Commission for
Communications Regulation

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

Submissions to Preliminary Consultation 14/13

Submissions Document

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Content

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RESPONSE TO COMREG PRELIMINARY CONSULTATION 14/13

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

Summary Comments

2RN owns and operates the national UHF broadcast network used to carry the SAORVIEW platform to over 98% of households in Ireland. As such 2RN is the primary operator of spectrum in this band in Ireland with significant expertise and experience in using this spectrum.

The use of UHF spectrum for DTT represents excellent value for money, providing national coverage from just 64 transmission sites. The current SAORVIEW network delivers approximately 48Mbit/s of linear broadcast content to 98% of households in the country which viewers use on average for almost 3.5 hours a day[1]. As the DTT platform grows via additional services this value will increase.

The DTT platform is characterised by:

- High availability and reliability of service
- National coverage beyond just high population density areas
- Service quality independent of the number of simultaneous users
- Ease of reception via existing roof-top antennas
- Free to air channels are unencrypted and hence free at the point of reception

The future of UHF spectrum is key to the future of digital broadcasting, and in particular public service broadcasting, in Ireland. Therefore this is not just a matter of economic or national resource management, but a matter of social, cultural and political importance. Any such discussion requires guidance and policy direction from the DCENR in the first instance and we believe that ComReg should wait for this guidance before proceeding further.

2RN would welcome any opportunity to participate in a meaningful discussion on the future use of the 700MHz band if required.

[1] TAM Ireland, Jan 2014

Comment on Chapter 6.1 - Future demand for particular uses of spectrum in the UHF band

We recognise and appreciate that ComReg has made genuine effort to present a balanced and fact-based opening of this discussion, but nevertheless we feel some unintended bias exists in its presentation. In particular we believe that the potential growth of mobile broadband use, and its consequential requirement for additional spectrum, is not challenged to the same degree as current and future broadcasting needs in the UHF band. This is an unfortunate symptom of the availability of current telecoms media, industry sponsored research, and European Commission driven opinion. Any issues of imbalance should be easily corrected in a detailed cost benefit analysis of any potential spectrum reassignment, including:

- A detailed investigation of mobile broadband spectrum needs in Ireland
- An investigation of ways to increase mobile broadband capacity (where necessary) within existing spectrum allocations (including the 2.6GHz band).
- Exploration of the potential future need of UHF broadcasting spectrum in Ireland
- Consideration of the potential cost and disruption caused to DTT viewers, the network operator and the SAORVIEW platform by any migration or reassignment
- Consideration of the social, cultural and economic value of PSB in the UHF band and the ability to continue to grow the DTT platform.

<u>Broadcasting</u>

The take-up of DTT in Ireland is growing. SAORVIEW is now received in 39% of Irish TV households (620,000)[2] and we expect take-up to continue to grow. Consumption of linear TV is growing, as is the SAORVIEW platform itself; with the recent addition of RTÉ One HD, and expected further enhancements. In terms of digital data consumption DTT broadcasting in Ireland already massively exceeds even the most optimistic (and questionable) of mobile broadband predictions[3].

Due to legacy issues in terms of international agreements and the requirement for a smooth transition from analogue TV (with minimal cost and disruption while releasing the 800MHz digital dividend) current DTT use in the UHF band is spread across almost the entire 470 to 790MHz band. This means that any changes to this band, even though there are only 2 multiplexes currently on air, will create disruption.

[2] Nielsen, Jan 2014

[3] e.g. 144Gbytes/month for 1SD channel watched for 3.5 hours/day (444Gbytes/month for a HD channel) compared with Cisco VNI estimate (Feb 2014) that an average smartphone will generate 2.5Gbytes/month by 2018

2RN believes it would be prudent to expect and plan for at least 3, or possibly 4, high quality national multiplexes in Ireland. 2RN recognises that the Broadcasting Act 2009 specifies that 6 multiplexes must be accommodated. This requirement clearly needs revision, and while it contains no direct reference to spectrum, it was enacted at a time when the entire 470 to 862MHz band was available for broadcast use. With the reassignment of the 800MHz to mobile broadband (18% of the UHF broadcasting band) and the potential reassignment of the 700MHz band (30% of the current broadcasting band - i.e. 470 to 790MHz), broadcasting could be left with just 57% of the spectrum available at the time of the Broadcasting Act 2009. An up to date rational approach needs to be taken to determine what can be practically expected from the remaining broadcast spectrum, irrespective of previous spectrum planning aspirations.

Mobile Broadband

We do not believe that there is currently a spectrum shortage in Ireland for mobile broadband, particularly with respect to rural broadband. If there is a perceived shortage, then the first step should be to fully exploit all existing mobile broadband spectrum with the most efficient technology available - including the 2.6GHz band, before reassessing and seeking spectrum in additional bands. Furthermore, 2RN believes that predicted growth in mobile broadband and in particular its future spectrum requirements is over-estimated. A detailed cost benefit analysis as described above will enable a greater and more realistic understanding of potential requirements here.

A key factor in determining future potential mobile broadband spectrum requirements is the degree to which wifi offload accounts for mobile data requirements, with current estimates that up to 80% of mobile data is already carried over wifi and not the mobile networks[4].

PMSE and White Space

UHF broadcasting enjoys a highly successful symbiotic relationship with PMSE which should not be undervalued. Production of broadcast content is increasingly dependent on wireless PMSE, the use of which continues to grow. It is important that PMSE requirements in UHF spectrum are taken into account when evaluating the options for the 700MHz band.

2RN would welcome the implementation of other white space applications in UHF spectrum, so long as sufficient safeguards are put in place (including additional resources to identify and mitigate intermittent and difficult to trace sources of

[4] Communications Chambers, UK - The value of Digital Terrestrial Television in an era of increasing demand for spectrum, Jan 2014.

interference) and they are used within the bounds of all relevant internationally agreed recommendations.

Comment on Chapter 6.2 - 700MHz band

The 700MHz band is currently in use for broadcasting. Migrating broadcasting from this band will affect viewers, the network operator (2RN) and the SAORVIEW platform, creating disruption and incurring costs. Migration costs and compensation will need to be considered as a key part of any analysis.

2RN estimates that a migration from the 700MHz band could affect up to 50% of potential viewers requiring many of them to change receiving equipment (in particular banded roof-top antennas). Since the implementation of mobile services in the 800MHz band SAORVIEW and 2RN have advised viewers to use banded or grouped roof-top antennas (in place of wideband antennas) for reception in the interests of interference avoidance.

