Management and use of the UHF radio frequency band in Ireland
(470 – 790 MHz)

Preliminary Consultation

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Glossary of Abbreviations

Table 1.0 sets out a non-exhaustive list of abbreviations and explanations applying to this Preliminary Consultation

Table 1: Abbreviations

Abbreviation	Explanation
Allocation	Allocation means the designation in a given frequency band of its use by one or more radiocommunication services under specified conditions as may be set out in the ITU-RR or in a national table of radio frequency allocations
Assignment	Assignment of a radio frequency or radio frequency channel is the authorisation by the competent national authority (e.g., ComReg) for its use by a radio station to provide services under specified conditions
AVC	Advanced Video Coding
BAI	Broadcasting Authority of Ireland
CEPT	European Conference of Postal and Telecommunications Administrations
CENELEC	European Committee for Electrotechnical Standardisation
ComReg	Commission for Communications Regulation
DCENR	Department of Communications Energy and Natural Resources
DTT	Digital Terrestrial Television
DVB T	Digital Video Broadcasting Terrestrial
DVB-T2	Digital Video Broadcasting Terrestrial, 2nd generation
DSL	Direct Subscriber Line
ECN	Electronic Communications Network
ECS	Electronic Communications Service
ECO	European Communications Office
ECC PT	Electronic Communications Committee Project Team
EEA	European Economic Area
EFIS	European Frequency Information System
ESRI	Economic and Social Research Institute
ETSI	European Telecommunications Standards Institute
EU	European Union
GDP	Gross Domestic Product
GSM	Global System for Mobile Communications
HEVC	High Efficiency Video Coding
IMT	International Mobile Telecommunications
ITU	International Telecommunication Union
ITU-R	ITU Radiocommunication Sector
IPTV	Internet Protocol TV
MB	Megabyte
MCA	Mobile Communications on Aircraft
MFN	Multi Frequency Network

Abbreviation	Explanation
Minister	Minister for Communications Energy and Natural Resources
MoU	Memorandum of Understanding
PMSE	Programme Making and Special Events
PMR	Private Mobile Radio
PPDR	Public Protection and Disaster Relief
PSB	Public Service Broadcasting
R&D	Research and Development
RR	Radio Regulations
RRC GE06	Regional Radiocommunications Conference Geneva 2006
RSC	Radio Spectrum Committee
RSPG	Radio Spectrum Policy Group
RTÉ	Raidió Teilifís Éireann
SIMS	Subscriber Identity Modules
TG4	Teilifís na Gaeilge
UHD	Ultra High Definition
UHF	Ultra High Frequency
UK	United Kingdom
US	United States of America
VOD	Video on Demand
WBB	Wireless broadband
WRC	World Radiocommunication Conference
WSD	White Space Device

Chapter 1

1 Executive Summary

1.1 Radio spectrum is a finite and valuable resource over which many services are provided to users. Radio spectrum provides a significant contribution to the Irish economy[1], and the efficient use and effective management of radio spectrum increases its utility and is a statutory obligation of the Commission for Communication Regulation ("ComReg"). Advances in technology are constantly improving the capabilities and driving the potential use of the radio spectrum resource, placing often varying and competing demands for the same spectrum rights.

1.2 Given its attractive propagation characteristics[2], sub-1GHz spectrum is of particular interest to many parties. The availability of sub-1GHz spectrum is limited, and the 470 – 790 MHz band (referred to as the "UHF band" in this document) is a considerable part of this particular spectrum resource. It is important that ComReg ensures the most efficient use of this important finite spectrum resource and, as discussed in this document, the current and future use of the UHF band is currently a topic of considerable interest, particularly at an international level.

1.3 At the International Telecommunication Union ("ITU") World Radiocommunication Conference ("WRC") in 2012 ("WRC-12"), a resolution was adopted (Resolution 232) to broaden the primary allocation status associated with the upper part of the UHF band for Region 1 (Europe, Africa and the Middle East). Specifically, this resolution resolved to give a co-primary allocation to mobile services (excluding aeronautical services) in the 694[3] - 790 MHz band (the "700 MHz band"), alongside the existing primary allocation for broadcasting services, and to identify this frequency band for International Mobile Telecommunications ("IMT"). This allocation will be effective immediately following the WRC due to take place in November 2015 ("WRC-15"). Extensive studies are currently underway within Europe and the relevant ITU working groups in preparation for the 700 MHz band allocation and the increased possibilities that this may bring to the services that could be provided using this band. Notably, the studies being

[1] In 2010, ComReg estimated that the economic contribution of radio spectrum to GDP in Ireland was 2.23% of total GDP. See ComReg Document 11/89 "Strategy for Managing the Radio Spectrum: 2011-2013"

[2] Sub-1GHz spectrum can penetrate walls and other obstructions ("in-building penetration") more easily than higher frequency spectrum leading to improved service coverage with fewer base stations.

[3] The lower edge of the band (694 MHz or some other value) is to be confirmed by WRC-15.

undertaken in accordance with Resolution 232 are being considered under agenda item 1.2[4] of WRC-15.

1.4 Given the increasing demand for IMT and other terrestrial mobile broadband services, and considering their contribution to global economic and social development by providing a wide range of multimedia applications (such as mobile telemedicine, tele-working and distance learning), a further resolution (Resolution 233) potentially relevant to the UHF band was adopted at WRC-12. This resolution invites the ITU-R to study the additional spectrum requirements of IMT and other terrestrial mobile broadband services and the potential candidate frequency bands, and in turn consider the results of the above studies and take appropriate actions at WRC-15. This is agenda item 1.1[5] of WRC-15. Considerable work on this issue is taking place at an international level and, while a number of candidate frequency bands are currently being studied in the ITU working groups preparing this WRC-15 agenda item, it is notable that the remainder of the UHF band from 470 – 694 MHz is one of the candidate frequency bands being considered.

1.5 Given the upcoming change in the allocation status of the 700 MHz band at WRC-15 and the discussions that are ongoing in relation to the future use of the UHF band at an international level, the aim of this preliminary consultation paper is to stimulate and facilitate discussion at a national level on the future use of the UHF band.

1.6 To inform this discussion this document:

- outlines the international discussions and developments regarding the UHF band. This provides background information relevant to considerations of the UHF band in the national context;
- discusses the current uses of the UHF band in Ireland, namely Digital Terrestrial Television ("DTT") and Programme Making and Special Events ("PMSE") services;
- discusses the potential uses of the UHF band. This discussion usefully draws on the ongoing international discussions on the UHF band and includes existing DTT and PMSE uses, as well as a number of potential new services including IMT/mobile services, the Public Protection and

[4] WRC-15 Agenda item 1.2: *to examine the results of ITU-R studies, in accordance with Resolution **232 (WRC-12)**, on the use of the frequency band 694-790 MHz by the mobile, except aeronautical mobile, service in Region 1 and take the appropriate measures;*

[5] WRC-15 Agenda item 1.1: *to consider additional spectrum allocations to the mobile service on a primary basis and identification of additional frequency bands for International Mobile Telecommunications (IMT) and related regulatory provisions, to facilitate the development of terrestrial mobile broadband applications, in accordance with Resolution **233 (WRC-12)**;*

Disaster Relief (PPDR) service and White Space Devices ("WSD") applications; and

- sets out the main issues associated with the UHF band upon which ComReg is seeking comments from interested parties.

1.7 Following this preliminary consultation paper, it is ComReg's intention to issue a further consultation paper on the development of a spectrum management strategy for the UHF band. The submissions from interested parties in response to this preliminary consultation paper will greatly assist ComReg in its preparation of the consultation paper and, in this regard, ComReg urges interested parties to set out their views on the main issues identified in chapter 6, including:

- The demand by services for spectrum in the UHF band and whether other services should also be considered;
- Considerations that Ireland should take into account in relation to the 700 MHz band;
- Excluding the 700 MHz band, considerations that should be taken into account in relation to the remainder of the UHF band (470 – 694 MHz).

1.8 Responses to this preliminary consultation should be submitted to ComReg by **14 March 2014**

Chapter 2

2 Introduction

2.1 Introduction

2.1 The radio frequency spectrum is a finite and valuable national resource underpinning a wide array of important economic [6], social and communications activities. The range and variety of uses of the radio spectrum are constantly evolving, as are also the demands and needs of the consumers who use these services and the needs of society in general. This is matched and driven by technological advancements that improve the capabilities of radiocommunication devices and facilitate the introduction of improved and/or new services.

2.2 Necessarily, regulation must also evolve and so, from time-to-time the rules that allocate spectrum to a certain usage are changed to allow the introduction of additional services. Such progressive developments need to be managed in a balanced fashion as the needs of all users, both existing and potential new users, need to be carefully considered. At an international level, the UHF band has been the subject of a number of recent developments and there are currently significant and extensive preparations and discussions taking place with regard to the future of the UHF band.

2.3 In relation to some of the most recent developments, at WRC-12[7], two resolutions relevant to the UHF band were adopted:

- Resolution 232[8], which resolved to give a co-primary allocation to mobile services (excluding aeronautical services) in the 700 MHz band, alongside the existing primary allocation for broadcasting services, and to identify this frequency band for IMT. This allocation is effective immediately after WRC-15 which is due to take place in November 2015, and the studies being undertaken as a result of this resolution will inform agenda item 1.2 at WRC-15;

- Resolution 233 [9], which resolved to study the additional spectrum requirements of IMT and other terrestrial mobile broadband services and

[6] Ibid footnote 1

[7] WRCs are held periodically by the ITU which is an agency of the United Nations. See Chapter 3 for further explanation of WRCs.

[8] Resolution 232 (WRC-12): Use of the frequency band 694-790 MHz by the mobile, except aeronautical mobile, service in Region 1 and related studies

[9] Resolution 233 (WRC-12): Studies on frequency-related matters on International Mobile Telecommunications and other terrestrial mobile broadband applications

the potential candidate frequency bands, and then consider the results of the above studies and take appropriate actions at WRC-15. This is agenda item 1.1 at WRC-15.

2.4 Given the above ITU resolutions and the studies that are required to inform the associated agenda items at WRC-15, extensive work at an international level relevant to the UHF band is currently underway to meet this demanding schedule.

2.5 In relation to agenda item 1.2 of WRC-15 concerning the 700 MHz band, Europe has already begun its preparations for the implementation of the 700 MHz allocation. In 2013, the European Commission (the "EC") issued a mandate to the European Conference of Postal and Telecommunications Administrations (CEPT). The mandate asks CEPT to develop harmonised technical conditions for the 700 MHz band in the European Union (the "EU") for the provision of wireless broadband electronic communications services and other uses (i.e. PMSE services and Public Protection and Disaster Relief (PPDR) services) in support of EU spectrum policy priorities.[10] The timetable in the mandate envisaged CEPT delivering two reports (Report A and Report B) to the EC as outlined below:

- the aim of Report A is to, among other things, set out the preferred technical (including channelling) arrangements and to identify the common and minimal (least restrictive) technical conditions for wireless broadband use. Report A is to be delivered to the EC by November 2014;

- the aim of Report B is to assess the need to refine the conditions set out in Report A in light of international developments such as the outcome of WRC-15. Report B is to be delivered to the EC by July 2016.

2.6 CEPT's work on the 700 MHz mandate is progressing according to the time schedule of the mandate, as confirmed at the CEPT ECC meeting of November 2013.[11]

2.7 Preparations are underway within Europe, through the CEPT, with respect to agenda item 1.1 of WRC-15 concerning the additional spectrum requirements of IMT and other terrestrial mobile broadband services and the potential candidate frequency bands. The CEPT[12] is progressing its work in

[10] See RSCOM12-37 Rev3 available at https://circabc.europa.eu/ (DG Connect / Radio Spectrum Committee) or CEPT website at http://www.cept.org/Documents/ecc/9585/ECC(13)INFO-002_RSCOM12-37-Mandate-CEPT-700-MHz

[11] See Interim Report from CEPT to the European Commission available at http://www.cept.org/Documents/ecc/14362/ECC(13)090-Annex17_Interim-Report-from-CEPT-for-the-700-MHz-band

[12] Conference Preparatory Group (CPG –PTD).

relation to preparing a preliminary CEPT common position and it is expected that this position will be developed during 2014. At a global level, an ITU-R working group [13] is compiling contributions in relation to studies being undertaken with respect to agenda item 1.1 as part of preparations for WRC-15. CEPT's ongoing work in this respect and the work of other countries and administrations are contributing to the work of the ITU-R working group. While a number of frequency bands are currently being discussed in relation to this WRC-15 agenda item, for the purposes of this paper it is notable that the remainder of the UHF band from 470 – 694 MHz is actively being considered by the ITU under WRC-15 agenda item 1.1. ComReg also observes that among other things sharing and compatibility studies have been proposed to assess the potential of the band for terrestrial mobile broadband services.

2.8 Aside from the above WRC-15 activities, work relevant to the UHF band is also being carried out by a number of other groups including:

- In June 2013, the CEPT/Electronic Communications Committee (ECC) established Task Group-6 (TG6) to study the future use of the UHF band, with a particular focus on the 470-694 MHz portion of the band.[14] TG6 has been tasked to identify scenarios for the development of this key part of the radio spectrum in the long term, taking into account technical and regulatory aspects in particular, while also recognising the economic, social and cultural issues associated with it. The third meeting of TG6 is taking place in February 2014, and it is envisaged that TG6 will prepare a draft ECC report for public consultation by mid 2014;

- CEPT/ECC Frequency Management Working Group established Project Team FM 53 to consider the use of WSD applications[15] and, in particular, to provide guidance to administrations on developing a framework for the introduction of TV WSDs using geo-location. A draft ECC report is expected from FM53 on TV White Space Devices (TV WSD) in February 2015;

- both CEPT and the EC are considering the spectrum requirements for Programme Making and Special Events (PMSE) in Europe (see section 5.3 below) and the UHF band forms part of these considerations; and

- CEPT/ECC WG FM49 is currently considering the future requirements of PPDR. Two possible candidate bands for a European broadband Public

[13] ITU-R Joint Task Group JTG 4-5-6-7.

[14] See http://www.cept.org/ecc/ecc-announces-long-term-vision-on-uhf-frequency-band

[15] See http://www.cept.org/ecc/groups/ecc/wg-fm/fm-53

Protection and Disaster Relief (BB PPDR) system are currently being considered, i.e., within the bands 400-470 MHz and 694-790 MHz.

- On 13 January 2014, the EC announced the formation of a high-level advisory group on the future use of UHF spectrum for TV and wireless broadband.[16] This advisory group has been asked to look at how Europe will access and use audiovisual content and data in the medium to long term and to deliver a final report by July 2014 that responds to four separate challenges:
    - *"What will next generation (terrestrial) provision/reception of audiovisual content (including linear TV) look like?*
    - *How do we secure the public interest and consumer benefits while facilitating market transformation?*
    - *What are the strategic elements of spectrum use in the UHF band in light of the first challenge? What would the regulatory role of the EU be in coordinating developments?*
    - *What are the financial implications for a next-generation terrestrial platform for broadcasting and internet use?";*

2.9 The above highlights the significant studies that are currently underway in relation to the UHF band and the preparation work that is taking place in relation to the ITU spectrum allocation change on the 700 MHz band that is to take effect immediately after WRC-15. This international work brings into focus the timely need for Ireland to consider the important issue of the long term use of the UHF band in Ireland, and the aim of this document is to stimulate and facilitate that discussion.

