with the need to ensure its effective and efficient use and in pursuit of benefits for the consumer such as economies of scale and interoperability of services, having regard to all decisions and measures adopted by the European Commission in accordance with Decision No. 676/2002/EC of the European Parliament and of the Council of 7 March 2002 on a regulatory framework for radio spectrum policy in the EU.

- A 2.30 Regulation 17(2) provides that, unless otherwise provided in Regulation 17(3), ComReg must ensure that all types of technology used for ECS may be used in the radio frequency bands that are declared available for ECS in the Radio Frequency Plan published under Section 35 of the 2002 Act in accordance with EU law.
- A 2.31 Regulation 17(3) provides that, notwithstanding Regulation 17(2), ComReg may, through licence conditions or otherwise, provide for proportionate and non-discriminatory restrictions to the types of radio network or wireless access technology used for ECS where this is necessary to—
- avoid harmful interference;
 - protect public health against electromagnetic fields;
 - ensure technical quality of service;
 - ensure maximisation of radio frequency sharing;
 - safeguard the efficient use of spectrum; or
 - ensure the fulfilment of a general interest objective as defined by or on behalf of the Government or a Minister of the Government in accordance with Regulation 17(6).
- A 2.32 Regulation 17(4) requires that, unless otherwise provided in Regulation 17(5), ComReg must ensure that all types of ECS may be provided in the radio frequency bands, declared available for ECS in the Radio Frequency Plan published under Section 35 of the Act of 2002 in accordance with EU law.
- A 2.33 Regulation 17(5) provides that, notwithstanding Regulation 17(4), ComReg may provide for proportionate and non-discriminatory restrictions to the types of ECS to be provided, including where necessary, to fulfil a requirement under the International Telecommunication Union Radio Regulations (“ITU-RR”).
- A 2.34 Regulation 17(6) requires that measures that require an ECS to be provided in a specific band available for ECS must be justified in order to ensure the fulfilment of a general interest objective as defined by or on behalf of the Government or a Minister of the Government in conformity with EU law such as, but not limited to—
- safety of life;
 - the promotion of social, regional or territorial cohesion;
 - the avoidance of inefficient use of radio frequencies; or

- the promotion of cultural and linguistic diversity and media pluralism, for example, by the provision of radio and television broadcasting services.
- A 2.35 Regulation 17(7) provides that ComReg may only prohibit the provision of any other ECS in a specific radio spectrum frequency band where such a prohibition is justified by the need to protect safety of life services. ComReg may, on an exceptional basis, extend such a measure in order to fulfil other general interest objectives as defined by or on behalf of the Government or a Minister of the Government.
- A 2.36 Regulation 17(8) provides that ComReg must, in accordance with Regulation 18, regularly review the necessity of the restrictions referred to in Regulations 17(3) and 17(5) and must make the results of such reviews publicly available.
- A 2.37 Regulation 17(9) provides that Regulations 17(2) to (7) only apply to spectrum allocated to be used for ECS, general authorisations issued and individual rights of use for radio frequencies granted after 1 July 2011. Spectrum allocations, general authorisations and individual rights of use which already existed on 1 July 2011 are subject to Regulation 18 of the Framework Regulations.
- A 2.38 Regulation 17(10) provides that ComReg may, having regard to its objectives under Section 12 of the 2002 Act and Regulation 16 and its functions under the Specific Regulations, lay down rules in order to prevent spectrum hoarding, in particular by setting out strict deadlines for the effective exploitation of the rights of use by the holder of rights and by withdrawing the rights of use in cases of non-compliance with the deadlines. Any rules laid down under this Regulation must be applied in a proportionate, non-discriminatory and transparent manner.
- A 2.39 Regulation 17(11) requires ComReg to, in the fulfilment of its obligations under that Regulation, respect relevant international agreements, including the ITU-RR and any public policy considerations brought to its attention by the Minister.

A2.2.2 Authorisation Regulations

Decision to limit rights of use for radio frequencies

- A 2.40 Regulation 9(2) of the Authorisation Regulations provides that ComReg may grant individual rights of use for radio frequencies by way of a licence where it considers that one or more of the following criteria are applicable:
- it is necessary to avoid harmful interference;
 - it is necessary to ensure technical quality of service;

- it is necessary to safeguard the efficient use of spectrum; or
- it is necessary to fulfil other objectives of general interest as defined by or on behalf of the Government or a Minister of the Government in conformity with EU law.