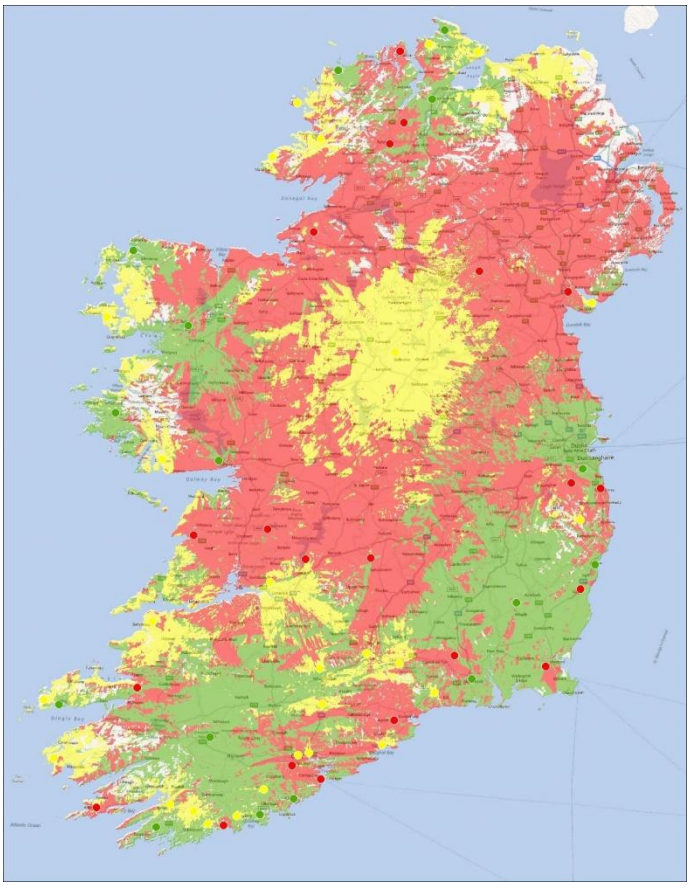

Figure 1 - Areas potentially impacted by 700MHz migration. Red = definite impact (33% households in Ireland), Yellow = likely impact (18%), Green = impact unlikely.

Similarly 2RN would have to alter or replace significant elements of our transmission infrastructure, including transmission equipment, antennas, and distribution equipment. In some cases it may be necessary to introduce additional transmission sites to repair coverage lost in the migration.

There would also be a cost associated with an information campaign to help viewers through what would most likely be a phased migration process. Costs associated with damage caused to the SAORVIEW brand may be more difficult to identify and resolve.

It is important that we would limit the potential extent of these costs through careful frequency planning and bilateral coordination with the UK resulting in minimum change. This type of optimised planning may result in slightly different assignments to a planning approach that seeks to optimise spectrum opportunity (at the cost of increased disruption).

While the benefits of economies of scale through harmonisation are clear in terms of equipment supply, it does not necessarily follow that there is a benefit in implementing the harmonised spectrum use if not needed.

Comment on Chapter 6.3 - The remainder of the UHF band

Demand for terrestrial broadcasting is expected to continue up until at least 2030[5] and it would be prudent to expect the DTT platform to grow to at least 3 national multiplexes within the medium term. Should the 700MHz band be reassigned, the DTT platform will require the full remaining UHF band; to co-exist with UK broadcasting use and continue to provide the same degree of low-cost national coverage.

Furthermore, notwithstanding any European harmonisation obligations, the remaining spectrum will be required to ensure that PMSE services are allowed to continue to successfully grow alongside DTT broadcast services.

2RN believes that it is too early to discuss alternative uses of the band at this point, without first identifying a potential move from the UHF band within national broadcasting policy. ComReg should only review spectrum management policy in this band at an appropriate time when instructed to by DCENR policy. Until then discussions of alternative future uses of the band serve only to create regulatory uncertainty which is damaging to the developing market. 2RN proposes that ComReg should support the removal of the 470 to 694 MHz spectrum band from the list of candidate bands for additional mobile spectrum allocations under WRC-15 agenda item 1.1 in any national or international preparations.

[5] Ofcom - "Securing long term benefits from scarce low frequency spectrum", November 2012.

2 eircom Group

eircom Group

Response to ComReg Consultation Paper:

Management and use of the UHF band in Ireland (470-790MHz)

ComReg Document 14/13

13 March 2014

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Response to Consultation

eircom welcomes the opportunity to respond to this consultation from ComReg in relation to the future management and use of the UHF band (470-790MHz).

Radio spectrum is a resource of huge economic importance for the Irish economy. Proper management of that resource is vital for both network operators and users to ensure that future access is administered in a manner that is open, transparent and above all efficient to the benefit of citizens.

We agree with ComReg[1] that "*Given its attractive propagation characteristics, 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*".

Operators require national regulatory authorities to provide a framework in which to allow for the provision and development of products and services. Such a framework is best delivered in a coordinated fashion across the European Union, ensuring that Ireland benefits to the maximum extent possible from the economies of scale generated by internationally harmonised use. We believe that such co-ordination should take place after international standards have been established and look forward to the outcome of WRC-15.

As highlighted by ComReg, the ITU has already identified spectrum within this band for International Mobile Telecommunications (IMT). This spectrum, 694-790MHz (the "700MHz band"), is of significant importance to the development and delivery of high quality mobile broadband services. The international decision making process is ongoing to establish harmonised rules for this band. The benefits of international harmonisation to Irish consumers cannot be overstated. eircom believes it is vitally important that every effort is made by Irish authorities to coordinate band plans and align assignments respecting the broader EU plans for this band. We believe that such co-ordination should take place after international standards have been established and not in advance of same in a speculative manner.

As such we fully agree with ComReg's view[2] "*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.*" In our view the harmonization and synchronization of Ireland's policy with that internationally on the 700MHz band will yield major societal benefits over and above the current use of the band.

In Ireland the UHF band is significantly under-utilised by current use for DTT. This is particularly the case because there is no market demand evident for commercial DTT services. This presents an opportunity for Ireland to easily re-plan the PSB DTT multiplexes and freeing up the 700MHz band, when EU policy is finalized, for IMT services. Steps should be taken to amend the Broadcasting Act to remove the redundant requirement to maintain a minimum of four multiplexes for the provision of commercial DTT.

As for the rest of the UHF band, eircom has no strong views on the future use of the band (470-690MHz) other than to note that with the ongoing international interest in this band, ComReg should exercise caution in its decision making not to foreclose the benefits of harmonized use.

[1] Para 1.2, ComReg 14/13
[2] Para A5.8, ComReg 14/13

3 Raidió Teilifís Éireann (“RTÉ”)

RTÉ RESPONSE TO

COMREG PRELIMINARY CONSULTATION

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

ComReg 14/13

12th March 2014

1. Introduction

RTÉ is the primary user of the UHF spectrum under consideration in this consultation, and has been investing in and delivering national public service television using UHF spectrum since the 1970s. Today, RTÉ's free to air Digital Terrestrial Television (DTT) platform SAORVIEW is delivered exclusively over UHF spectrum and is entirely dependent on it. DTT in the UHF band provides universal, free to air access to public service media services that seek to inform, educate and entertain Irish citizens, and contributes significantly to media pluralism.

SAORVIEW can be received in over 98% of Irish Households and by some 56% of households in Northern Ireland[1]. About 96% of all households on the island of Ireland are able to access Irish television via DTT[2] without a contract, subscription or monthly bill. SAORVIEW makes Irish language programming available without subscription to more households than ever before.