2.10 A timely discussion of the UHF band has many benefits to Ireland as, among other things, it will:

- allow interested parties to make their views known thereby assisting ComReg and stakeholders to better understand the long term requirements on use of the UHF band ;
- allow ComReg and other stakeholders to be better informed on the needs for Ireland in respect of the international discussions that are ongoing in relation to WRC-15 agenda items 1.1 and 1.2; and

[16] See http://europa.eu/rapid/press-release_IP-14-14_en.htm

- facilitate ComReg and other stakeholders in making appropriate preparations at an early stage to ensure the efficient use of spectrum to the benefit of consumers and users of the spectrum rights.

2.2 Document structure

2.11 The remainder of this Preliminary Consultation is structured as follows:

- **Chapter 3** sets out a summary of background information relevant to the use of the UHF band and of the relevant legal framework;
- **Chapter 4** describes the current uses of the UHF band in Ireland, namely DTT and PMSE services;
- **Chapter 5** discusses potential uses of the UHF band in the future. Based upon international discussions, five potential uses are discussed namely DTT, PMSE, mobile broadband services, PPDR and WSD;
- **Chapter 6** sets out a number of considerations relevant to this debate and invites views on these and any other related matters respondents believe to be central to the use of the UHF band in Ireland. In particular, it requests views on:
    - The demand by services for spectrum in the UHF band and whether other service should also be considered
    - Considerations that Ireland should take into account in relation to the future use of the 700 MHz band.
    - Excluding the 700 MHz band, the considerations that should be taken into account in relation to the remainder of the UHF band (from 470 – 694 MHz).
- **Chapter 7** sets out how interested parties can submit contributions and the deadline for receipt of contributions, as well as the indicative next steps.

2.12 Several annexes support the above chapters as follows:

- Annex 1 - ComReg's Legal Framework and Statutory Objectives in relation to radio spectrum;
- Annex 2 - Overview of observed growth in demand for data (and in particular mobile broadband data) in selection of European countries;

- Annex 3 - Overview of national-level spectrum activities to identify future uses of spectrum and candidate bands (Australia, Canada, Denmark, UK and US); and
- Annex 4 – Annex 4: International developments with respect to DTT broadcasting in UHF.
- Annex 5 – Case Study: Observations and commentary on the re-allocation of 800 MHz band in Ireland.

Chapter 3

3 Background on the UHF band

3.1 This Chapter provides background information relevant to a discussion on the use of the UHF band in Ireland. In particular on:

- the current allocation of the UHF band and its use in Ireland;
- the upcoming WRC-15 allocation within the UHF band;
- the national discussion and preparations that might be required in relation to the WRC-15 developments; and
- the legal framework and statutory obligations in relation to the management of radio spectrum in Ireland.

3.1 The current allocation of the UHF band and its use in Ireland

3.1.1 The ITU Radio Regulations (the "ITU-RR") allocation of the UHF band

3.2 The ITU is the body that establishes the international regulations for the use of radio spectrum at a global and regional level. These regulations are set out in the ITU Radio Regulations (ITU-RR) and on the basis of three regions into which the world is divided for administrative purposes. Ireland is a member of Region 1 (the region including Europe, Africa and the Middle East), and adopts the regulations associated with that Region.[17]

3.3 The ITU-RR, an inter-governmental treaty, are updated at each WRC. WRCs are generally held every 3 to 4 years. The last WRC was held in 2012 (i.e. WRC-12). The next WRC is due to be held in November 2015 (i.e. WRC-15).

3.4 In the current ITU-RR allocations (as updated by WRC-12), in Region 1 the UHF band is allocated on a primary[18] basis to the broadcasting service. In

[17] Ireland is a signatory to the ITU Convention, which is a treaty-level legal agreement that obliges ITU member states to comply with the ITU-RR. Amongst the obligations that apply is that the radiocommunications services operated in a country must not cause harmful interference to the radio services operated in a neighbouring country where those services operate in accordance with the ITU-RR.

[18] The ITU-RR distinguishes between the status of radio spectrum services by defining an allocation to a service as either a primary or secondary allocation. More than one service can be allocated as a primary service to a spectrum band. A secondary service is defined in the ITU-RR as a service which "*shall not cause harmful interference to stations of primary services to which frequencies are already assigned or to which frequencies may be assigned at a later date; cannot claim protection from*

addition, footnote 5.296 of the ITU-RR allocates in Ireland and many other European and African countries the band 470-790 MHz on a secondary basis to the land mobile service intended for use by applications ancillary to broadcasting (e.g. PMSE).

3.1.2 Ireland's current allocation of the UHF band and its usage

3.5 In Ireland, the allocation of radio spectrum bands is set out in the Radio Frequency Plan for Ireland.[19] As Ireland is a signatory of the ITU convention, Ireland is obliged to comply with the ITU-RR and the Radio Frequency Plan for Ireland follows the ITU-RR UHF band allocations for Region 1 as described in the previous paragraph.

3.6 The allocation of a spectrum band to a service does not necessarily mean that the band is assigned to or used by all of the services allocated.[20] Rather, an allocation defines the intended use of a spectrum band, while the actual assignment of frequencies to a particular use is usually a matter for the a national spectrum management authority.

3.7 In Ireland the UHF band is assigned to and used by the services envisaged under the current ITU-RR allocations, namely DTT and PMSE services (see Figure 1 below). Chapter 4 of this document presents further information on the current usage of the UHF band.

Figure 1: The current usage of the UHF band in Ireland

3.2 The upcoming WRC-15 allocation within the UHF band

3.8 As noted previously, in preparation for the WRC-15, there are extensive studies and discussions currently taking place at the European and international level related to the UHF band. An overview of these

harmful interference from stations of a primary service to which frequencies are already assigned or may be assigned at a later date; c) can claim protection, however, from harmful interference from stations of a same or other secondary service(s) to which frequencies may be assigned at a later date;" A secondary service is therefore a subordinate service to a primary service in specific spectrum band.

[19] See ComReg Document 13/118, "The Radio frequency Plan for Ireland".

[20] There may be various reasons for this. For example, there may be no demand for this service in a particular country, the band could be allocated on a co-primary basis to more than one service but only one service is deployed in the band, etc.

preparations and discussions has been provided in Chapter 2 of this document.

3.9 In relation to the ITU-RR allocation status of the UHF band there are a number of important issues to be implemented or discussed at WRC-15 as outlined below:

- In relation to the 700 MHz band, for Region 1 Resolution 232 (agreed at WRC-12) resolved to give a co-primary allocation to mobile services (excluding aeronautical services) in the 700 MHz band, alongside the existing primary allocation for broadcasting services, and to identify this frequency band for IMT. This allocation is effective immediately after WRC-15. The Resolution also invited the ITU-R to undertake studies on the appropriate lower frequency for the band edge, taking account, amongst other things, of compatibility between mobile and broadcasting services;

- In relation to the remainder of the UHF band, Resolution 233 of WRC-12 resolved to firstly study the additional spectrum requirements of IMT and other terrestrial mobile broadband services and the potential candidate frequency bands, and then consider the results of the above studies and take appropriate actions at WRC-15. As stated in Chapter 2, the 470-694 MHz portion of the UHF band is under active consideration, and the ITU-RR allocation status of this band will depend on WRC-15 discussions on agenda item 1.1. However, based on current CEPT studies there is no indication, at this point, that the current allocation status of that part of the UHF band will change for ITU Region 1. Currently within CEPT, the band 470 – 694 MHz is being recommended for further consideration to take into account sharing and compatibility studies.

3.10 It should also be noted that a change to an allocation at an ITU regional level does not necessarily mean that all countries within that ITU Region must or will adopt that allocation or bring it into use by assigning frequencies to the allocated service.

3.11 If a country wishes to use the band in question for a service not covered by the current allocation (i.e., the broadcasting service and the IMT service) in the band, it can request (subject to agreement of other countries) an alternative allocation. This alternative allocation is recorded in a footnote associated with the ITU allocation. As the 700 MHz band co-primary allocation for Region 1 is to take effect immediately after the WRC-15, a country can choose not to implement the new co-primary allocation and continue to use broadcasting only in this part of the UHF band. In Ireland, the Department of Communications, Energy and Natural Resources (the "DCENR") is the entity which will be responsible for coordinating and leading

the negotiations on Ireland's position at WRC-15 and, to date, there is no indication that Ireland intends to seek an alternative allocation from the ITU-RR 700 MHz allocation for Region 1.[21]

3.12 In relation to the modification or issuing of spectrum rights of use in response to a changed ITU-RR allocation, this is a matter for the individual countries to consider and plan in light of its own national circumstances and obligations.

3.3 National discussion and preparations

3.13 Clearly, an appropriate period of time is required at a national level to discuss the relevance of a revised allocation to Ireland and to make the necessary preparations to implement same.[22]

3.14 Given the activities that are taking place in relation to the UHF band at an international level and, in particular, the addition of a co-primary allocation to the Mobile service in the 700 MHz band in Region 1 at WRC-15, this paper presents information to stimulate and facilitate a discussion on the management and use of the UHF band in Ireland.

3.15 ComReg notes that a number of countries are considering the consequences of the decisions taken at WRC-12 and accompanying options in preparation for WRC-15. Annex 4 to this paper sets out an overview of a selection of countries where relevant national-level spectrum activities are being considered in relation to the 700 MHz band or the UHF band in general. By way of summary:

- In 2013, the German regulator (the BNetzA) released a consultation proposing to include the 700 MHz band in a multi-band auction to be held as early as 2014[23] to ensure that the frequency bands involved are available to consumers by 2017-18;[24]

- In France, there is an ongoing political drive to allocate and auction spectrum rights in the 700 MHz band for wireless broadband, and a

[21] As WRC-15 is still almost 2 years away, the position of Ireland in relation to WRC-15 agenda items has yet to be determined by the DCENR. However, at a European level, there has been much preparation work already carried out within CEPT and in discussions to date no country has indicated that it will seek an alternative allocation for the 700 MHz band at WRC-15.

[22] See, for example, the 800 MHz case study as outlined in Annex 5.

[23] http://www.bundesnetzagentur.de/cln_1911/DE/Sachgebiete/Telekommunikation/Unternehmen_Institutionen/Frequenzen/OeffentlicheNetze/Mobilfunknetze/Projekt2016/projekt2016-node.html

[24] http://www.fiercewireless.com/europe/story/german-operators-face-new-spectrum-auctions-2014/2013-06-25#ixzz2hDY11zk2

recent article suggests that the timing of this auction would take place some time after WRC-15[25]; and

- In the UK, Ofcom has issued a number of documents relating to the UHF band and the 700 MHz band. Following a call for inputs issued in 2011[26], Ofcom consulted on a UHF Strategy Statement in March 2012[27], and it issued a statement in November 2012.[28] Among other things, these documents noted the international debate that is emerging within both the ITU and the EU, and Ofcom stated that "…*it had decided to aim to secure the dual long term strategic objectives of providing more low frequency spectrum for mobile broadband whilst also securing the ongoing delivery of benefits provided by DTT."*

3.16 Spectrum in the UHF band has very attractive propagation characteristics[29], and discussions on the use of the UHF band in Ireland are likely to involve many interested parties (e.g. existing users, potential future users, mobile and TV end users, DCENR, the BAI[30],ComReg, etc.). It is therefore important that Ireland's discussions on the UHF band are carried out in a comprehensive and timely fashion in order to, amongst other things, ensure the effective management and efficient use of this important spectrum band for the benefit of consumers and various users alike.

3.4 Overview of the legal framework for spectrum in Ireland

3.17 In Ireland, the DCENR is responsible for spectrum policy[31] issues such as Ireland's position in relation to WRC-15 agenda items as discussed above.

[25] French 700 MHz auction will be after WRC-15, 22 January 2014, http://www.policytracker.com/headlines/questions-raised-over-whether-france-will-hold-its-700-mhz-auction-before-2015

[26], "Developing a framework for the long term future of UHF spectrum bands IV and V", Ofcom call for input document published 20 April 2011. http://stakeholders.ofcom.org.uk/binaries/consultations/uhf-spectrum-band/summary2/condoc.pdf

[27] "Securing long term benefits from scarce spectrum resources: A strategy for UHF bands IV and V" Ofcom Consultation 29 March 2012, http://stakeholders.ofcom.org.uk/binaries/consultations/uhf-strategy/summary/spectrum-condoc.pdf

[28] "Securing long term benefits from scarce spectrum resources: A strategy for UHF bands IV and V" Ofcom Statement 16 November 2012 http://stakeholders.ofcom.org.uk/consultations/uhf-strategy/statement/

[29] Sub-1GHz spectrum including spectrum in the UHF band facilitate wide area coverage, reasonable in-building signal penetration and high-capacity bandwidth capabilities.

[30] The Broadcasting Authority of Ireland.

[31] See DCENR Spectrum Policy Statement (September 2010) http://www.dcenr.gov.ie/NR/rdonlyres/83EB5634-66B9-45DE-9362-24414408E4AC/0/SpectrumPolicyStatement.pdf and

ComReg is, among other things, responsible for implementation of spectrum policy and regulation of the electronic communications sector (telecommunications, radiocommunications and broadcasting transmission), including the management of the radio spectrum.

3.18 Broadcasting policy is decided by the Minister for Communications, Energy and Natural Resources and content issues are regulated by the BAI[32]. ComReg's role primarily relates to spectrum management and assignment of spectrum for broadcasting transmitter stations. In addition, ComReg is obliged to comply with specific broadcasting legislation, such as the Wireless Telegraphy Acts[33] and the Broadcasting Act 2009 (the "2009 Act")[34] in particular which, among other things, places obligations on ComReg to provide spectrum for a minimum number of DTT multiplexes.

3.19 Section 132 of the 2009 Act relates to the duties of ComReg in respect of the licensing of spectrum for use in establishing DTT multiplexes and places an obligation on ComReg to issue:

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

3.20 The 2009 Act is silent on the specific frequencies to be made available for DTT. However, the DCENR's National Policy Framework for identifying spectrum for the Digital Dividend (2009)[35] provided some policy guidance as to the DTT spectrum requirements and, among other things, stated that:

- *"The spectrum for broadcasting, post analogue switch-off, required to accommodate the statutory minimum of 6 nationwide multiplexes (core requirements) should be identified and reserved. Additional broadcasting requirements may be considered but not as core requirements. ;*
- *Following analogue switch-off, in so far as it is possible to do so, Ireland's UHF DTT broadcasting should be concentrated in the band 470 to 790 MHz. …".*

[32] The BAI was established on the 1st October 2009 under the 2009 Act and assumed the roles previously held by the Broadcasting Commission of Ireland (BCI) and the Broadcasting Complaints Commission (BCC).