A 2.41 Regulation 9(10) of the Authorisation Regulations provides that ComReg must not limit the number of rights of use for radio frequencies to be granted except where this is necessary to ensure the efficient use of radio frequencies in accordance with Regulation 11.

A 2.42 Regulation 9(7) also provides that:

- where individual rights of use for radio frequencies are granted for a period of 10 years or more and such rights may not be transferred or leased between undertakings in accordance with Regulation 19 of the Framework Regulations, ComReg must ensure that criteria set out in Regulation 9(2) apply for the duration of the rights of use, in particular upon a justified request from the holder of the right.
- where ComReg determines that the criteria referred to in Regulation 9(2) are no longer applicable to a right of use for radio frequencies, ComReg must, after a reasonable period and having notified the holder of the individual rights of use, change the individual rights of use into a general authorisation or must ensure that the individual rights of use are made transferable or leasable between undertakings in accordance with Regulation 19 of the Framework Regulations.

Publication of procedures

A 2.43 Regulation 9(4)(a) of the Authorisation Regulations requires that ComReg, having regard to the provisions of Regulation 17 of the Framework Regulations, establish open, objective, transparent, non-discriminatory and proportionate procedures for the granting of rights of use for radio frequencies and cause any such procedures to be made publicly available.

Duration of rights of use for radio frequencies

A 2.44 Regulation 9(6) of the Authorisation Regulations provides that rights of use for radio frequencies must be in force for such period as ComReg considers appropriate having regard to the network or service concerned in view of the objective pursued taking due account of the need to allow for an appropriate period for investment amortisation.

Conditions attached to rights of use for radio frequencies

- A 2.45 Regulation 9(5) of the Authorisation Regulations provides that, when granting rights of use for radio frequencies, ComReg must, having regard to the provisions of Regulations 17 and 19 of the Framework Regulations, specify whether such rights may be transferred by the holder of the rights and under what conditions such a transfer may take place.
- A 2.46 Regulation 10(1) of the Authorisation Regulations provides that, notwithstanding Section 5 of the Wireless Telegraphy Act, 1926, but subject to any regulations under Section 6 of that Act, ComReg may only attach those conditions listed in Part B of the Schedule to the Authorisation Regulations. Part B lists the following conditions which may be attached to rights of use:
- Obligation to provide a service or to use a type of technology for which the rights of use for the frequency has been granted including, where appropriate, coverage and quality requirements.
 - Effective and efficient use of frequencies in conformity with the Framework Directive and Framework Regulations.
 - Technical and operational conditions necessary for the avoidance of harmful interference and for the limitation of exposure of the general public to electromagnetic fields, where such conditions are different from those included in the general authorisation.
 - Maximum duration in conformity with Regulation 9, subject to any changes in the national frequency plan.
 - Transfer of rights at the initiative of the rights holder and conditions of such transfer in conformity with the Framework Directive.
 - Usage fees in accordance with Regulation 19.
 - Any commitments which the undertaking obtaining the usage right has made in the course of a competitive or comparative selection procedure.
 - Obligations under relevant international agreements relating to the use of frequencies.
 - Obligations specific to an experimental use of radio frequencies.
- A 2.47 Regulation 10(2) also requires that any attachment of conditions under Regulation 10(1) to rights of use for radio frequencies must be non-discriminatory, proportionate and transparent and in accordance with Regulation 17 of the Framework Regulations.

Procedures for limiting the number of rights of use to be granted for radio frequencies

A 2.48 Regulation 11(1) of the Authorisation Regulations provides that, where ComReg considers that the number of rights of use to be granted for radio frequencies should be limited it must, without prejudice to Sections 13 and 37 of the 2002 Act:

- give due weight to the need to maximise benefits for users and to facilitate the development of competition, and
- give all interested parties, including users and consumers, the opportunity to express their views in accordance with Regulation 12 of the Framework Regulations.

A 2.49 Regulation 11(2) of the Authorisation Regulations requires that, when granting the limited number of rights of use for radio frequencies it has decided upon, ComReg does so “...on the basis of selection criteria which are objective, transparent, non-discriminatory and proportionate and which give due weight to the achievement of the objectives set out in Section 12 of the 2002 Act and Regulations 16 and 17 of the Framework Regulations.”

A 2.50 Regulation 11(4) provides that where it decides to use competitive or comparative selection procedures, ComReg must, inter alia, ensure that such procedures are fair, reasonable, open and transparent to all interested parties.