SAORVIEW is already a huge success. In less than 18 months since the analogue switch off in October 2012 SAORVIEW has been adopted by 39% of Irish households[3] and continues to grow as retailers are reporting continued, good sales of SAORVIEW equipment. The SAORVIEW offering continues to develop : RTÉ One HD launched on SAORVIEW in December 2013 and the SAORVIEW PLUS digital recorder was launched last year. SAORVIEW is easily available alongside free to air UK services, providing a compelling and competitive high quality / low cost alternative means of multichannel TV delivery that is attractive to viewers.

The DTT platform represents a unique combination of characteristics such as technical excellence and efficiency, favourable coverage and support of services, flexibility, market success and wide acceptance by industry as well as by the public in most European countries. DTT plays an important role in inter-platform competition ensuring plurality of platform ownership, helping drive innovation in pay platforms, and contributing to competition in broadband markets which are increasingly offering bundled TV services.

As such the UHF spectrum currently used by broadcasting is a matter of national cultural, social, and economic importance. If political and regulatory decisions are taken to gradually weaken the position of the digital terrestrial network by limiting spectrum access, services will eventually deteriorate. Furthermore, barriers to the launch of new services on DTT such as HDTV and UHDTV will further weaken the attractiveness of the platform and potentially drive consumers and broadcasters to alternative forms of distribution. This in turn will provide reduced competition and increased control for fully commercial entities over the remaining distribution platforms for radio and television in Ireland. Ultimately, this may lead to an outcome where there is no longer a simple and low cost solution for TV distribution such as terrestrial broadcasting on which Irish citizens currently depend - this would be clear evidence of a regulatory failure.

[1] Ofcom Digital Switchover Factsheet 4, June 2012
[2] Combined coverage from SAORVIEW in Ireland and Northern Ireland and Irish services (RTÉ One, RTÉ Two, and TG4) available on Freeview in Northern Ireland.
[3] 620,000 Irish DTT households, Nielsen, January 2014. Of those 161,000 are SAORVIEW only homes.

Any discussion and decision making relating to the future use of UHF broadcasting spectrum should be led by the DCENR as a matter of national broadcasting and spectrum policy. Notwithstanding this, RTÉ welcomes the opportunity to contribute to what will hopefully be a fact based dialogue, which could avert the onset of any regulatory uncertainty concerning the future of free to air television services in Ireland.

RTÉ believes that the following key items need to be addressed before any meaningful discussion can begin on the future use of UHF spectrum:

- A detailed cost benefit analysis is required regarding the 700MHz band; taking account of the costs to viewers and broadcasters alike for changing spectrum use, and taking a close look at the incremental benefit to mobile broadband markets of adding this band.

- Disruption and costs for existing viewers and network operators will be a key component to any further spectrum migration. RTÉ notes that there is no precedent for direct compensation (with respect to broadcasting services). Therefore we believe that consideration of a potential compensation mechanism - as provided for by the RSPP[4] - needs to be given high priority during early considerations of any potential migration of broadcast services in Ireland.

The remainder of this document contains comments and observations on ComReg's preliminary consultation text (ComReg 14/13) with reference to the paragraph numbers. RTÉ looks forward to an open dialogue on this essential national resource.

2. Comments on Chapter 1 - Executive Summary

1.1 - When considering any apparent inherent limitations of spectrum usage, or when evaluating potential spectrum shortages (e.g. as currently perceived with respect to future mobile broadband services) it is important to recognise that by far the most effective way to increase spectrum efficiency is for greater frequency reuse (i.e. smaller cell sizes)[5]. With modern wireless systems the ability to reuse spectrum in this way is primarily limited by economics. The benefits of feeding such problems with more spectrum are temporary - the displacement of an existing system is permanent.

1.2 - The notion that sub-1GHz spectrum has "attractive propagation characteristics" is often expressed when looking at UHF use. While this is clearly true for the most part, it needs some additional context with respect to mobile broadband use (or single frequency broadcast networks use). In a dense cellular environment with scarce spectrum availability this property is also a disadvantage, limiting network coverage though unwanted self-interference. Ultimately

[4] As allowed for under the RSPP - Articles 5 and 18.

[5] See the following articles for an interesting alternative perspective on the utility of spectrum: "The Myth of Spectrum Scarcity", Martin Cooper, 2010, & http://www.arraycomm.com/technology/coopers-law/

the long term future of very high capacity short range mobile broadband will be in higher frequency bands allowing greater frequency reuse (the advantage of it not propagating so far) and greater capacity.

Note also that in addition to its other bands mobile/mobile broadband already occupies over 30% of the sub-1GHz spectrum from 470MHz (i.e. 470 MHz to 1GHz).

1.3 - For balance it is worth noting that the extensive studies being carried out in Europe and elsewhere in preparation for the 700MHz band allocation are also considering the potential problems - and how to mitigate them - that this will cause incumbent users.

1.7 - RTÉ believes that any further action by ComReg with respect to the future use of broadcast spectrum should be informed by and set against a clear policy framework from Government. ComReg should await the conclusion of the DCENR's current UHF spectrum policy review before proceeding further with any consultation work which could inadvertently influence how future broadcasting spectrum policy is implemented. We think that open face to face engagement with stakeholders would be more suitable at this stage preventing any unintended positions from forming. RTÉ would welcome the opportunity to participate in any such initiative. As an interested party we believe this would be a more effective form of engagement at a preliminary stage saving us time and effort, and helping all parties to better understand and deal with the consequences of any potential changes.

RTÉ suggests the appropriate next steps should include:

- A review of the DCENR policy framework under development, regarding broadcasting and UHF spectrum.

- Carry out a detailed Cost Benefit Analysis with respect to the 700MHz band, taking full account of the social and cultural aspects of free to air (FTA) DTT in the UHF band, the incremental benefit of allocating this additional spectrum to mobile broadband in Ireland, the opportunity cost of disrupting and reducing spectrum access to an emerging service, and in consultation with industry. This will enable ComReg to consider the most appropriate way to implement any updated policy decisions from DCENR regarding the 700MHz band in due course.

- Proceed with open dialogue on a face to face basis, for example through workshops or meetings.

- Give consideration to a compensation mechanism should any migration of the 700MHz band be required in Ireland.

- Issue a statement of regulatory certainty regarding the continued use of the 470 to 694MHz band for broadcasting, reflecting any updated DCENR policy as necessary.

3. Comments on Chapter 2 - Introduction

2.2 - Regulation must also provide certainty for existing users to allow continued investment and development of services.

2.5 - Although it may be likely, it is worth pointing out in this section that the European Commission has not yet made a decision on whether the 700MHz band should be implemented in Europe. Important issues regarding the safeguarding of terrestrial broadcasting and compensation for migration are continuing to emerge during this preliminary stage.

2.7 - It is worth noting that consideration of sharing studies so far has resulted in much contention, and the concept is not considered to be practicable by broadcasters.

2.8 - It is also worth noting the ECs workstream on convergence "Challenges and opportunities of broadcast-broadband convergence and its impact on spectrum and network use"

2.10 - Early consideration of the potential issues, once guidance is given by the DCENR, also allows ComReg to develop its implementation of policy in such a way as to minimise any potential disruption to existing users of broadcasting spectrum.