[33] See Annex 2 for a summary of the legislation comprising the Wireless Telegraphy Acts.

[34] The Broadcasting Act 2009, http://www.irishstatutebook.ie/2009/en/act/pub/0018/

[35] Development of a National Policy Framework for indentifying spectrum for the Digital Dividend, February 2009.

3.21 In relation to radio spectrum in general, a summary of the legal framework within which ComReg operates, including ComReg's functions, objectives and duties in relation to spectrum management is at Annex 2.

Chapter 4

4 Ireland's current use of the UHF (470 – 790 MHz) band

4.1 There are currently two main uses of radio spectrum in the UHF band in Ireland, namely for DTT and for PMSE services. In addition, and similar to all spectrum bands, from time to time unused radio spectrum in the UHF band is used for Test and Trial purposes. These current uses are discussed in turn in this chapter.

4.1 Digital Terrestrial Television (DTT)

4.2 Similar to other countries in Europe, the UHF band in Ireland is currently allocated and used for terrestrial broadcasting services, namely DTT services.

4.3 As discussed in section 4.1.2 of this document, Irish DTT services are provided using the Saorview service and ComReg's Quarterly Report for Q3 2013 estimated that for September 2013, approximately 38% of TV homes had an "Irish DTT" reception method, while 10.7% of all TV homes in Ireland classified DTT as the highest form of TV reception available within the home. Saorview currently provides 8 TV services (1 in High Definition (HD) and 7 in Standard Definition (SD)) and 10 radio services,[36] using the two DTT PSB multiplex licences issued to RTÉ.

4.1.1 The DTT Spectrum Plan

4.4 The spectrum plan for the UHF band in Ireland and the DTT use of this band is subject to the application of procedures of the Final Acts of the 2006 Regional Radiocommunication Conference held in Geneva (the "RRC-06") and its corresponding frequency plan (the "GE06 plan")[37], which may be supplemented as a consequence of bi-lateral or multi-lateral agreements between administrations.

4.5 The DTT spectrum plan for Ireland requires detailed coordination with our nearest neighbour, the UK. A bilateral agreement with the UK, agreed on 1 June 2012, namely the "800 MHz Clearance Plan", revised the GE06 plan

[36] The TV services carried on Saorview are RTÉ One, RTÉ two HD, TV3, TG4, RTÉ News Now, 3e, RTÉ jr, RTÉ One+1 and the digital teletext service RTÉ Aertel. The radio services provided are RTÉ Radio 1, RTÉ 2fm, RTÉ Lyric FM, RTÉ Raidió Na Gaeltachta, RTÉ Radio 1+1, RTÉ 2XM, RTÉ jr, RTÉ Gold, RTÉ Choice and RTÉ Pulse.

[37] The GE06 plan covers VHF Band III from 174-230MHz and the UHF band from 470 – 862 MHz.

for both Ireland and the UK and limited DTT use to the 470-790MHz frequency range. In addition, this plan recognised that the 790 – 862 MHz frequency band (the "800 MHz band") would be made available for electronic communication services ("ECS") in accordance with the Radio Spectrum Policy Programme ("RSPP") decision of the 14 March 2012[38] and EC Decision 2010/267/EU[39].

4.6 The agreement of a DTT spectrum co-ordination plan with the UK requires careful planning and consideration and Ireland's DTT spectrum planning with the UK generally aims, among other things, to:

- obtain equitable access to spectrum;
- facilitate coverage and quality of service levels for broadcasting reception; and
- protect Ireland's spectrum opportunities for the provision of future broadcasting services in the State.

4.7 In relation to the 800 MHz Clearance Plan, a number of specific obligations and factors also influenced Ireland's negotiations with the UK and the agreed outcome. The three main factors were:

- the obligations as set out in the 2009 Act (see section 3.4 above);
- The DCENR's National Policy Framework for identifying spectrum for the Digital Dividend (2009) (see section 3.4 above); and
- the Memorandum of Understanding (MoU) between the Minister for Communications Energy and Natural Resources and the UK Secretary of State for Culture, Media and Sport of the 1 February 2010[40]. This MoU, amongst other things:
    - aimed to provide for North-South co-operation on the transition to DTT and analogue switch off; and
    - committed the two Governments to facilitating the widespread availability of RTÉ and TG4 services in Northern Ireland on a free-to-air basis and BBC services in Ireland on a paid for basis.

[38] Decision No 243/2012/EU of the European Parliament and of the Council: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:081:0007:0017:EN:PDF

[39] European Commission Decision 2010/267/EU: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32010D0267:EN:HTML

[40] Memorandum of Understanding - Coordination of digital switchover with Northern Ireland, 1 February 2010

4.8 With the aim of meeting the above requirements and ensuring equitable access to spectrum in Ireland and the UK, the 800MHz Clearance Plan comprises spectrum for 9 DTT multiplexes in the UHF band for each of Ireland and the UK. There are distinctions to each of the DTT national multiplexes in Ireland. Specifically:

- two multiplexes are planned for Public Service Broadcasting (PSB) use, i.e. these multiplexes are to be licensed to RTÉ on request (as provided for under section 132 parts (1) and (2) of the 2009 Act). These multiplexes are designed to facilitate overspill coverage into Northern Ireland, in line with the MoU between Ireland and the UK[41];

- four multiplexes are planned to meet the remaining core requirements of the 2009 Act. (i.e. these multiplexes are to be licensed to the BAI on request, as provided for under section 132 (3) of the 2009 Act); and

- three remaining multiplexes are planned in the event of expansion of DTT services (as provided for under Section 132 parts (4) and (5) of the 2009 Act) and to ensure equitable access to spectrum for both the UK and Ireland.

4.9 Overall, the 800 MHz Clearance Plan ensures that there remains sufficient spectrum available in the UHF band to meet the DTT multiplex licensing requirements of the 2009 Act.

4.1.2 Overview of DTT licensing in Ireland

ComReg's DTT licensing framework

4.10 In 2007, ComReg concluded its DTT licensing framework and in this regard:

- ComReg Document 07/90a (Licence for Digital Terrestrial Television) finalised the form of a DTT licence;

- ComReg Document 07/90b (Technical conditions for Digital Terrestrial Television) set out the technical conditions for DTT. Among other things, ComReg Document 07/90b states that the transmission standard to be used shall be the DVB-T standard as specified in ETSI[42] EN 300 744 and that the coding standards MPEG 2 or MPEG 4(H.264) are to be used[43]; and

[41] Memorandum of Understanding - Coordination of digital switchover with Northern Ireland, 1 February 2010

[42] The European Telecommunications Standards Institute.

[43] The coding standard MPEG 4 (H264) is currently used by Saorview.

- the Broadcasting Amendment Act (Digital Terrestrial Television Licence Fees) Regulations, 2007 (S.I. No. 796 of 2007) set out the terms and conditions of a DTT licence, including the spectrum licence fees.

The PSB DTT licences issued to RTÉ

4.11 In 2007, at the request of RTÉ, ComReg issued the first PSB DTT licence (PSB 01) to RTÉ. In 2011, the second PSB DTT licence (PSB 02) was requested by RTÉ and issued by ComReg. These licences issued in line with ComReg's DTT licensing framework[44] enable the provision in digital format of public service content in Ireland by RTÉ and TG4, as well as TV3 and 3e. Both licences expire on 13 December 2019.

4.12 In line with the above PSB DTT licences, RTÉ provides its free-to-air DTT service, called Saorview[45], which was launched to the public in May 2011.

4.13 Saorview currently carries 8 TV programme channels (7 Standard Definition + 1 High Definition) and 10 radio channels. Saorview is currently broadcast from 64 transmission sites in Ireland. These transmission sites provide coverage of the above services to 98%[46] of the Irish population.

The BAI's 2008 multiplex contract award process for commercial DTT services

4.14 As previously discussed, ComReg has a legal requirement under the 2009 Act to provide spectrum for a minimum of 4 national DTT multiplexes to be issued to the BAI (upon request) for the provision of multiplexes to multiplex contractors.

4.15 In 2008, the predecessor to the BAI, the Broadcasting Commission of Ireland (BCI), conducted a licensing process for the selection of a commercial DTT operator (to enter into multiplex contracts with it) and applications were received from three consortia, Boxer DTT Limited, One Vision, and Easy TV. The competitive application process did not result in any applicant agreeing multiplex contract terms with the BAI, and therefore no DTT multiplex licence request was made by the BAI to ComReg.

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[44] Among other things, the provisions of the PSB licences allow ComReg to vary or amend the conditions of either of the current PSB licences. Specifically section 18 of the licence states that:

> *"The Commission may amend, or vary, the terms of the Licence, following such public consultation as is deemed appropriate by Commission, at any time and the Licensee shall be given reasonable opportunity to make representations regarding the proposed amendment or variation and the Commission shall consider those representations in making any variation."*

[45] http://www.saorview.ie/

[46] http://www.saorview.ie/help-support/faqs/can-i-get-saorview/

4.16 Following the end of this process, in August 2010 the BAI further considered the prospects for commercial DTT services in Ireland and concluded that it would not be practicable to begin a commercial DTT multiplex licensing process in the immediate future, as it would not be feasible to introduce commercial DTT in Ireland as originally intended until after Analogue Switch Off (ASO) at the earliest.[47]

The BAI's current view on the potential for commercial DTT services

4.17 On 7 January 2014, the BAI published a review of the potential for commercial DTT in Ireland,[48] as prepared by Oliver & Ohlbaum Associates (O&O) (the "O&O Report").

4.18 The O&O Report identifies a number of policy implications and considerations and, in relation to spectrum in the UHF band, ComReg observes that it:

- recognises that there are alternative uses for spectrum in UHF band. In particular it stated that *"If commercial DTT services are not viable, the spectrum in the UHF band earmarked for DTT is under-utilised; alternative uses for the spectrum, which might include the extension or enhancement of Saorview services, alternative mobile services, white spaces devices, or programme making and special events (PMSE), are likely to be contingent on decisions made by the World Radiocommunication Conference in 2015;"*; and

- suggests a conclusion in relation to the BAI's role. In particular it stated that *"In the absence of a commercial service of substance joining the platform, existing participants in Saorview, guided by the technology roadmap and their own forecasts of the likely evolution of the platform, should reach a view about DTT spectrum requirements into the future and present this to the ComReg and the Department of Communications, Energy and Natural Resources for consideration. There may be other competing uses for the spectrum but these should be considered alongside a clearly articulated future for a public service Saorview."*

4.19 On the basis of the O&O Report, the BAI issued a press release[49] stating that it:

- *"agreed with the findings contained in the report, which suggested that the market conditions for launching commercial DTT services have not*

[47] BAI statement on Conclusion of Commercial DTT Multiplex Licensing Process, 5 August 2010.

[48] http://www.bai.ie/wordpress/wp-content/uploads/20131204_OOCommDTTRpt_v.Final_MT.pdf

[49] http://www.bai.ie/?p=4236

improved and remain very challenging since the last unsuccessful licensing process was undertaken in 2008."; and

- *"has informed the Minister for Communications that it does not believe any statutory purpose would be achieved by embarking on a course of action in respect of commercial DTT, the most likely outcome of which would be negative and that it would be unlikely that any regulatory actions could substantially influence this situation."*

Spectrum licensed and reserved for DTT in the UHF band

4.20 As discussed above, while the 800 MHz Clearance Plan provides for 9 multiplexes in the UHF band, only two DTT multiplex licences have been issued by ComReg to date, namely the PSB licences issued to RTÉ that contain spectrum rights of use at 64 transmission sites.

4.21 DTT multiplex licences contain spectrum rights of use that are spread across the UHF band from channel 21 to 60. Figure 2 below shows the distribution of UHF channels currently licensed to PSB 01 and PSB 02 against the distribution of planned channels, as provided for by the the 800 MHz Clearance Plan. The dark green colour represents the RTÉ PSB 01 licence and the light green colour represents the RTÉ PSB 02 licence. Channel 38 is used exclusively by PMSE (see section 4.2 below).

4.22 As can be seen from Figure 2, a large amount of spectrum planned in the UHF band for DTT use is not currently used, the majority of which is reserved for commercial DTT across Ireland.

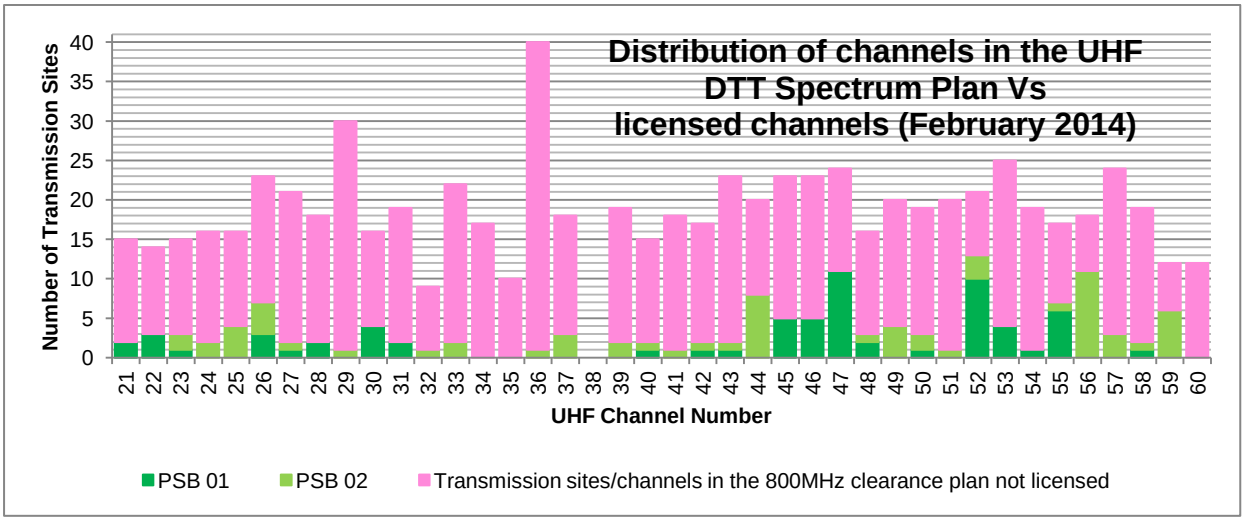

Figure 2: Distribution of channels in the DTT Spectrum Plan (i.e. the 800 MHz clearance plan) vs. channels licensed in PSB01 and PSB02 (February 2014)

4.2 PMSE

4.23 In Ireland, spectrum rights of use for PMSE are authorised by ComReg under the "Temporary Business Radio"[50] licensing scheme on the basis that such use should neither cause interference to other services nor seek protection from interference by other users of the radio spectrum (this is often referred to as licensing on a "non-interference, non-protection" basis). These temporary licences have a maximum duration of six months but are usually issued only for the duration of the specific event. The regulations governing the issue of Temporary Business Radio licences are the Wireless Telegraphy (Business Radio Licence) Regulations, 1949 (S.I. 320 of 1949) as amended.