Fees for spectrum rights of use

A 2.51 Regulation 19 of the Authorisation Regulations permits ComReg to impose fees for rights of use which reflect the need to ensure the optimal use of the radio frequency spectrum.

A 2.52 ComReg is required to ensure that any such fees are objectively justified, transparent, non-discriminatory and proportionate in relation to their intended purpose and take into account the objectives of ComReg as set out in Section 12 of the 2002 Act and Regulation 16 of the Framework Regulations.

Amendment of rights and obligations

A 2.53 Regulation 15 of the Authorisation Regulations permits ComReg to amend rights and conditions concerning rights of use, provided that any such amendments may only be made in objectively justified cases and in a proportionate manner, following the process set down in Regulation 15(4).

A2.3 Other Relevant Provisions

Wireless Telegraphy Act, 1926 (the “1926 Act”)

- A 2.54 Under Section 5(1) of the 1926 Act, ComReg may, subject to that Act, and on payment of the prescribed fees (if any), grant to any person a licence to keep and have possession of apparatus for wireless telegraphy in any specified place in the State.
- A 2.55 Section 5(2) provides that, such a licence shall be in such form, continue in force for such period and be subject to such conditions and restrictions (including conditions as to suspension and revocation) as may be prescribed in regard to it by regulations made by ComReg under Section 6.
- A 2.56 Section 5(3) also provides that, where it appears appropriate to ComReg, it may, in the interests of the efficient and orderly use of wireless telegraphy, limit the number of licences for any particular class or classes of apparatus for wireless telegraphy granted under Section 5.
- A 2.57 Section 6 provides that ComReg may make regulations prescribing in relation to all licences granted by it under Section 5, or any particular class or classes of such licences, all or any of the following matters:
- the form of such licences;
 - the period during which such licences continue in force;
 - the manner in which, the terms on which, and the period or periods for which such licences may be renewed;
 - the circumstances in which or the terms under which such licences are granted;
 - the circumstances and manner in which such licences may be suspended or revoked by ComReg;
 - the terms and conditions to be observed by the holders of such licences and subject to which such licences are deemed to be granted;
 - the fees to be paid on the application, grant or renewal of such licences or classes of such licences, subject to such exceptions as ComReg may prescribe, and the time and manner at and in which such fees are to be paid; and
 - matters which such licences do not entitle or authorise the holder to do.
- A 2.58 Section 6(2) provides that Regulations made by ComReg under Regulation 6 may authorise and provide for the granting of a licence under Section 5

subject to special terms, conditions, and restrictions to persons who satisfy it that they require the licences solely for the purpose of conducting experiments in wireless telegraphy.

Broadcasting Act 2009 (the “2009 Act”)

A 2.59 Section 132 of the 2009 Act relates to the duties of ComReg in respect of the licensing of spectrum for use in establishing digital terrestrial television multiplexes and places an obligation on ComReg to issue:

- two DTT multiplex licences to RTÉ by request (see Sections 132 (1) and (2) of the 2009 Act); and
- a minimum of four DTT multiplex licences to the BAI by request (see Sections 132 (3) and (4) of the 2009 Act) for the provision of commercial TV content.

Article 4 of Directive 2002/77/EC (Competition Directive)

A 2.60 Article 4 of the Competition Directive provides that:

“Without prejudice to specific criteria and procedures adopted by Member States to grant rights of use of radio frequencies to providers of radio or television broadcast content services with a view to pursuing general interest objectives in conformity with Community law:

- *Member States shall not grant exclusive or special rights of use of radio frequencies for the provision of electronic communications services.*
- *The assignment of radio frequencies for electronic communication services shall be based on objective, transparent, non-discriminatory and proportionate criteria.”*

Radio Spectrum Policy Programme

A 2.61 On 15 February 2012, the European Parliament adopted the five-year Radio Spectrum Policy Programme (“RSPP”) which establishes a multi-annual radio spectrum policy programme for the strategic planning and harmonisation of the use of spectrum. The objective is to ensure the functioning of the internal market in the Union policy areas involving the use of spectrum, such as electronic communications, research, technological development and space, transport, energy and audiovisual policies.

A 2.62 Among the activities being undertaken in the context of the RSPP is a comprehensive inventory of spectrum use in the range 400 MHz to 6 GHz in order to identify developing and potentially significant uses of that spectrum.