4. Comments on Chapter 3 - Background on the UHF Band

3.4, 3.5 & 3.11 - Although it is covered later (Chapter 4), the Geneva 2006 Regional treaty, of which Ireland is a signatory, needs to be referenced at this point. It is important to note that the rights of signatories to the treaty must be respected while the treaty is still active, irrespective of a World Radio Conference.

5. Comments on Chapter 4 - Ireland's current use of the UHF (470-790 MHz) band

4.3 & elsewhere - Note that since December 2013 the SAORVIEW platform consists of 2 HD services (RTÉ One HD, RTÉ Two HD) and 6 SD services (TV3, TG4, RTÉ News Now, RTÉ Jr, 3e and RTÉ One +1) together with nine radio services[6] and Digital Aertel. SAORVIEW is now in 39% of all TV homes, which is 620,000 homes (Nielsen, January 2014).

4.8 - While there is provision for up to 9 DTT multiplexes in the 800MHz Clearance Plan, it is important to recognise that this does not represent 9 equal layers. In particular it would be incorrect for any readers to assert that the DTT platform in Ireland currently uses only 2/9ths of the 470 to790MHz band. Any practical implementation of the 800MHz Clearance Plan could result in 2 layers with a high level of similar national coverage (up to 98%), 4 layers of broadly similar near national coverage (but somewhat less than 98%), and a further 3 layers of reduced coverage. Practical implementations of more than the 2 initial layers would have implications for the potential coverage of each of the layers, and their use would impact existing viewers. This

[6] RTÉ Radio 1, RTÉ 2FM, RTÉ Lyric FM, RTÉ Raidió na Gaeltachta, RTÉ Radio 1 Extra, RTÉ 2XM, RTÉ jr, RTÉ Gold, and RTÉ Pulse

is an important point as it highlights the extensive interdependencies and compromises within the 800MHz Clearance Plan, and that the unused layers do not represent exclusive and separate clean spectrum.

4.22 - With reference to figure 2, it should be noted that almost all of the spectrum planned in the UHF band is currently in use in some part (and often substantial parts) of Ireland by the SAORVIEW network alone. In other cases the unused spectrum is not available for use (notably in highly populated areas along the east coast) due to usage in the UK. Furthermore, with respect to our comments on section 4.8 above, it could be confusing for some readers to present all not-licenced channels with equal status, and gives an impression of a greater availability of spectrum than exists in practice.

4.27 - Note that the use of multiple PMSE devices in a single location cannot typically be operated in adjacent and contiguous 200kHz blocks of spectrum. Significantly more spectrum is needed to prevent unwanted interference between devices. RTÉ continues to effectively manage its growing use of PMSE devices alongside DTT within the ComReg licensing scheme following the 800MHz clearance.

6. Comments on Chapter 5 - Potential future uses of the UHF band

5.2 - While some services can indeed share spectrum when carefully planned (e.g. DTT and PMSE), other services are not compatible. Sharing between broadcasting and mobile broadband is not possible within the same band without complicated, and most likely inefficient, geographical separation.

5.4 - See comment on section 4.8

5.9 - Note that many Irish DTT homes avail of free to air UK services, either from UK Freeview or satellite (e.g. using combi boxes), and these are additional to the 10% of homes who have SAORVIEW only.

5.19 to 5.23 - An important factor in determining future demand for DTT services is the fact that consumption of linear TV is growing. In 2012 the average European consumed 3 hours and 55 minutes per day of scheduled linear television content, 7 minutes more than in 2011[7]. While on demand TV viewing is also growing it is not expected to reach the levels of linear TV consumption before 2020 at least, and is not expected to have a significant eroding effect on linear TV consumption:

[7] Médiamétrie - Eurodata TV Worldwide - One Television Year in the World - Edition 2013, www.mediametrie.com/eurodatatv/communiques/one-tv-year-in-the-workd-2012-or-the-multiple-tv-experience.php?id=831

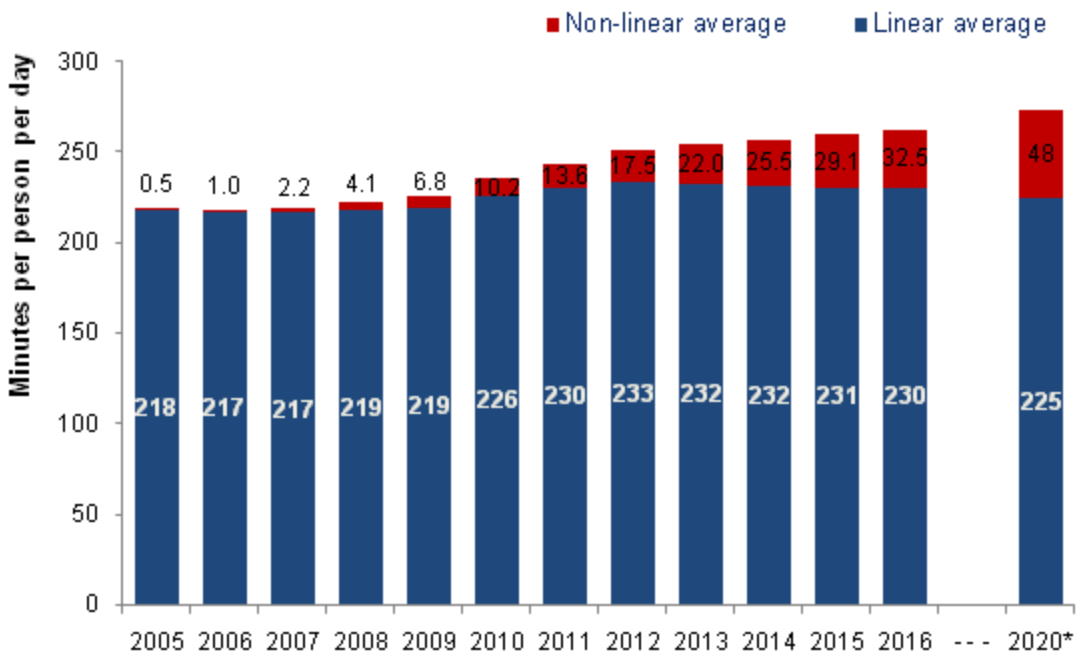

Figure 1 - Evolution of TV viewing in Germany, France, Italy, Spain and the UK. Source: IHS - Screen Digest: Cross-platform Television Viewing Time FY 2012 with *2020 forecast by EBU.

Recent research from the UK for 2013 found that 98.5% of total viewing is still carried out via the TV set, with the remaining 1.5% on alternative screens such as laptop and tables[8].

In Ireland last year, TAM Ireland reports that adult viewers watched television for an average 3 hours 28 minutes every day, of which 91% of that accounts for viewing of live TV[9].

5.22 - The case for convergence between DTT and LTE is not yet proven.