4.24 Spectrum assigned for PMSE is used to cover a wide range of live and pre-recorded events of social and community importance. PMSE is typically assigned frequencies under a secondary spectrum allocation to the mobile service with assignments being made between existing services or in bands allocated to other services but not yet assigned. PMSE may also share some frequency bands with low-power, short-range devices which also typically operate on a non-interference, non-protection basis. PMSE is therefore licensed at frequencies and in geographical areas where there is little likelihood of interference to protected licensed services.

4.25 In relation to the UHF band, the following spectrum can, as required, be assigned to PMSE on a secondary basis:

- UHF channel 38 (606 – 614MHz), as this has been allocated specifically for PMSE use within Ireland;
- the spectrum between planned DTT channels in the UHF band. This is called "interleaved spectrum"; and
- the spectrum planned for DTT channels but currently unused.

4.26 A full list of the available interleaved spectrum and unused DTT channels in the UHF band across Ireland can be found on ComReg's website[51].

4.27 The PMSE services licensed in the UHF band are mainly used for wireless microphones and in-ear monitoring systems at events such as music concerts and sporting fixtures. Wireless microphones and in-ear monitoring

[50] See ComReg Document 08/08R2 – Guidelines for Radio Licensing for Special Events and Temporary Use in Ireland – 28 September 2011.

[51] http://www.comreg.ie/_fileupload/File/PMSE/Interleaved%20and%20Unused%20Sprectrum%20between%20470%20MHz%20-%20790%20MHz.pdf

systems transmit at very low power (maximum ERP of typically 10-50 mW) with a channel spacing of 200 kHz.

4.3 Test and Trial Ireland

4.28 Similar to all spectrum bands, unused radio spectrum in the UHF band can be licensed for Test and Trial purposes.

4.29 Test and Trial Ireland [52] is a novel product provided by ComReg, in collaboration with other State agencies such as the Industrial Development Authority (IDA), for the testing or trialling of innovative new products. ComReg has issued many Test and Trial licences for a variety of services and users including:

- Ericsson LTE-TD (a test licence in 2010 that enabled Ericsson to conduct a world first real LTE-TD mobile broadband test using testing rights to spectrum in the 2.3GHz band in an urban environment, with possible applications being for high-definition TV, video conference and or mobile broadband);
- Mobile TV trials (various trial licences in 2006, 2007 and 2008 covering the Dublin Metropolitan area) [53]; and
- DTT trial (trial licence issued as precursor to the current DTT service in 2007 serving two main transmitter stations at Clermont Carn and Three Rock Mountain) [54].

4.30 Currently, there is one test licence issued to CTVR for spectrum in the UHF band. This test licence facilitates radio propagation tests between the CTVR (Trinity College Dublin, Dublin 2) and Intel (Leixlip, County Kildare) over a distance of about 16km, and could also potentially be used by WSDs.

4.31 ComReg continues to promote the use of radio spectrum for non-commercial purposes and, in particular, the testing and/or trialling of radio spectrum equipment and wireless services, and in this regard, unused radio spectrum

[52] See www.testandtrial.ie for further information on ComReg's Test and Trial Licensing programme.

[53] A trial commenced in Dublin in 2007 under a trial licence issued by ComReg in January 2007. The trial Mobile TV Service commenced in Dublin in 2007 was a partnership between O2 Communications (Ireland) Ltd (O2) and Arqiva Ltd and included three hundred and fifty O2 customers as trial participants. The trial enabled the licensee to conduct an attitudinal survey on trialists' views towards Mobile TV.

[54] The trial was initiated as a means of enhancing stakeholder interest in DTT, particularly in the light of developing broadcast markets within Europe and the EU's expectation of a shutdown of the analogue terrestrial TV platform by 2012. The second part of the trial, launched on March 5 2007, involved a limited public launch with 500 public participants to gauge consumer feedback.

in the UHF band will continue to be considered for licensing under Test and Trial Ireland.

Chapter 5

5 Potential future uses of the UHF Band

5.1 Introduction

5.1 International interest in the UHF band illustrates its current and future utility. While not intended to be exhaustive, this chapter presents information on five uses that are currently being considered at an international level, two existing services in the UHF band (namely the DTT and PMSE services) and three potential new services in the band (namely mobile, PPDR and WSD application).

5.2 While the information in this chapter is set out separately for each service, it should be noted that the UHF band can be used by more than one service at any one time (e.g. currently it is used by both the DTT and PMSE services) and therefore these potential uses should not be considered mutually exclusive.

5.3 In addition, while the UHF band is being discussed as an existing or potential spectrum band in which each of the five services discussed in this chapter could be used, it should be noted that the UHF band may not be the only spectrum band being used or considered by any of these services (e.g. mobile services in Ireland uses a number of spectrum bands) and, consequently, it is possible that alternative spectrum bands are sufficient or could also be considered in relation to each.

5.2 The DTT service

5.4 As discussed in Chapter 4, DTT is a service currently being used under the allocation to the Broadcasting service in the UHF band. ComReg is required to provide spectrum for at least six DTT multiplexes, the 800 MHz Clearance Plan comprises spectrum for nine DTT multiplexes:

- two to be issued to RTÉ;
- four to be issued to the BAI; and
- three in the event of any expansion of DTT services.

5.5 From these nine multiplexes, only two DTT PSB multiplex licences have been issued to RTÉ, while the others remain unassigned. Using the two DTT

PSB multiplex licences, RTÉ provides a free-to-air DTT service called Saorview which was launched to the public in May 2011.

5.2.1 The current DTT figures for Ireland

5.6 Information on broadcasting in Ireland is set out in ComReg's Quarterly Market Report on the Irish Communications Market. The most recent quarterly report is ComReg Document 13/120[55] published on 18 December 2013, and this presents information in relation to Quarter 3 of 2013.

5.7 The reception of television services data contained in ComReg Document 13/120 is taken from the Nielsen TV Audience Measurement (TAM) Establishment Survey and this survey indicates that there were 1,585,000 TV homes[56] in Ireland in September 2013. This survey collects information on the reception method by which homes with a television access television services in Ireland[57], and Figure 3 below presents this information for each reception method from September 2011 to September 2013.

[55] http://www.comreg.ie/_fileupload/publications/ComReg13120.pdf

[56] The term 'TV homes' is a term used in The Establishment Survey a survey produced by Nielsen TV Audience Measurement in Ireland (quoted in ComReg Document 13/120). Television Audience Measurement (TAM) Ireland define the term 'total TV homes' as 'a household which has at least one television in working order'.

[57] Each home can have more than one method of reception e.g. aerial and cable or digital satellite, digital satellite and cable, etc. The question is asked for their main and up to 9 television sets. For this reason, the total for the reception methods adds up to more than 100% of total TV homes.

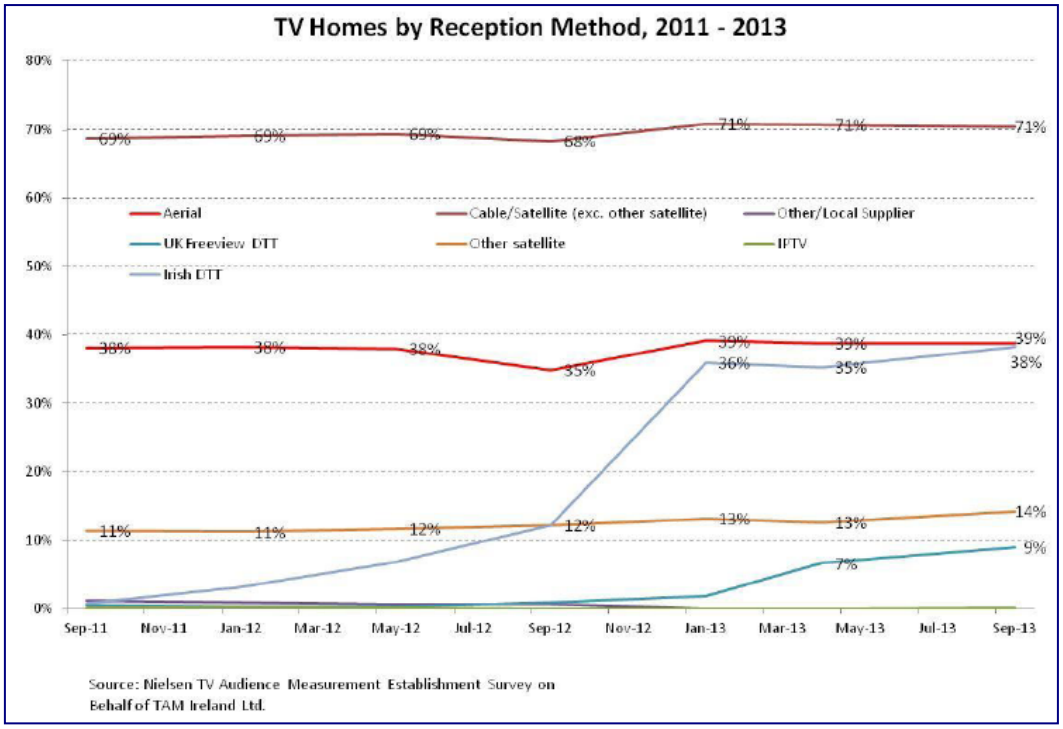

Figure 3: TV homes by method of reception, 2011-2013 (source ComReg Document 13/120)

5.8 The data for the "Irish DTT" service presented in Figure 3 above includes the Saorsat[58] service, and for September 2013 approximately 38% of TV homes had an "Irish DTT" reception method.

5.9 The report also provides a breakdown of the number of TV homes by reception type. Unlike the reception method discussed above, this method classifies a TV home with one reception type and this is on the basis of the reception method through which the highest number of TV channels is received. Applying this methodology, ComReg document 13/120 estimates that DTT (including Saorsat) represented 10.7% (or 169,595) of all TV homes in Ireland.

5.2.2 Overview of DTT in other countries

5.10 Before presenting information on the potential future demand for DTT in Ireland, it is useful to note developments in other countries as this may provide helpful insights relevant to the future use of DTT in Ireland.

5.11 Firstly, according to the Special Eurobarometer Report 396 on the E-communications household survey published in November 2013[59], DTT is

[58] In the O&O report, it is estimated that there are less than 5,000 Saorsat users. Thus, while Saorsat users are strictly speaking not using a DTT technology, the inclusion of Saorsat figures would not have a material effect on overall DTT figures.

[59] http://ec.europa.eu/public_opinion/archives/ebs/ebs_396_en.pdf

the most popular way for households to access television services in Europe. As shown in Figure 4 below, for the period February to March 2013, 40% of European households received television services via DTT , with 31% using cable and 23% using satellite.

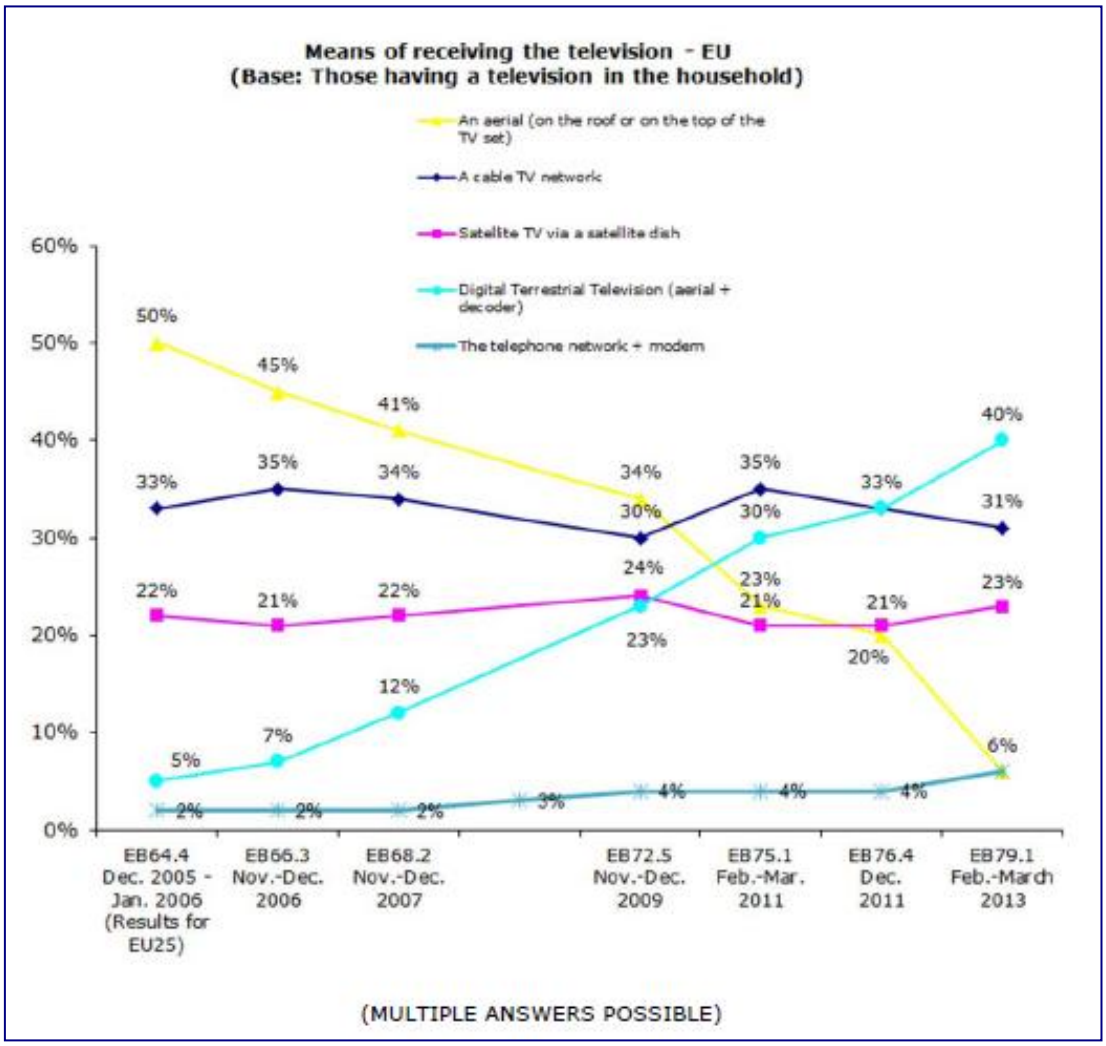

Figure 4: The means of receiving television services in Europe (source Special Eurobarometer Report 396)

5.12 However, while the Eurobaramoter report also identifies significant differences in the methods that respondents use to access television in different Member States, and in this regard it noted that while DTT is most common in Spain (where almost nine in ten respondents used this method to receive television in their homes (89%)), DTT was also the least common in Bulgaria and Hungary (where only one in twenty respondents used DTT in their households (both 5%)).

5.13 This data suggests that while DTT is an important service across Europe, its significance varies depending upon the Member State. This difference in

DTT usage across Europe is not surprising as a number of countries have more established and developed DTT services than others.

5.14 In relation to the potential future spectrum requirements of DTT within Europe, in 2012, two questionnaires were issued to countries, one at European level by the Radio Spectrum Policy Group (RSPG)[60], the other at a more global level by the ITU[61] seeking to determine the future spectrum requirements for broadcasting services. Annex 5 to this paper outlines the results of these questionnaires in relation to a number of European countries - Finland, France, Germany, Italy, the Netherlands, and the United Kingdom.

5.15 Overall, the results of these questionnaires indicated that differences exist in terms of the development of DTT within Europe, and that the long term spectrum need for broadcasting services is likely to vary from country to country.

5.16 For countries such as Finland, France, Italy and the United Kingdom, all of which have well developed and established DTT services with in excess of six DTT multiplexes nationally, these countries expected to launch additional national DTT multiplexes and/or add capacity to their networks by migrating to DVB-T2 in the short term (1 – 5 years).

5.17 For other countries such as Germany, and the Netherlands, and while the DTT service is well developed and established, these countries indicated that no further developments were planned in the short term (1 – 5 years). Further, in Germany and the Netherlands, the future of commercial DTT services appears questionable. In the case of Germany, RTL are considering a withdrawal from DTT by the end of 2014 although more recently it has signalled its intention to revisit the matter[62]. In the Netherlands, KPN will withdraw its DTT services when its licence expires in 2017.

[60] "*Questionnaire on the long term spectrum requirements for television broadcasting in the European Union including the number of TV services, HDTV, interactive services, mobility requirements and the possible introduction of Ultra High Definition Television*", 24 July – 28 September 2012. Summary of responses, Responses received.

[61] ITU-R Circular Letter 6/LCCE/78 – "*Questionnaire on spectrum requirements for terrestrial television broadcasting in connection with WRC-15 Agenda item 1.2"*, 11 May 2012.

[62] At the beginning of 2013, RTL indicated that "there was too much political uncertainty about the future of digital terrestrial broadcasting" and were considering the withdrawal from DTT by the end of 2014. In its recent coalition agreement, the three parties, CDU, CSU and SPD, forming the new German government, have agreed to continue to earmark frequency spectrum for the continuation of DVB-T2 broadcasts in the country. As a consequence, RTL are reconsidering their earlier announcement to withdraw from the DTT platform in Germany. Source, DVB 19 December 2013: http://www.dvb.org/news/rtl-deutschland-reconsiders-dvb_t

5.2.3 Future demand for DTT services in Ireland

5.18 ComReg recognises that broadcasting policy, including assessments regarding the future demand of DTT in Ireland, is a matter for the Minister for Communications, Energy and Natural Resources. However, given ComReg's role in the management of the spectrum resource and the potential for other services to use spectrum in the UHF band, the information presented in this section aims to facilitate the debate on the use of the UHF band.

5.19 In considering the future demand of any service it is useful to first outline its current status. DTT services in Ireland are provided using Saorview and ComReg's Quarterly Report for Q3 2013 estimated that, for September 2013, approximately 38% of TV homes had an "Irish DTT" reception method, while 10.7% of all TV homes in Ireland classified DTT as the highest form of TV reception available within the home. The Saorview service currently carries 8 television channels (1 in High Definition (HD)[63] and 7 in Standard Definition (SD)) and 10 radio stations,[64] and the Saorview services are provided using the two DTT PSB multiplex licences issued to RTÉ.

5.20 In relation to the future demand for DTT spectrum in Ireland, ComReg notes that, while the BAI's recent statement that it *"has decided not to proceed with a licensing process for commercial DTT at this time"* provides a certain degree of clarity on BAI's requirement for commercial DTT Multiplex licences, the overall demand for spectrum for DTT remains unclear as the future plans for Saorview remain unknown.

5.21 In this regard, ComReg notes the conclusion in the O&O report that "*Saorview remains an important platform for the channels that distribute on it"* and that the *"existing participants in Saorview guided by a technology roadmap and their own forecasts of the likely evolution of the platform, should reach a view about DTT spectrum requirements into the future and present this to the ComReg and the Department of Communications, Energy and Natural Resources for consideration",* O&O go on to suggest a number of ways forward in this regard[65].

[63] ComReg understands that Saorview plans to migrate RTÉ 1 from SD to HD in the future. This would mean two services would be broadcast in HD and 6 in SD.

[64] The TV services carried on Saorview are RTÉ One, RTÉ two HD, TV3, TG4, RTÉ News Now, 3e, RTÉ jr, RTÉ One+1 and the digital teletext service RTÉ Aertel. The radio services provided are RTÉ Radio 1, RTÉ 2fm, RTÉ Lyric FM, RTÉ Radio Na Gaeltachta, RTÉ Radio 1+1, RTÉ 2XM, RTÉ jr, RTÉ Gold, RTÉ Choice and RTÉ Pulse.

[65] *"...through the use of hard disk recorders to enable households to pause and replay live TV, and to store content for later viewing, or to enable channels to "push" programming to the hard disk. The development of high definition services on the platform will also help maintain its relative appeal"*

5.22 As a result of ongoing technology developments, there would appear to be scope for broadcasters to expand their service offerings to other terrestrial networks. By means of example, it appears that there is the potential for synergistic arrangements between the broadcasting and mobile network community involving some combinations of DTT and LTE broadcast network topologies.

5.23 Further and considering that the BAI does not intend to use the spectrum for commercial DTT at this time; this unused spectrum potentially presents an opportunity for the services offered on Saorview to extend their reach[66]. This unused spectrum coupled with advances in technology[67] could be used to augment the distribution of the broadcasting content delivered on Saorview by terrestrial means in an innovative way to a greater number of viewers. The potential for this, in line with the recommendations from the O&O report suggests that additional spectrum for this purpose may be required in the future.

5.2.4 ComReg's spectrum planning for DTT

5.24 While the demand for DTT spectrum in Ireland is somewhat unclear, the legislative requirements provide clarity on the minimum amount of spectrum that must be provided and/or reserved for DTT, namely at least six DTT multiplexes, two for PSB DTT and at least four for commercial DTT. ComReg's spectrum planning for DTT has ensured the provision for same.

5.25 Notwithstanding, it is perhaps noteworthy that this DTT legal requirement stems from the Broadcasting (Amendment) Act of 2007 - a time when it was envisaged that Ireland would have both PSB and commercial DTT services. Given that the BAI has recently decided "*not to proceed with a licensing process for commercial DTT at this time"* the spectrum planned for and set aside for commercial DTT purposes in accordance with the 2009 Act could remain unused.

5.3 The PMSE service

5.26 As discussed in Chapter 4, audio PMSE systems such as wireless microphones and in-ear monitoring systems currently use the UHF band. Given the current limited usage of spectrum by DTT in the UHF band, to date ComReg has not experienced any difficulty in assigning spectrum for

[66] In particular, in line with the public service broadcasting objects as set out in the Broadcasting Act 2009. Section 114 in the case of RTÉ and section 118, in the case of TG4.

[67] *For example, through advances in broadcast technologies such as DVB-T2 lite, LTE Broadcast, LTE evolved multimedia broadcast and multicast service (eMBMS) and High efficiency video coding (HEVC)*

audio PMSE purposes. Spectrum for PMSE can currently be assigned on a secondary basis in:

- UHF channel 38 (606 – 614MHz), as this has been allocated specifically for PMSE use within Ireland;
- the spectrum between planned DTT channels in the UHF band. This is called "interleaved spectrum"; and
- the spectrum planned for DTT channels but currently unused.

5.27 In relation to the future demand for PMSE service, with the increasing demand for spectrum in the UHF band for other uses (see for example the mobile sector discussed in section 5.4 below) the availability of UHF spectrum for PMSE services may become more restricted in the future. However this will depend on the allocation of spectrum in the UHF band for other uses and whether the spectrum planned for commercial DTT is used or not.

5.28 As the use of the UHF band varies across Europe in particular in relation to DTT, this scarcity issue is likely to be more pronounced in those countries who have already licensed a large number of DTT multiplexes in this band and where DTT demand may be increasing. At a European level, specific legislation has been adopted to address this issue and this legislation requires Member States in cooperation with the Commission *"to seek to ensure the necessary frequency bands for PMSE, in accordance with the Union's objectives to improve the integration of the internal market and access to culture.* [68]

5.29 Furthermore, as noted at the 46th RSC meeting in December 2013, the EC is currently considering the preliminary elements for a draft Commission Implementing Decision on the technical conditions for radio spectrum use by wireless microphones and associated applications for programme making and special events (wireless audio PMSE equipment) in the European Union,[69] and in February 2014, the EC is holding a workshop with PMSE stakeholders on this topic.

5.30 The above highlights that an EC technical harmonisation decision on audio PMSE might arise in the future. However, should an EC Decision on PMSE

[68] Article 8.5 of the EU Radio Spectrum Policy Programme (RSPP)

http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:081:0007:0017:EN:PDF

[69] See 46TH Radio Spectrum Committee Meeting 11-12 December 2013 Chairman's Summary Report https://circabc.europa.eu/sd/d/fc7d8c6c-cfdd-4712-83bd-bd6096ee6ce3/RSC#46_Chairman_Report.pdf

in the UHF band be adopted in the future, ComReg's spectrum planning in the UHF band will take any such Decision (if it arises) into consideration.

5.4 Mobile broadband services

5.31 While the discussions generally seem to be at an early stage in most countries, ComReg considers that there is likely to be strong support to designate and make the 700 MHz band available for mobile services across Europe and relevant factors, in this regard, are described below.

5.32 Firstly, a key driver for consideration of the 700 MHz band for mobile services in Europe is the substantial growth in demand for mobile data services. In that regard, ComReg notes that:

- global volumes of data carried over mobile networks mushroomed significantly around 2008, initially driven by the popularity of 3G phones, 3G-enabled laptops and 3G wireless broadband adaptors and, more recently, by demand for tablet devices;
- according to Cisco, there was a reported 522% increase in total worldwide mobile data traffic between 2008 and 2010.[70] ComReg notes that the actual mobile data traffic identified by Cisco between 2007 and 2010 exceeded the ITU's forecasts (as set out in the ITU document ITU-R M.2072), and the latest Cisco Visual Networking Index February 2013 indicates that actual global mobile data traffic grew 70% in 2012;
- similarly, the Organisation for Economic Cooperation and Development (OECD) reports that mobile broadband has experienced healthy growth (18%) in the last 12 months, largely driven by continuing strong demand for tablets and smartphones[71]; and
- one explanation for such substantial growth is the increasing consumer demand for video-based services on mobile devices and the bandwidth demands this places on mobile networks. In that regard, Google Inc has previously reported that the number of YouTube videos delivered to mobile devices around the world tripled in 2010, to 200 million video views every day. Also of note is that watching a typical web video on a mobile device takes more than 100 times the bandwidth of a typical phone call.

5.33 In the Irish context, mobile broadband services play an important role and, according to the Broadband Commission's Report 2012, Ireland ranks 12th

[70] Cisco VNI Global Mobile Data traffic Forecast Update 2010-2015 (2011).

[71] http://www.oecd.org/sti/broadband/oecdbroadbandportal.htm

in mobile broadband penetration in the world with 59.4 active subscriptions per 100 inhabitants.[72] Further, ComReg's quarterly market reports indicates that**:**

- as at Q3 2013 broadband internet subscriptions accounted for 99.4% of all internet subscriptions with mobile broadband accounting for a share of 30.7%[73]; and

- breaking out the mobile broadband segment shows that the number of smartphone/tablet (SIMS) increased 11.5% in the year from Q1 2012 to Q1 2013. This growth segment is particularly important because these devices are forecast to support the greatest future demand for mobile-data[74];

5.34 In addition, according to the most recent white paper statement by the analyst group Akamai on the State of the Internet 2012 (at Q4 2012), Ireland ranks 15th in the world in average measured connection speeds.[75]

5.35 It is widely accepted that future demands for mobile services are likely to increase because, amongst other things[76]:

- Demand for wireless broadband devices (such as dongles, smartphones and tablets) continues to grow; and

- Data speeds of mobile networks are increasing (e.g via the deployment of LTE technology) which both improves the user experience for current services and enables the provision of newer or more bandwidth intensive services[77].

5.36 Secondly, the 700 MHz band is already being made available in important markets outside Europe. For instance, the band has been used for the

[72] Report by the Broadband Commission (2012) on "The State of Broadband 2012: Achieving Digital Inclusion for All". The Broadband Commission was established by the ITU and the United Nations Educational, Scientific and Cultural Organisation (UNESCO) in response to UN Secretary-General Ban Ki-Moon's call to step up efforts to meet the Millennium Development Goals.

[73] See ComReg Document 13/120, mobile broadband figures reported by ComReg currently do not include internet access over mobile phones.

[74] Ibid footnote 75 and see also, Ericsson Mobile Report June 2013.

[75] http://www.akamai.com/stateoftheinternet (Volume 5, Number 4, 4th Quarter 2012)

[76] This is evidenced in the ITU-R M.2243 document, which sets out an overview of a selection of analysts' forecasts for global mobile data traffic between 2011 and 2015 (see also Annex 2).

[77] For example: linear or managed IPTV services, possibly made up of live TV programming; non-linear services, possibly made up of Video On Demand (VOD) and/or time shifted TV programming; video gaming using high data-rate services and high contrast visual content in 3D and/or high-definition formats; and various cloud applications and services.

provision of wireless broadband (WBB) services in the US[78] since 2008.[79] Other key markets include Japan and other countries in the Asia-Pacific region. An important benefit for the adoption of a similar approach in Europe is that operator and consumer equipment is readily available.

5.37 In addition, and perhaps as result of the above factors, there is increasing focus at a national level in Europe for making the 700 MHz band available for mobile services. For instance:

- In June 2013, France indicated preliminary support for WBB use of the 700 MHz band, and a recent article suggests that the timing of this auction would follow after WRC-15[80];
- Also in 2013, the German national regulator (the BNetzA) consulted on a proposal to include the 700 MHz band in a multi-band auction to be held as early as 2014 to ensure that the frequency bands involved are available to consumers by 2017-18[81];
- A consultation is underway in Poland by the Polish regulator (UKE) concerning whether the 700 MHz band could be exclusively allocated to broadcasting services or to WBB or to both services and or whether the entire UHF band could be used to distribute wireless broadband communications and multimedia content[82]; and
- The preliminary views of FICORA in Finland and Ofcom in the UK seem to favour adopting the 700 MHz band for WBB in the future.

[78] Currently in the US, the 700 MHz band is 698 – 806 MHz.