5.25 - It is also worth noting that the 2009 Act was written at a time when there was up to 390MHz of spectrum available to Broadcasting (470 - 862MHz). A potential broadcasting band consisting of 470 to 694MHz is significantly smaller and can therefore support fewer high quality broadcast services, particularly in the likely event that more intensive use of the spectrum is required in the UK.

5.27 & 5.28 - As a vital component of programme making PMSE use is growing both in studios and at outside events. Manufacturers and users expect PMSE use to continue to grow by 5% annually in the period up to 2019[10]. RTÉ currently uses a total of over 24 MHz of spectrum for PMSE throughout the entire 470 to 790MHz band (in non-contiguous blocks), with over 130 devices in Donnybrook alone[11]. This is a good indication that PMSE is successfully able to

[8] Thinkbox, February 2014
[9] http://www.tamireland.ie/node/381
[10] ECC Report 204, Feb 2014
[11] The production of TV shows such as “The Late Late Show” can require up to 50 RF devices alone,

share spectrum with broadcasting with the current levels of spectrum availability, without any PMSE specific harmonisation measures.

The impact of a reduced band size on spectrum congestion should not be underestimated as it can disproportionately affect the availability of useable spectrum. One study of the potential impact that reassigning the 700MHz band would have had on the Eurovision Song Contest 2011 (Düsseldorf, Germany) found that less than 50% of the required PMSE equipment would be useable in a more congested post 700MHz environment12. This could similarly apply to opportunities for other white space applications.

5.31 to 5.37 - In the interests of a balanced document, the section on Mobile broadband services should include an equivalent national and European analysis of the take-up and implementation of LTE, similar to the section on Broadcasting.

5.32 - The important role played by wifi offload on mobile broadband devices is highly significant for mobile broadband spectrum demand. Naturally predictions vary. Ofcom commissioned research by Real Wireless that estimated that wifi (and femtocell) offload could grow from 40% (current in 2012) to between 45 and 60% by 2030[13]. Other research estimates that wifi offload already accounts for 50%[14] to over 80%[15] of data from mobile devices. Currently three-quarters of tablets are wifi only, with no mobile connectivity[16].

Cross referencing the Cisco forecasts for mobile data traffic with respect to the delivery of linear TV via DTT in Europe gives some additional perspective to the figures, and the scale of the value currently being delivered by DTT services in UHF spectrum:

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which must co-exist throughout the day long production with production in adjacent studios.

[12] ITU-R Draft Report 4-5-6-7/523-E, February 2014

[13] Techniques for increasing the capacity of wireless broadband networks: UK, 2012 - 2030, Real Wireless, April 2012

[14] Mobile Devices to Generate Data Traffic Equivalent to 42 Quadrillion Tweets by 2017, at Over 90,000 PB, Juniper Research, April 2013

[15] "The value of Digital Terrestrial Television in an era of increasing demand for spectrum", Rob Kenny, Robin Foster & Tim Suter, Communications Chambers, UK, January 2014.

[16] Ibid

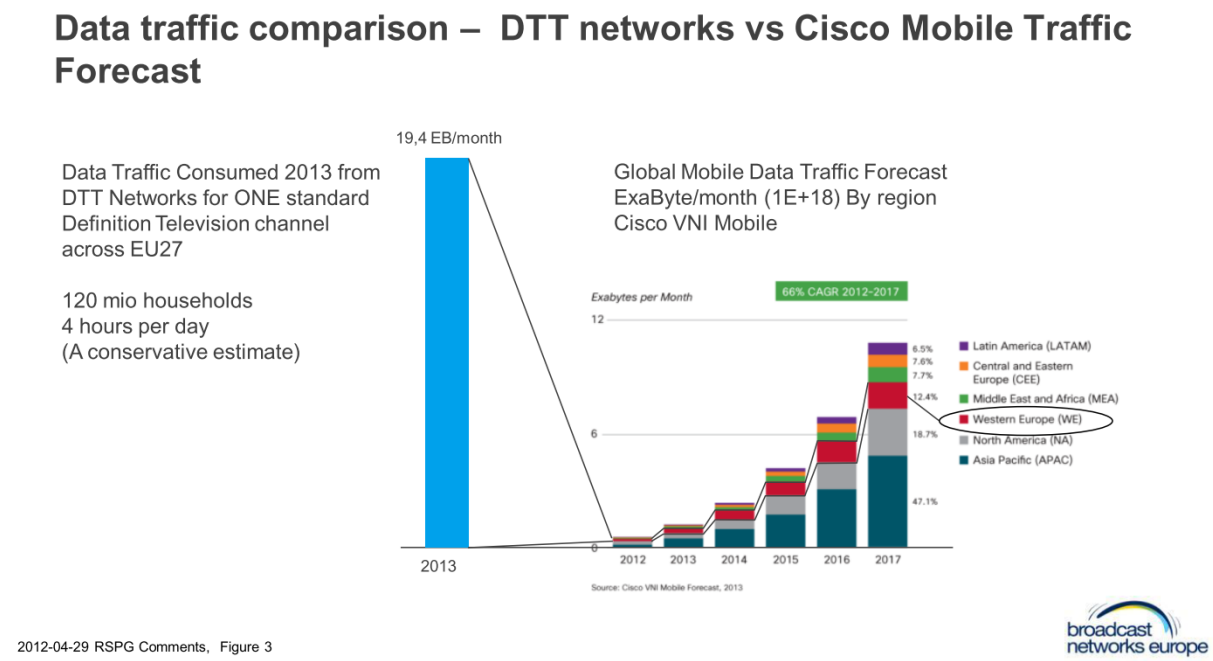


Figure 2 - Source: Broadcast Networks Europe (augmenting Cisco VNI Mobile Forecast, Feb 2013)[17]

Furthermore, it should be noted that sustainable dramatic mobile growth rates are not universally accepted trends; Analysys Mason has estimated that year on year growth rates, while still high, are falling[18].

Developments in the area of net neutrality - currently under consideration by the European Commission - and network peering costs need to be factored into any future analysis of video traffic on mobile broadband networks, noting an emerging trend in the US where video content providers (e.g. Netflix) must pay for their IP network transit costs[19].

5.35 - Care is needed when considering the potential capabilities of LTE systems, particularly in terms of their potential to deliver high quality linear TV services comparable to DTT services. For example, not all aspects of the scenario presented in footnote 77 are possible in a practical network using any of the current LTE systems under development.

5.36 - Other bands (which are available internationally) need to be made available for mobile broadband and occupied first, before considering disrupting national FTA broadcasting (e.g. 2.6GHz).

[17] Response to the consultation on the "Draft RSPG Opinion on Strategic Challenges facing Europe in addressing the Growing Spectrum Demand for Wireless Broadband.", Broadcast Networks Europe, May 2013

[18] The collapse in the value of the mobile gigabyte: Myth and Reality, Analysis Mason, 2012

[19] http://www.washingtonpost.com/blogs/the-switch/wp/2014/02/23/comcasts-deal-with-netflix-makes-network-neutrality-obsolete/

5.42 - Note that the RSPG identification of 1701.5MHz significantly exceeded the requested intermediate requirement of 1200MHz in the RSPP.

7. Comments on Chapter 6 - Preliminary Consultation Issue: Management and use of the UHF band in Ireland

Future demand for particular uses of spectrum in the UHF band

6.3 - See individual comments on chapter 5 above.

Continued access to high quality UHF spectrum is required to maintain a strong, appealing, relevant and competitive FTA broadcasting platform in Ireland. Limiting access to spectrum will cause disruption and incur costs for users and broadcasters alike, which will ultimately devalue the SAORVIEW platform as both the primary FTA TV delivery platform in Ireland and an important element in inter-platform competition.

Demand is not yet proven for further spectrum for other uses such as mobile broadband, particularly in Ireland. The incremental benefits of the 700MHz band for the mobile industry must be assessed against the costs of migration for the incumbent users and the public. Significant difficulties associated with a possible release of the 700MHz band from the current use must be addressed before such a release is considered.

6.4 - Regarding any other potential uses of the band it should be noted that any such uses must be considered within the context of the Geneva 2006 Treaty of which Ireland is a signatory.

700 MHz Band

6.9 - A full and detailed cost benefit analysis is needed before any useful discussion can take place on the future use of the 700MHz band. The terms of reference for the cost benefit analysis should be open to input from industry and needs to include:

- Demand for Broadcasting Spectrum
- Realistic demand for Mobile Broadband Spectrum (including a review of current spectrum use and potential increases of efficiency within)
- Social, cultural and economic benefits of the services being considered including public service broadcasting
- Different implementation options including a least disruptive model for broadcast users
- Migration costs for viewers, network operators and broadcasters
- Protection of broadcasting in adjacent spectrum
- Compensation for existing users

Notwithstanding any EU mandate on timing, any implementation of the 700MHz band should only be introduced when the incremental benefits are proven and all migration issues and costs adequately resolved. If the band is to be released in the medium term, migration needs to be

coordinated with the UK. The transition is likely to take some time to minimise disruption to viewers in Ireland and UK, and to facilitate network infrastructure changes.

Remainder of the UHF Band

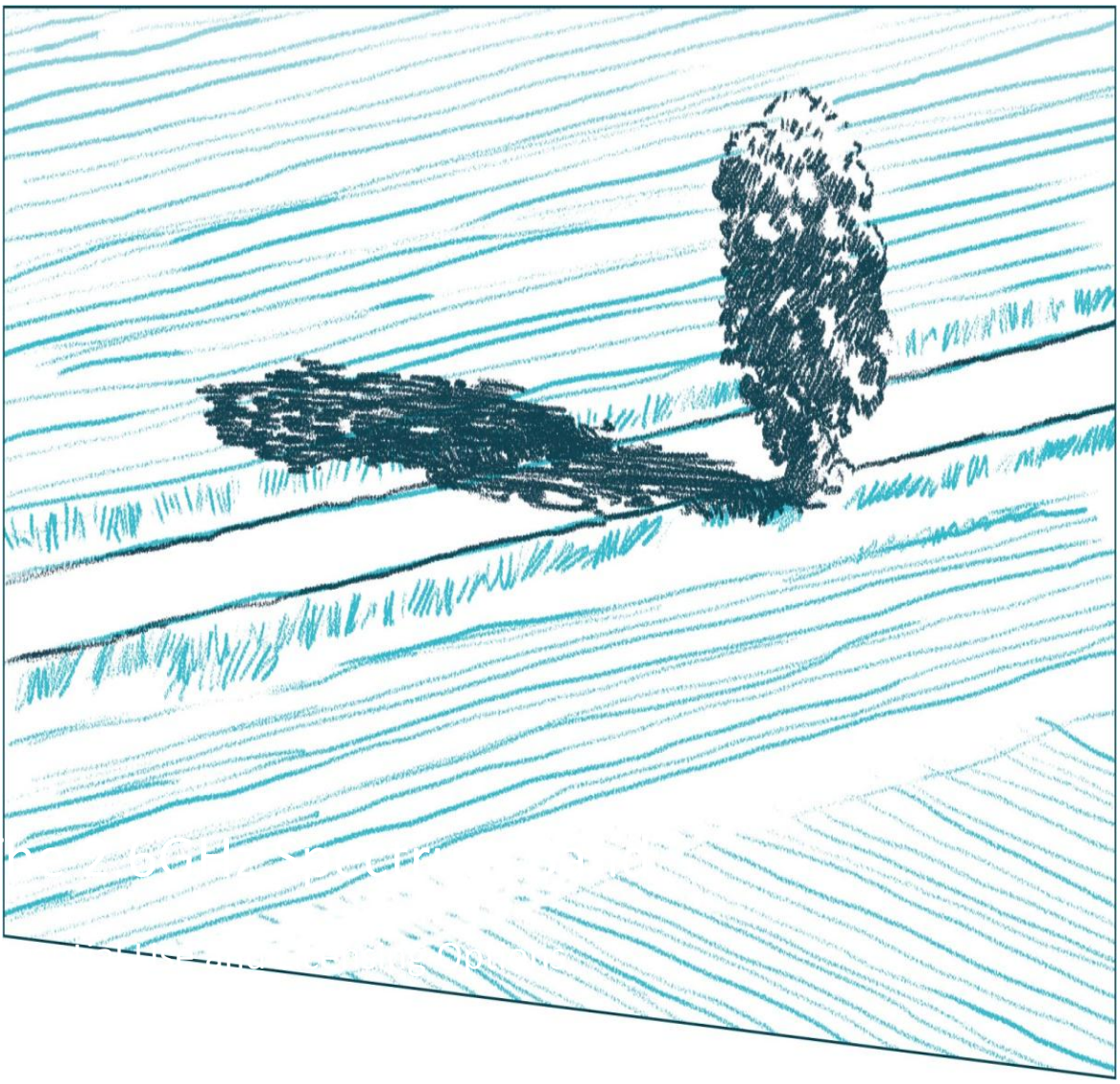
6.13 - The remainder of the UHF band (470 to 694MHz) is required for terrestrial TV until at least 2030 and possibly beyond. In the UK, where UHF spectrum use is closely linked with Ireland, Ofcom has stated that DTT is expected to require access to UHF spectrum until at least 2030[20]. Strong indications of regulatory certainty are needed to encourage continued investment and development of the SAORVIEW platform within this remaining band should the 700MHz band be implemented for mobile broadband in Ireland.

It is too early, and inappropriate, to explore migration considerations and costs for the rest of the band at this point. No directly comparable substitutes are currently available or under development for the delivery of FTA national TV. All potential alternative platforms have associated shortcomings in terms of offering true FTA, easily accessible, nationally owned access to Public Service TV.

Unless instructed to by DCENR (e.g. via a change in broadcast policy), significant usage changes in the remainder of the UHF band (470 to 694MHz) should not be considered until a later date, and this should be clearly indicated by ComReg to provide regulatory certainty.

[20] Securing long term benefits from scarce low frequency spectrum, Ofcom, November 2012.