[79] The US 700 MHz band plan concerns several uplink and downlink configurations, and whilst these configurations are unlikely to be adopted elsewhere it seems Canada does intend to adopt it. The more favoured bandplan is currently the Asia Pacific Telecommunity (APT) bandplan consisting of 2 times 45 MHz uplink-downlink. The APT bandplan is likely to be adopted in Mexico and Brazil (the government of Brazil plans to have mobile broadband access in all Municipalities by 2014 (although this plan is primarily predicated on licensing processes in the band 2,500 to 2690 MHz along with other bands (See. http://www.gsma.com/latinamerica/gsma-report-mobile-heart-brazil-transformation)

[80] French 700 MHz auction will be after WRC-15, 22 January 2014, http://www.policytracker.com/headlines/questions-raised-over-whether-france-will-hold-its-700-mhz-auction-before-2015

[81] http://www.bundesnetzagentur.de/cln_1911/DE/Sachgebiete/Telekommunikation/Unternehmen_Institutionen/Frequenzen/OeffentlicheNetze/Mobilfunknetze/Projekt2016/projekt2016-node.html

[82] http://www.telecompaper.com/news/uke-starts-consultation-on-second-digital-dividend--939709

5.4.1.1 European-wide developments relating to wireless broadband in the 700 MHz band

5.38 ComReg also observes that support for the adoption of the 700 MHz band for mobile broadband across Europe is increasing.

5.39 Firstly, the Radio Spectrum Committee (RSC) developed an EC mandate for CEPT and tasked it to develop harmonised technical conditions for the 694-790 MHz frequency band for the provision of wireless broadband electronic communications services and other uses in support of EU spectrum policy priorities.[83]

5.40 Since then, the RSPG has provided some high-level guidance to the EC which may be relevant in the current matter:

- RSPG 13-521, which sets out an Opinion on the strategic challenges facing Europe in addressing the growing spectrum demand for WBB; and
- RSPG 12-408, which sets out an Opinion on Review of Spectrum Use.

5.41 The RSPG Opinion 13-521 reviewed the current allocations of spectrum in Europe within the frequency range from 400 MHz to 6 GHz and identifies the steps which need to be taken to make particular bands available for wireless broadband. In doing so, it recognises that mobile broadband services have already taken an important place in the overall provision of broadband access. However, it also recognises that mobile communications is not the only means to provide wireless broadband and that alternative means such as Wi-Fi and satellite networks can play an important role in delivering broadband services. In short, there is no "one size fits all" solution to provide cost-effective broadband.

5.42 The RSPG notes that 1701.5 MHz of spectrum can be identified as being already available for wireless broadband, including 538.5 MHz for WiFi-type applications, with a further 140 MHz identified with the potential to become available in the near term (by 2015) and 886 MHz having been identified as spectrum with potential to support broadband applications in the medium term (i.e. beyond 2015).

[83] The main tasks to be fulfilled by CEPT under the EC mandate are set out in document RSCOM12-37 rev 3. The schedule of delivery dates for the deliverables under the mandate is set out and much of the work is expected to be on-going through to July 2016.

5.43 In addition, the RSPG Opinion 12-408 provides some guidance on how analysis of demand and supply for spectrum for uses might be reconciled through the identification of frequency bands.

5.44 Additional information in relation to activities to identify demand and supply for spectrum uses is set out at Annex 4 to this paper.

5.5 PPDR (Public Protection and Disaster Relief) service

5.45 The following definitions are provided in Report ITU-R M.2033 [1] "Radiocommunication objectives and requirements for public protection and disaster relief" (2003) to try to define Public Protection and Disaster Relief:

- Public protection (PP) radiocommunication: Radiocommunications used by responsible agencies and organisations dealing with maintenance of law and order, protection of life and property, and emergency situations.

- Disaster relief (DR) radiocommunication: Radiocommunications used by agencies and organisations dealing with a serious disruption of the functioning of society, posing a significant, widespread threat to human life, health, property or the environment, whether caused by accident, nature or human activity, and whether developing suddenly or as a result of complex, long-term processes.

5.46 As part of the Mandate to CEPT to develop harmonised technical conditions for the 700 MHz band in the EU, the EC requested CEPT to take into account other priority areas of EU spectrum policy such as PPDR services, in particular to facilitate the deployment of broadband PPDR applications in the same frequency band.

5.47 Within CEPT, ECC the Project Team FM49[84] is responsible for addressing the radio spectrum requirements for PPDR, and is currently developing an ECC Report that will consider two possible candidate bands for a European broadband PPDR system (BB PPDR). These bands are the 400-470 MHz and the 694-790 MHz bands and this ECC report is expected to be completed in April 2015.

5.48 Within Ireland, a digital mobile radio service is currently being used by the emergency services, including An Garda Síochána, using the Terrestrial Trunked Radio (TETRA) system. This is an ETSI standard for narrowband professional mobile radio based on TDMA and designed for use by government agencies, emergency services, (police forces, fire departments, ambulance) for public safety networks, rail transportation staff for train

[84] http://www.cept.org/ecc/groups/ecc/wg-fm/fm-49

radios, transport services and the military. TETRA in Ireland uses the duplex band 380-385/390-395 MHz and is a narrow band form of PPDR, supporting voice applications.

5.49 ComReg would welcome further information from interested parties on the future needs of the PPDR service in Ireland or its spectrum requirements.

5.6 White Space Device applications

5.50 In the European context, CEPT report 24 defines the general term of White Space as follows:

"White Space is a label indicating a part of the spectrum, which is available for a radiocommunication application (service, system) at a given time in a given geographical area on a non-interfering / non-protected basis with regard to other services with a higher priority on a national basis."

5.51 While the above is applicable to any spectrum band, White Space use is often further clarified in the context of the UHF band. When we consider the Irish context and the current use of the UHF band, as mentioned in chapter 4, DTT services are currently planned in the frequency range 470 – 790 MHz. In DTT Multi Frequency Networks (MFN's), high power TV broadcast transmitters using the same frequency typically need a geographic separation between their coverage areas to avoid interference. Subsequently, in any given location 8 MHz UHF channels may be available for alternative localised use. This remaining spectrum is termed "interleaved spectrum" or "TV white spaces".

5.52 A variety of applications have been proposed for potential use cases of TV white spaces. For example, Ofcom UK is at an advanced stage in developing a framework for the introduction of White Space Devices (WSD) in the UHF band[85]. Ofcom has conducted a number of consultations on this issue and stakeholders have identified five main use cases for TV white spaces in the UK, as follows:

- Rural Broadband: TV white spaces used to provide fixed wireless broadband communications to rural communities.
- Hot Spot Coverage: TV white spaces used to provide fixed or mobile indoor /outdoor communications in hot spots. This is very similar to the way Wi-Fi technology is used today in coffee shops and public areas.

[85] "TV white spaces - A consultation on white space device requirements", Ofcom (UK), 22 November 2012

- In Home Broadband: TV white spaces used to provide in home wireless communications in the same way that Wi-Fi technology and mobile network femto cells are used today.

- In home multimedia distribution: Similar to in home broadband except that TV white spaces would be used to transfer multimedia content or other data from one device to another in the home and could act as a form of cable replacement.

- Machine to Machine Communications: This typically refers to low data-rate connections between sensors and devices used for the purposes of control, telemetry, or remote monitoring. Depending on the precise application, the WSDs could take the form of a base station, or a small and low-power radio device.

5.53 Within CEPT, Working Group Frequency Management Project Team FM53 is responsible for considering the overall regulatory framework for WSD in the UHF band. This work is currently in progress and an ECC report is expected in February 2015.

5.54 WSDs have been introduced in the United States of America (USA), under a framework established by the Federal Communications Commission (FCC)[86].

5.55 In Ireland, ComReg recognises the White Spaces Ireland[87] initiative which aims to facilitate the introduction of WSDs through engaging with industry in development trials. ComReg is actively facilitating this process through Test and Trial Ireland.

5.56 At this stage, the future regulatory framework for WSD and its demand for spectrum have not been established.

[86] http://www.fcc.gov/encyclopedia/white-space-database-administration

[87] http://ctvr.ie/industry/white-spaces-ireland/

Chapter 6

6 Preliminary Consultation Issue: Management and use of the UHF band in Ireland

6.1 It is abundantly clear that the management and use of the UHF band in Ireland is likely to attract significant interest over the coming years as international developments progress. To assist ComReg in its spectrum management considerations; this chapter sets out what ComReg currently considers to be the main issues related to the use of the UHF band in Ireland and invites comments from interested parties in relation to these matters.

6.1 Future demand for particular uses of spectrum in the UHF band

6.2 Chapter 5 of this document set out information relevant to the five potential future uses of the UHF band in Ireland, namely DTT, PMSE, mobile, PPDR and WSD.

6.3 ComReg invites interested parties to provide views on any of the potential uses discussed in Chapter 5 and, in particular, on potential issues relating to spectrum demand and supply associated with these uses.

6.4 In addition, ComReg invites interested parties to provide views on any other potential uses that should be considered.

6.5 In addition to the above general invitation, ComReg sets out below the specific inputs it is seeking in relation to the 700 MHz band and the remainder of the UHF band.

6.2 700 MHz band

6.6 Immediately following WRC-15, the ITU-RR will be updated such that the 700MHz band will be allocated to mobile services (excluding aeronautical mobile) on a co-primary basis with broadcasting services in Region 1, which includes Ireland. As discussed in Chapter 3, the introduction of this allocation change at an ITU regional level does not necessarily mean that all countries within that ITU Region must or will adopt that allocation, or that spectrum assignments within a country be modified or issued in response to that changed ITU-RR allocation.

6.7 However, an allocation change modifies the potential uses of a spectrum band and, at a national level, a period of time is necessarily required to consider the implications of same and to make any necessary preparations.

6.8 At an international level, preparations and studies on the 700 MHz band are currently underway and, in a number of countries (e.g. the UK, Germany, and France), national consultations have been started or positions taken.

6.9 ComReg considers that there are considerable advantages to having a debate on this issue sooner rather than later and, in this regard, seeks feedback generally on the spectrum management considerations that it should take into account in relation to the upcoming 700 MHz band allocation at WRC-15. Specifically, ComReg seeks views on issues such as:

- the potential demand for particular uses of spectrum in the 700 MHz band;
- the benefits of facilitating these uses;
- the migration considerations and costs that might be considered in relation to the existing users; and
- the timing considerations associated with implementing this ITU-RR allocation change in Ireland.

6.3 The remainder of the UHF Band

6.10 At a global level, agenda item 1.1 of WRC-15 seeks to consider additional spectrum allocations to mobile services on a primary basis and to identify additional frequency bands for IMT, in order to facilitate the development of terrestrial mobile broadband applications in accordance with Resolution 233 (WRC-12)[88]. The remainder of the UHF band, 470 – 694 MHz, is currently being considered as a candidate band for study under this agenda item.

6.11 In addition, the future of the UHF band is under consideration by CEPT and the EC recently formed a high level advisory group to advise it on this issue and has also issued a request for an Opinion by the RSPG on the issue.

6.12 Given the on-going debate at an international level, and noting that a number of countries have already begun a public debate on this issue, ComReg is seeking the views of interested parties with regard to Ireland's use of the remainder of the UHF band i.e. 470 – 694 MHz, and how any such use should be balanced between the needs of existing uses and potential new uses.

[88] http://www.itu.int/oth/R0A0600004C/en

6.13 Similar to its consideration of the 700 MHz band, ComReg seeks views on the spectrum management considerations that it should take into account in relation to the remainder of the UHF band. More specifically ComReg seeks feedback on matters such as:

- the potential demand for particular uses of spectrum in the remainder of the UHF band;
- the economic, social and cultural benefits of facilitating these uses;
- the migration considerations and costs that might be considered in relation to the existing users; and
- Any associated timing considerations with facilitating new uses.

Chapter 7

7 Submitting comments and next steps

7.1 Submitting comments

7.1 All input and comments to this preliminary consultation are welcome; however, it would make the task of analysing responses easier if comments were referenced to the relevant section of each chapter and/or annexes to this document.

7.2 Please also set out your reasoning and all supporting information for any views expressed.

7.3 The period for comment will run until **12 noon (GMT) on 14 March 2014**, during which time ComReg welcomes written comments on any of the issues raised in this preliminary consultation.

7.4 Responses must be submitted in written form (post or email) to the following recipient, clearly marked "Submissions to ComReg 14/13":

Ms. Sinéad Devey

Commission for Communications Regulation

Irish Life Centre

Abbey Street

Freepost

Dublin 1

Ireland

Phone: +353-1-8049600

Email: marketframeworkconsult@comreg.ie

7.5 In order to promote further 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 ComReg's guidelines on the treatment of confidential information[89].

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

7.6 We would request that electronic submissions be submitted in an unprotected format so that they can be included in the ComReg submissions document for electronic publication.

7.7 ComReg appreciates that respondents may wish to provide confidential information if their comments are to be meaningful. As it is ComReg's policy to make all responses available on its website and for inspection generally, respondents to this preliminary consultation are again requested clearly to identify confidential material, and to place confidential material in a separate annex to their response, also providing supporting reasoning as to why such material is confidential in that annex.

7.2 Next Steps

7.8 Insofar as it might receive correspondence on matters relating to this document, ComReg hereby gives notice that it will publish all material correspondence received in this regard. Such information will be subject to the provisions of ComReg's guidelines on the treatment of confidential information[90].

7.9 Following this preliminary consultation, it is ComReg's intention to issue a further consultation paper on the development of a spectrum management strategy for the UHF band for the foreseeable future. Submissions from interested parties in response to the present paper will greatly assist ComReg in its preparation of this further consultation paper and, in this regard, ComReg urges respondents to set out their views on the main issues identified in Chapter 6 and any other relevant issues.

[90] ComReg document 0524 - *Guidelines on the treatment of confidential information*

Annex 1: Legal Framework and Statutory Objectives

A 1.1 The Communications Regulation Acts 2002-2011[91] (the "2002 Act"), the Common Regulatory Framework (including the Framework and Authorisation Directives [92] as transposed into Irish law by the corresponding Framework and Authorisation Regulations [93]), and the Wireless Telegraphy Acts1926 to 2009[94] 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 1.2 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 1.3 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

[91] 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.

[92] 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")

[93] 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.

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

particular material in this Annex does not necessarily mean that ComReg considers same to be of specific relevance to the matters at hand.

A 1.4 All references in this annex to enactments are to the enactment as amended at the date hereof, unless the context otherwise requires.

A1.1 Primary Objectives and Regulatory Principles under the 2002 Act and Common Regulatory Framework

A 1.5 ComReg's primary objectives in carrying out its statutory functions in the context of electronic communications are to:

- promote competition[95];
- contribute to the development of the internal market[96];
- promote the interests of users within the Community[97];
- ensure the efficient management and use of the radio frequency spectrum in Ireland in accordance with a direction under Section 13 of the 2002 Act[98]; 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 Regulations [99] in particular those designed to ensure effective competition [100].

A1.1.1 Promotion of Competition

A 1.6 Section 12(2)(a) of the 2002 Act requires ComReg to take all reasonable measures which are aimed at the promotion of competition, including:

[95] Section 12 (1)(a)(i) of the 2002 Act.
[96] Section 12 (1)(a)(ii) of the 2002 Act.
[97] Section 12(1)(a)(iii) of the 2002 Act.
[98] 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.
[99] 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).
[100] 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 1.7 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 1.8 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.

A1.1.2 Contributing to the Development of the Internal Market

A 1.9 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 electronic communications networks, electronic communications services 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 1.10 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.

A1.1.3 Promotion of Interests of Users

A 1.11 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 electronic communications services;
- 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 1.12 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.

A1.1.4 Regulatory Principles

A 1.13 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 electronic communications networks and services;
- 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.

A1.1.5 BEREC

A 1.14 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.

A1.1.6 Other Obligations Under the 2002 Act

A 1.15 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;[101]
- have regard to international developments with regard to electronic communications networks and electronic communications services, associated facilities, postal services, the radio frequency spectrum and numbering[102]; 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.[103]

A1.1.7 Policy Directions[104]

A 1.16 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 1.17 The Policy Directions which are most relevant in this regard include the following:

[101] Section 12(3) of the 2002 Act.
[102] Section 12(5) of the 2002 Act.
[103] Section 12(6) of the 2002 Act .
[104] 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.

Policy Direction No.3 on Broadband Electronic Communication Networks

A 1.18 ComReg shall in the exercise of its functions, take into account the national objective regarding broadband rollout, viz, the Government wishes to ensure the widespread availability of open-access, affordable, always-on broadband infrastructure and services for businesses and citizens on a balanced regional basis within three years, on the basis of utilisation of a range of existing and emerging technologies and broadband speeds appropriate to specific categories of service and customers.

A 1.19 ComReg is conscious that the three year objective described in this policy direction has now expired making this direction less relevant currently.

Policy Direction No.4 on Industry Sustainability

A 1.20 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 1.21 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 1.22 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 1.23 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 1.24 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 1.25 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;
- the potential of alternative technology delivery platforms to support competition.

A1.2 Other Relevant Obligations under the Framework and Authorisation Regulations

A1.2.1 Framework Regulations

A 1.26 Regulation 17 of the Framework Regulations governs the management of radio frequencies for electronic communications services. 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 electronic communications services;
- that spectrum allocation used for electronic communications services 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 1.27 Regulation 17(2) provides that, unless otherwise provided in Regulation 17(3), ComReg must ensure that all types of technology used for electronic communications services may be used in the radio frequency bands that are declared available for electronic communications services in the Radio Frequency Plan published under section 35 of the 2002 Act in accordance with EU law.

A 1.28 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 electronic communications services 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 1.29 Regulation 17(4) requires that, unless otherwise provided in Regulation 17(5), ComReg must ensure that all types of electronic communications services may be provided in the radio frequency bands, declared available for electronic communications services in the Radio Frequency Plan published under section 35 of the Act of 2002 in accordance with EU law.

A 1.30 Regulation 17(5) provides that, notwithstanding Regulation 17(4), ComReg may provide for proportionate and non-discriminatory restrictions to the types of electronic communications services to be provided, including where necessary, to fulfil a requirement under the International Telecommunication Union Radio Regulations ("ITU-RR").

A 1.31 Regulation 17(6) requires that measures that require an electronic communications service to be provided in a specific band available for electronic communications services 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 1.32 Regulation 17(7) provides that ComReg may only prohibit the provision of any other electronic communications service 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 1.33 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 1.34 Regulation 17(9) provides that Regulations 17(2) to (7) only apply to spectrum allocated to be used for electronic communications services, general authorisations issued and individual rights of use for radio frequencies granted after the 1 July 2011. Spectrum allocations, general authorisations and individual rights of use which already existed on the 1 July 2011 Framework Regulations are subject to Regulation 18.

A 1.35 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 1.36 Regulation 17(11) requires ComReg to, in the fulfilment of its obligations under that Regulation, respect relevant international agreements, including the ITU Radio Regulations and any public policy considerations brought to its attention by the Minister.

A1.2.2 Authorisation Regulations

Decision to limit rights of use for radio frequencies

A 1.37 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 1.38 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 1.39 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 1.40 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 1.41 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 1.42 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 1.43 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 1.44 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 1.45 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 1.46 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 1.47 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 1.48 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 1.49 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 1.50 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).

A1.3 Other Relevant Provisions

Wireless Telegraphy Act, 1926 (the "1926 Act")

A 1.51 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 1.52 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 1.53 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 1.54 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 1.55 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 1.56 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 1.57 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 1.58 On 15 February 2012, the European Parliament adopted the five-year Radio Spectrum Policy Programme which establishes a multiannual 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 1.59 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.

Annex 2: Overview of observed growth in demand for data (and in particular mobile broadband data) in selection of European countries

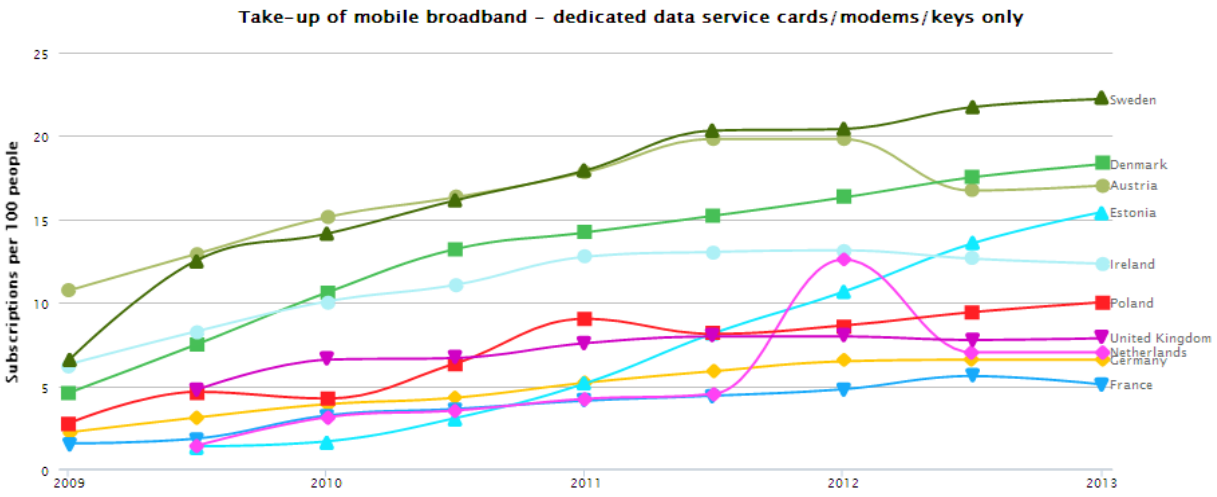

Figure A2.1 Take-up of mobile broadband – dedicated data service cards/modems/keys only (source onlie eurostat statistics services)

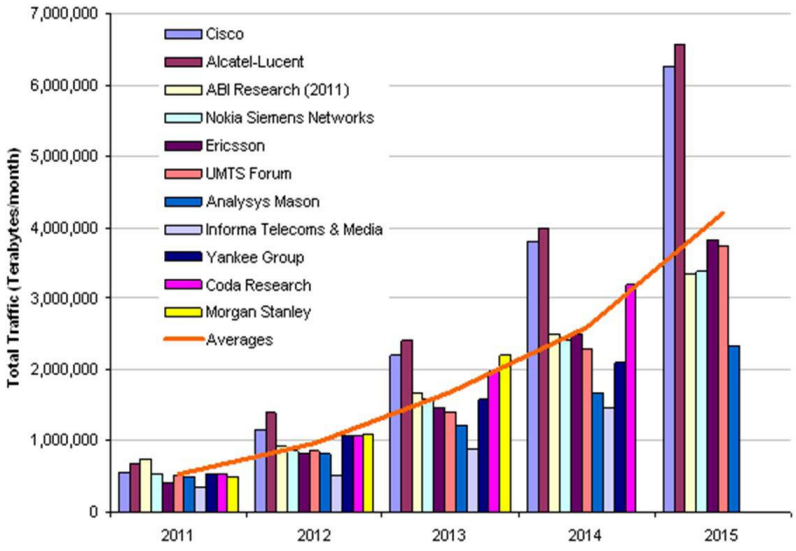

Figure A2.2 Overview of a selection of analysts' forecasts for global data-traffic between 2011 and 2015 (source ITU-R M.2243).

Annex 3: Overview of national-level spectrum activities to identify future uses of spectrum and candidate bands (Australia, Canada, Denmark, UK and US)

A 3.1 This section sets out an overview of relevant national-level spectrum activities undertaken in Australia, Canada, Denmark, UK and US towards identifying additional spectrum allocations for WBB. These examples are indicative of the broad national policy approaches to spectrum for WBB, however, there are an increasing number of countries now taking policy decisions in relation to one specific radio frequency band, the 700 MHz, and these are discussed in Chapter 5.6 above.

A 3.2 For information, we set out a stylised diagram at figure A3.1 of the candidate spectrum bands currently being considered at the global level for the mobile broadband use case. Spectrum bands shown are not drawn to scale. These possible candidate bands were the focus of some of agenda items and the discussions at the WRC-07, such that the main outcome of WRC-07 was that a total of 392 MHz of new spectrum was identified for terrestrial use by IMT-Advanced in Europe. 120 MHz of which, was globally harmonized for IMT-Advanced (from 450 to 470 MHz and from 2300 to 2400 MHz

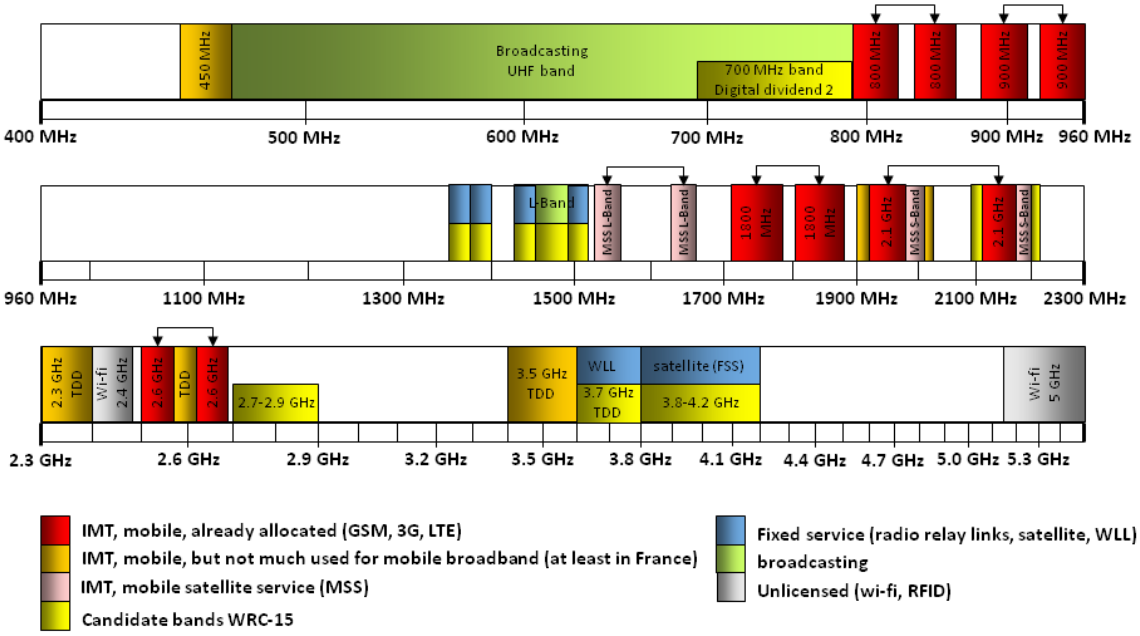

Figure A3.1 Source: Discussion Paper by SFR's mobile network Chief Frequency Officer T Welter (2013).

Australia

A 3.3 In its report Towards 2020 – Future spectrum requirements for mobile broadband the Australian Communications and Media Authority (ACMA) considered various spectrum demand drivers[105], such as:

- Reallocation of the 700 MHz band;
- Reallocation and conversion of the 2.5 GHz band;
- Expiring licences; and
- Smart infrastructure and new thinking about infrastructure parks.

A 3.4 ACMA sought views on these and other related issues to develop its five year spectrum outlook (2012 to 2016). The UHF radio spectrum band. amongst others, is seen as a cornerstone to the future of radio spectrum services in Australia. ACMA considers that while the use of mobile networks and devices to support triple play services such as voice, data and video is changing the dynamics of internet use by providing mobile flexibility. It also notes the trend to increasing volume of data downloaded by internet users in Australia.

[105] http://www.acma.gov.au/webwr/_assets/main/lib312084/ifc13_2011_toward_2020-future_spectrum_requirements.pdf

A 3.5 ComReg observes that ACMA's forward looking policy is to try and match supply of appropriate spectrum to meet demand for particular uses.

Canada

A 3.6 In 2012, Industry Canada released a study, prepared by RedMobile Consulting, which set out to forecast of the level of demand for spectrum to support future commercial mobile services in the 2011-2015 time frame.[106]

A 3.7 The RedMobile study concluded that commercial mobile services in Canada will require 375 to 500 MHz of spectrum by 2015 based on three particular scenarios[107]:

- The business-as-usual (BAU) scenario
    - which assumes no major changes in current patterns of traffic growth, network densification or efficiency. Traffic is forecast to double every year, site counts of each operator are expected to continue growing at between five to ten percent per year, and spectrum use efficiency is forecast to increase to 1.078 Bits/Sec/Hertz.Footnote 15 Total spectrum requirements in the BAU scenario were forecast to be 375 MHz and 473 MHz in 2015 and 2017, respectively.
- A wire-free-world (WFW) scenario
    - where traffic growth was assumed to be twice as fast as the BAU scenario, and investment and efficiency improvements were modelled in response. Total spectrum requirements in this scenario were forecast to be 460 MHz and 594 MHz in 2015 and 2017, respectively.
- A low-investment (LI) scenario was examined.
    - Where the traffic growth was forecast to be the same as the BAU scenario, but this scenario showed lower investment in networks and devices. Total spectrum requirements in this scenario were forecast to be 500 MHz and 649 MHz in 2015 and 2017, respectively.

[106] See RedMobile's Study of Future Demand for Radio Spectrum in Canada http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf10253.html

[107] The scenarios differed in their assumptions regarding three key factors: projected traffic growth, investment and network densification, and spectrum use efficiency

A 3.8 On foot of its work, Industry Canada intends to make 528 MHz of spectrum available for commercial mobile services (a large part of which will be made available with the upcoming 700 MHz and 2500 MHz auctions)[108]. Industry Canada notes that to meet the demand at the upper range of RedMobile Consulting estimates that an approximate twenty-five percent increase in available spectrum will be required.