4 Telefónica



UHF Band 470 – 790MHz

Response to Document 14/13

14th March 2014

Telefónica

Introduction

Telefonica Ireland (O2) welcomes ComReg's decision to consult on the future of the UHF band (470MHz – 790MHz). As explained below, O2 believes this band is particularly important in Ireland, and as it would seem that there will be significant changes to the use of the band in the next few years, it is important that ComReg has begun consideration of the issues now.

There is a growing momentum behind repurposing of the band 694MHz - 790MHz from broadcasting to mobile broadband access right across Europe and in ITU Region 1. It would now seem to be inevitable that the above band will be recovered from its current use and re-allocated in Region 1, with only questions around technical implementation and timing to be resolved. This repurposing will require considerable time for planning and implementation, and Ireland will not want to be left behind. For this reason, we should have clarity of policy in relation to whether the spectrum will be re-allocated in Ireland, what band, and the timing as soon as is possible. There might be a need for legislative change, broadcast network re-planning, network implementation, and an allocation process/auction before the spectrum is ready for re-use. Each of these will take considerable time to complete and so the work begun by ComReg should now continue so as to avoid Ireland being behind its peers and competing countries in availability of mobile broadband services.

Significance of Wireless Broadband

Wireless access has played a significant role in broadband service in Ireland for several years, and currently accounts for 34% of subscriptions. We can speculate as to the reasons for this, but the delayed roll-out of DSL initially gave rise to an un-met demand for broadband access which was initially met by fixed/nomadic wireless access, and later by mobile broadband dongles. The population distribution outside of cities in Ireland, and the condition of the copper access network may have contributed to this gap, but whatever the reason it is clear that wireless access has played a significant role in the provision of broadband access since the services were made available, and continues to do so.

Over and above broadband access, we have seen explosive growth in the use of data on smartphones in the past year. Data throughput on O2's network has grown by almost 60% in the second half of 2013, and this is consistent with both reported historical growth and forecast growth from various sources. Cisco's Visual Networking Index[1] states that in 2013 more than 50% of video data traffic has been carried on mobile networks for the first time. A significant part of this data can be attributed to the growing penetration of smartphones and use of applications tailored to run on those smartphones. It is now the case that the internet is no longer something to be used at specific locations or at certain times. Consumers use the internet as a matter of course throughout their day to day lives, and behaviour has changed accordingly. We would expect this trend to continue for a number of years to come, bringing more innovation and opportunity.

[1] http://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/white_paper_c11-520862.html

Forecast Growth in Throughput

As stated above, O2 has seen rapid growth in data throughput over the past couple of years, but this was accentuated in the last six months of 2013. At this time, we would expect the general pattern to continue, though it is difficult to be precise about how long it will continue and at what rate. There are a number of forecasts available, including those referred to by ComReg in the consultation document. The growth in throughput is due to multiple factors, including increased penetration of smartphones and higher peak-data rates at the access level but also changing consumer behaviour, whereby the internet is used more often and for more data per session. It has already moved away from just being used at static access points, and there is no sign of a change to this trend.

A number of reference sources including Ericsson[2], Neilson[3], Red Mobile[4], and Cisco would indicate that data throughput is doubling annually, and this would seem to be consistent with O2's recent experience. In addition, in November 2013, Qualcomm has published a paper that refers to a 1000X increase in data throughput. While they don't predict when this will happen, if we had a doubling of throughput each year for 10 years, then this would equate to a 1,000 fold increase over that period. Whatever the growth actually experienced over the next few years, it is generally accepted that the current general pattern will continue, and that networks will need to be able to expand to meet this demand.

Demand for Mobile Broadband Spectrum

Policymakers, operators, and manufacturers across the globe are currently struggling to predict how the above mentioned growth in mobile network throughput can be satisfied. Some governments have already decided to allocate more spectrum, including the USA, which decided in 2010 to make an additional 500 MHz of spectrum available. The GSMA requested consultants Coleago to prepare a report on demand for spectrum as an input to the ITU planning process. The final report was issued in 2013[5] and concludes that about 2GHz of spectrum will be needed to meet demand from mobile networks. As ComReg has pointed out, the NITA in Denmark asked Analysys Mason carry out a study as part of their consideration of a target to reach "100Mb/s Everywhere", which concluded that 1,700MHz of spectrum would be needed for broadband access by 2025, leaving a 600MHz shortfall.

In Ireland, demand for high frequency spectrum might be less pronounced than is the case in more urbanised countries, however just as is the case in other EU countries, there is a predictable requirement for more spectrum to be allocated to wireless broadband services in the coming few years. Given the relatively low population density, the advantages of access to lower frequency spectrum are more pronounced here, and so the UHF band will play a more important role in broadband access here than in many other EU countries. For this reason, we believe ComReg will

[2] http://www.ericsson.com/news/1561267

[3] http://www.nielsen.com/us/en/newswire/2011/average-u-s-smartphone-data-usage-up-89-as-cost-per-mb-goes-down-46.html

[4] http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf10253.html

[5] http://www.gsma.com/spectrum/wp-content/uploads/2014/01/Coleago-Report-on-Spectrum-Demand-Model-Results..pdf

need to progress the release of additional UHF spectrum for broadband access in the short to medium term.

As a minimum, Ireland (through the Minister for Communications and ComReg) should support the allocation of the band from 694MHz – 790MHz to mobile on a co-primary basis under agenda item 1.2 of WRC-15. ComReg should, in parallel progress the practical measures that would be required to make the spectrum available for mobile broadband from 2019. In addition, Ireland should support the allocation of the full band from 470MHz – 694MHz to mobile on a co-primary basis under WRC-15 agenda item 1.1. This does not necessarily mean that the full band would be repurposed in the short term, but allows the future option to do so, if it is decided that that is most beneficial.

Changing Broadcasting Landscape

While we expect that the broadcasters will put forward the most informed analysis of their future need for UHF spectrum, there are some observations that are worth noting. The traditional model of a broadcaster transmitting audio-visual content in real-time over a terrestrial wireless network is no longer representative of how content is consumed today. In the first place, broadcasters today must compete with content providers who never existed in the traditional form, and include the likes of Netflix, AerTV, Youtube, and Facebook. In addition, most broadcasters now have an online player of their own like the RTE Player. Considering only content delivered by broadcast, Saorview is the primary method of reception for just over 10% of Irish TV consumers. At the same time, with the addition of new formats, the RTE player continues to grow its users with a 35% growth in usage over the past two years and gaining 330,000 users in the past six months[6]. The use of UHF spectrum for broadcasting is of diminishing importance as a means to deliver audio-visual content generally and this is the case even for traditional broadcasters such as RTE. The UK's Entertainment Retailers Association has recently revealed that "Access models" including streaming services for video (Netflix, Lovefilm) and music (Spotify, Deezer) and in-app purchases for games (Angry Birds, Moshi Monsters) have grown their share of entertainment revenues to 26% in 2013[7].

In Ireland, we currently have only two operational multiplexes, and it would seem that there is little likelihood of demand emerging for additional muxes. Other EU countries that propose to repurpose UHF spectrum for broadband access typically plan to do so while maintaining up to 6 muxes on the UHF band. In addition, there is potential for future spectrum demand for at least two muxes to be met using VHF band III, further easing the overall requirement to use UHF for broadcasting.