Denmark

A 3.9 In 2011, Denmark's National IT and Telecom Agency (NITA) issued a report, compiled by Analysys Mason, which reviewed the international trends in respect of actual and planned use of spectrum bands for broadband use. [109] NITA consulted on its strategy on how to make enough spectrum available by seeking views on Analysys Mason's report.

A 3.10 The report notes that because the Danish government's broadband target is more ambitious than those of other governments (which do not require 100% of households to have access to a 100Mbit/s service).

A 3.11 The overall objective of the study was to determine the amount of spectrum required to deliver fixed and mobile broadband services through wireless technologies in Denmark, noting the Danish government's broadband target and the assumption that a combination of wired and wireless networks will be needed to deliver the goal of '100Mbit/s everywhere'.[110]

A 3.12 Analysys Mason's consulting team concluding that the Danish government would need to make at least an additional 600MHz spectrum available for wireless broadband services, to reach its target of bringing 100Mbit/s broadband to the whole country. The report concludes that to meet the level of demand calculated in certain scenarios, additional spectrum would have to be awarded, and that spectrum demand could reach 1700MHz by 2025. Taking into account spectrum already used or planned to be used for WBB, this leaves around 600MHz shortfall to be met through identification of additional bands.

[108] ComReg understands that the award is set to begin on 14 January 2014 while Industry changes its licence transfer policy so that all transfer requests would be reviewed on a case by case basis.

[109] http://www.analysysmason.com/en-GB/About-Us/News/Newsletter/Analysys-Masons-study-suggests-600MHz-more-spectrum-is-required-for-wireless-broadband-services-in-Denmark/#12%20July%202011

[110] The estimation of spectrum requirements in the report for NITA is based on a model that evaluates mobile and fixed wireless access (FWA) spectrum demand in three different geo-types: urban, suburban and rural areas, and the spectrum requirements for a range of scenarios assuming that there is a requirement to provide a wireless substitute service to fixed broadband services delivering speeds of 100Mbit/s by 2020.

United Kingdom

A 3.13 Ofcom in the UK has set out its strategic approach to securing the long term benefits from scare spectrum resources in the band 470 to 862 MHz by examining future mobile broadband spectrum requirements.

A 3.14 Ofcom commissioned Real Wireless to report on techniques for increasing the capacity of wireless broadband networks.[111,112] In its report, Real Wireless identified a range of different approaches mobile operators could adopt to increase the future capacity of their networks including:

- Using more spectrum;
- Using more efficient mobile technology;
- Using more mobile sites; and
- Using more Wi-Fi and Femtocell mobile data offloading.

A 3.15 Ofcom concludes that, whilst more *"…mobile spectrum alone is unlikely to meet the future demand for mobile data capacity, it will form an essential part of a range of different techniques that will need to be used to meet this demand"*[113]

United States of America

A 3.16 In June 2010, President Obama signed a Memorandum calling for the National Telecommunications and Information Administration (NTIA), in collaboration with the Federal Communications Commission (FCC), to make 500 MHz of spectrum available for fixed and mobile wireless broadband in the next ten years. Guidance for the NTIA and FCC on how radio spectrum bands will be identified and evaluated for that purpose was set out in document by the US Department of Commerce.[114]

A 3.17 A variety of factors upon which the prioritisation and evaluation of candidate bands would be based, is set out in the Department of Commerce document as follows *inter alia*:

[111] www.ofcom.org.uk/static/uhf/real-wireless-report.pdf

[112] In 2009 PA Consulting issued a report for Ofcom entitled "Predicting Areas of Spectrum Shortage". Interestingly, Ofcom compared of a subset growth forecasts common to both the PA Consulting (2009) and Real Wireless (2011) reports showing the latter forecasts to be higher because of actual mobile data consumption growth in the interim period.

[113] www.ofcom.org.uk/consultations/uhf-strategy/ (at page 28 therein)

[114] http://www.ntia.doc.gov/report/2010/ten-year-plan-and-timetable-make-available-500-megahertz-spectrum-wireless-broadband-pre

- the amount of useable bandwidth to support wireless broadband and the degree to which that spectrum is contiguous;
- industry interest in the band and the expected auction revenue, if applicable, that the band will yield;
- indirect benefits to the economy of making the band available for wireless broadband;
- the availability of comparable spectrum (or other alternative arrangements) if relocation of incumbent users is necessary;
- the estimated costs of relocating Federal incumbents to another band; and
- the impact to services using global allocations that would require international negotiations to bring about reallocation.

Annex 4: International developments with respect to DTT broadcasting in UHF

A 4.1 In 2012, two questionnaires were issued to countries, one at European level by the RSPG[115], the other a more global level by the ITU[116] seeking to determine the future spectrum requirements for broadcasting.

A 4.2 The aim of the RSPG questionnaire was to establish the long-term spectrum requirements for television broadcasting in the EU. The results of the questionnaire informed its Opinion (RSPG13-521 rev1[117]), in particular its consideration of the 700 MHz band, as part of identifying spectrum for wireless broadband use.

A 4.3 The ITU questionnaire was issued by ITU-R Working Party 6A[118] as a consequence of the first session of the Conference Preparatory Meeting 15-1, to seek estimates from Members States and Sector Members of current and future spectrum requirements for terrestrial television broadcasting in Region 1 and Iran. The results of the questionnaire would also be used to by the JTG 4-5-6-7 is to confirm the lower edge of the allocation to the mobile service made at WRC-12 from 694-790 MHz.

A 4.4 A sample of European countries and their broadcasting developments are outlined to inform the debate here in Ireland. The countries are Finland, France, Germany, Italy, the Netherlands and the United Kingdom. The following information provided is sourced from the respective countries responses to the both the RSPG and ITU questionnaires.

Finland

A 4.5 Finland currently operates a total of nine national DTT multiplexes (seven in the UHF band and two in VHF Band III) plus four local DTT multiplexes. ASO in Finland was completed in 2007 and uses a mixture of both DVB-T

[115] "*Questionnaire on the long term spectrum requirements for television broadcasting in the European Union including the number of TV services, HDTV, interactive services, mobility requirements and the possible introduction of Ultra High Definition Television*" 24 July – 28 September 2012. Summary of responses, Responses received.

[116] ITU-R Circular Letter 6/LCCE/78 – "*Questionnaire on spectrum requirements for terrestrial television broadcasting in connection with WRC-15 Agenda item 1.2"*, 11 May 2012.

[117] RSPG13-521 rev1 – *RSPG Opinion on Strategic challenges facing Europe in addressing the growing spectrum demand for wireless broadband*, 13 June 2013.

[118] ITU-R Working Party 6A is concerned with terrestrial broadcast delivery and operates under ITU-R Study Group 6, which is concerned with matters relating to the Broadcasting Service within the ITU-R.

and DVB-T2 across its national multiplexes. They expect that they will launch a further national DTT multiplex in the UHF band in the short-term (1 to 5 years). In terms of Finland's estimated long-term (beyond 2020) DTT multiplex requirements, they expect a requirement for four national multiplexes in the UHF band and three national multiplexes in VHF Band III. Finland also expects a demand to provide for some regional multiplexes (not quantified).

France

A 4.6 France currently operates a total of six national and 13 local DTT multiplexes all of which are in the UHF band. ASO in France was completed in 2011 and uses DVB-T across all of its DTT multiplexes. France expects that it will launch a further two national DTT multiplex in the UHF band in the short-term (1 to 5 years). In terms of Frances's estimated long-term (beyond 2020) DTT multiplex requirements, at present, this has yet to be determined.

Germany

A 4.7 Germany currently operates a total of six national and 3 local DTT multiplexes all of which are in the UHF band. ASO in Germany was completed in 2008 and uses DVB-T across all of its DTT multiplexes. Germany has no expectation to launch further DTT multiplexes in the short-term (1 to 5 years). In terms of Germany's estimated long-term (beyond 2020) DTT multiplex requirements, at present, this has yet to be determined dependant on the plans of German broadcast organisations and decisions surrounding future broadcasting technologies (e.g., DVB-T2). Since the closing dates of both the RSPG and ITU questionnaires, the German commercial broadcaster RTL are considering a withdrawal from DTT by the end of 2014 although more recently it has signalled its intention to revisit the matter[119]..

Italy

A 4.8 Italy currently operates a total of 16 national UHF DTT multiplexes, 3 national VHF Band III DTT multiplexes as well as 18 local/regional DTT multiplexes. ASO in Italy was completed in 2012 and uses a mixture of DVB-T and DVB-T2 technologies across all of its national DTT

[119] At the beginning of 2013, RTL indicated that "there was too much political uncertainty about the future of digital terrestrial broadcasting" and were considering the withdrawal from DTT by the end of 2014. In its recent coalition agreement, the three parties, CDU, CSU and SPD, forming the new German government, have agreed to continue to earmark frequency spectrum for the continuation of DVB-T2 broadcasts in the country. As a consequence, RTL are reconsidering their earlier announcement to withdraw from the DTT platform in Germany. Source, DVB 19 December 2013: http://www.dvb.org/news/rtl-deutschland-reconsiders-dvb_t

multiplexes. Italy expects to launch a further six national DTT multiplexes in the short-term (1 to 5 years). In terms of Italy's estimated long-term (beyond 2020) DTT multiplex requirements, at present, Italy expect to require up to 40 DTT multiplexes to accommodate both their national and local/regional DTT requirements.

Netherlands

A 4.9 The Netherlands currently operates a total of five national DTT multiplexes all of which are in the UHF band. ASO in the Netherlands was completed in 2011 and uses DVB-T across all of its DTT multiplexes. The Netherlands has no expectation to launch further DTT multiplexes in the short-term (1 to 5 years). In terms of the Netherland's estimated long-term (beyond 2020) DTT multiplex requirements, at present, there remains a need for DTT capacity comparable to the number of multiplexes, i.e., five multiplexes. Since the closing dates of both the RSPG and ITU questionnaires, the Netherlands commercial broadcaster KPN announced it would withdraw from the DTT platform in the Netherlands when its licence expires in 2017.

United Kingdom

A 4.10 The United Kingdom currently operates a total of six national DTT multiplexes and one regional DTT multiplex (in Northern Ireland) all of which are in the UHF band. ASO in the United Kingdom was completed in 2012 and uses a mixture of DVB-T and DVB-T2 across all of its DTT multiplexes. The United Kingdom expect to launch two further DTT multiplexes in the short-term (1 to 5 years) in the 600 MHz band using DVB-T2[120]. The United Kingdom (Ofcom) has consulted extensively on a long-term UHF Strategy [121], including its long-term DTT multiplex requirements. Since the closing dates of both the RSPG and ITU questionnaires, the United Kingdom has published its UHF Strategy and intends to release the 700 MHz band (694 – 790 MHz) for IMT and achieve six DTT multiplexes below the 700 MHz in the long-term.

[120] http://stakeholders.ofcom.org.uk/consultations/600mhz-award/statement

[121] http://stakeholders.ofcom.org.uk/consultations/uhf-strategy/statement/

Annex 5: Case Study: Observations and commentary on the reallocation of the 800 MHz band in Ireland

Introduction

A 5.1 Previously the spectrum band 470 - 862 MHz was principally used for the provision of analogue terrestrial television services. With the introduction of digital technology it became possible to provide television services digitally and in 2011 digital terrestrial television (DTT) services were launched in Ireland via the Saorview platform. The introduction of DTT services provided benefits to users in terms of an increased quality and range of services.

A 5.2 Additionally, as digital services are more spectrally efficient than analogue services, DTT did not require the same quantum, and following the analogue terrestrial television switched-off on 24 October 2012, the 790-862 MHz band (the "800 MHz band") was made available for Electronic Communications Services ('ECS') in Ireland. Alongside the 900 MHz and 1800 MHz bands, the 800 MHz band was released on a liberalised basis[122] to the market in the 2012 Multi-Band Spectrum Award (MBSA) process.[123] Winning bidders will pay in excess of €850 million for these spectrum rights over the life of the licences.

A 5.3 Seven months following the issue of Liberalised Use Licences to the MBSA winning bidders, 4G mobile broadband services using Long Term Evolution (LTE) technology were launched in Ireland.[124]

Spectrum planning

A 5.4 In the case of the designating and making available of the 800 MHz band for terrestrial systems capable of providing electronic communications services in the State, technical planning was required to clear the broadcasting service out of the 800 MHz band in order to allow other users of this spectrum band.

[122] On a liberalised basis means that the spectrum can be used on a technology and service neutral basis in line with the relevant EC Decisions

[123] ComReg 12/131

[124] 4G services have been launched in the 800 MHz band by eircom (launched on September 2013), Vodafone (October 2013) and H3GI (January 2014).

A 5.5 To achieve this clearance a number of parties successfully co-operated together (the DCENR, BAI, RTÉ and ComReg) as follows:

- From a legislation and policy viewpoint, the DCENR successfully introduced legislation (i.e. the Broadcasting Acts of 2007 and 2009) and guidance to provide certainty on the availability of spectrum for broadcasting use, and to provide guidance (.i.e. the DCENR national policy framework for the Digital Dividend[125]) to ComReg on the spectrum planning for broadcasting;
- From a spectrum planning perspective, ComReg, RTÉ and the BAI, co-operated together to reach an agreement with Ofcom that would facilitate broadcasting in the UHF band, thereby freeing the 790-862 MHz band for other uses; and
- RTÉ implemented the resulting frequency plan and switched-off the analogue terrestrial television service in the UHF and the 790-862 MHz bands.

Commentary

A 5.6 ComReg is cognisant of the benefits realised in Ireland when, on behalf of Ireland, DCENR advanced its decision to allocate the 800 MHz band to the mobile service. Acting in advance of the European Council and Parliament's Decision on the RSPP which mandated that authorisation processes be completed by 1 Jan 2013, Ireland benefited in numerous ways:

- Ireland's position in spectrum negotiations reflected international trends. In particular it enabled spectrum planners from BAI, RTÉNL and ComReg to develop the current DTT spectrum plan and in doing so facilitated the introduction of the mobile service in the 800MHz band.
- Certainty in relation to establishing an ASO date of the 24 October 2012, it enabled:
    - Irelands national free-to-air terrestrial television network to move from analogue to DTT in line with other Member States
    - The 800MHz band to be cleared of the broadcasting service and made available for a competitive award process and subsequently the introduction of 4G mobile broadband services, and

[125] Development of a National Policy Framework for indentifying spectrum for the Digital Dividend, February 2009.

- The timely release of this band, ahead of the RSPP deadline of the 1 Jan 2013. Therefore Ireland did not require a derogation from the RSPP unlike several other member states.

A 5.7 Ultimately, citizens and consumers benefited from the availability of DTT and, as the roll-out of services advances new 4G mobile broadband services.

A 5.8 In ComReg's view, one of the critical success factors behind the benefits realised by Ireland with the 800 MHz band harmonisation was the synchronisation of Ireland's policy on the 800 MHz band with that internationally. Given the current momentum that is behind the 700 MHz band co-allocation, a new debate on the future use of the 700 MHz is warranted and necessary.