Given that there will not be a demand for 9 DTT multiplexes, section 132 of the Broadcasting Act 2009 should be reviewed so as to ensure ComReg has greater flexibility to allocate spectrum as required by changing demand.

[6] http://www.rte.ie/blogs/digital/2014/02/13/the-growth-of-video-on-demand/
[7] http://www.eraltd.org/news/era-news/streaming-and-access-services-scoop-a-quarter-of-the-entertainment-market.aspx

Practical Considerations

While O2 believes there will be a requirement to release UHF spectrum for broadband access in the next few years, we also recognise that there are many practical challenges to be considered. We recognise that the release of 800MHz spectrum occurred coincident with analogue switch-off. This shift in delivery method meant networks and consumers were going through a transition already, and the "compression" of the transmission plan could be carried out with relatively little extra effort. Future releases of UHF spectrum will need a revised broadcast transmission plan (coordinated internationally), the existing transmission network will need to be re-tuned, also requiring consumers to update their receiver settings with appropriate information campaigns.

When 800MHz was being initially rolled out for LTE service, there was concern that TV reception would be impacted. So far that concern has proven to be unfounded. One difference that arises in the 700MHz band is that the segments of spectrum used for uplink and downlink are reversed. This might have an impact, however it is not unique to Ireland, and will be taken into consideration in developing standardised bandplans and equipment specifications. O2 does not expect any compatibility issues to arise between wireless broadband and cable TV services, so long as the CATV networks are adequately screened.

Given that the UK is likely to proceed to release spectrum in the band 694MHz - 790MHz, and that the UK is our nearest neighbour, ComReg should now re-plan the UHF band to provide for DTT and mobile broadband to ensure that the new plans can be coordinated with Ofcom, while they develop their own plans.

O2 believes that the whole of the usable spectrum in the 700MHz band should be made available through an open, transparent process. Licences granted should be issued as service as well as technology neutral.

Timing

Any process to re-purpose spectrum will take a number of years from planning to implementation. While we are fortunate that mobile networks are not capacity constrained at the moment, it is necessary to start the process now to ensure the spectrum will be available when needed. The expiry of current DTT licences in 2019 provides a final "backstop" as it will be necessary to have completed a re-licensing process before then. However it would make no sense to have licences change significantly or expire at short notice, and O2 believes at least 2 years notice of a change to spectrum assignments might be required. We already know that it can take a couple of years to complete an auction or other allocation process, so ComReg is right to begin the process now with this consultation document, and aim to have the assignment process completed in 2016.

PMSE, White Spaces, PPS

O2 recognises the requirement for spectrum to be made available for programme making and special events. This requirement will be replicated in every country that plans to release UHF spectrum, and we should, if possible adopt any standardised approach. The nature of use of PMSE would tend to be more compatible with the use of white spaces that many other services.

Regarding Public Protection and Disaster Relief, there is no need for the ITU or EU to identify harmonised spectrum *exclusively* for PPDR within the 700MHz band – other bands will be needed and the 700MHz band will be important for the future needs of a wide variety of mobile and mobile broadband users. Although the 700MHz band can be expected to form part of the future network resources that MNOs will use to meet PPDR requirements, it is also worth noting that the band below 470MHz and other spectrum bands can provide significant capacity to meet many PPDR requirements.

5 UPC Communications Ireland Limited (“UPC”).

UPC Ireland Response to: ComReg 14/13 Management and use of the UHF radio frequency band in Ireland.

UPC Communications Ireland Limited ("UPC") welcomes the opportunity to provide its response to ComReg on its Consultation ("the consultation") on the Management and use of the UHF radio frequency band in Ireland.

This is an important issue for UPC Ireland, particularly as the UPC Ireland network has spectrum in this band which is currently in use or enabled for future use. Furthermore, given the fundamental importance to the national economy of high speed fixed broadband services as provided by UPC Ireland, disruption that might be caused to that service by the use of this spectrum for LTE is likely to have a profound impact.

Table 1: Confidential

In the near future, both the 700MHz and 800MHz bands will likely be used by Mobile Network Operators (MNO's) to offer Long Term Evolution (LTE) data and broadband services. Given the overlapping use of 700MHz and 800MHz frequency bands by both Mobile and Cable operators, an issue arises that significantly threatens the quality of services enjoyed by UPC Irelands customers. If the mobile network LTE signals penetrate cables in the UPC network, this can lead to significant disruption and degradation in service quality for our TV and Broadband customers.

In certain circumstances where the UPC Ireland network is fully compliant with ComReg document 98/66R2 – "Conditions for the operation of a Digital Cable Relay Network under an Authorisation", it will be possible for high strength, near-field LTE interference to cause disruption to Digital TV and DOCSIS broadband services.

A number of studies have outlined the impact of LTE on Hybrid Fibre Coaxial (HFC) networks, however these were mainly laboratory based tests. Further to these studies, UPC Ireland's sister company in The Netherlands conducted a study to understand the impact of LTE handsets on a typical cable household.

In the ✂Netherlands study, most of the service disruption was attributable to harmful interference from uplink transmission of LTE handsets within customer homes. Due to similarities in construction and environment, is likely that the levels of service disruption within UPC Ireland customer homes will be similar to those measured in the Netherlands.

Further, there is also likely to be an additional level of harmful interference for UPC Ireland on the cable distribution network (including the "cable drop") outside the home, since it is mainly delivered using overhead construction (as opposed to The Netherlands where the distribution network is mainly underground). Consequently it is reasonable to expect that the overall negative impact of LTE services on UPC Ireland DTV and Broadband services may be even higher than that measured by ✂ in the Netherlands.

Given the extent of the potential issues outlined above that may impact on Irish consumers and the significant cost of rectifying those issues, UPC Ireland believes it is imperative that ComReg ensures that appropriate specific conditions are included in any future 700MHz licences. These conditions should be aimed at ensuring spectrum coexistence measures, i.e. (full coordination with current radio and non-radio, licensed and non-licenses users of the UHF band (incl. 700 Mhz)), minimising harmful interference with other networks and requiring rectification of any harmful interference in a timely manner.

UPC Ireland believes there is significant legal and regulatory basis to support the imposition of such licence conditions on future use of the 700MHz band, namely

- The Spectrum Policy Statement issued by the Department of Communications Energy and Natural Resources in September 2010. Policy Direction No.11 on the Management of the Radio Frequency Spectrum. 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.

- Regulation 17(3) of the Framework Regulations 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 ……..

- 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 which includes; - Technical and operational conditions necessary for the avoidance of harmful interference …….

In addition, UPC Ireland requests ComReg to implement a model similar to that in the Netherlands for resolution of harmful LTE interference issues on all UHF bands, including both 700MHz and 800MHz bands. In the Netherlands, the Economics Ministry facilitated an agreement between cable and mobile network operators which defined the conditions under which the operators would work together to address any potential impact on each other's services that might arise due to harmful interference within the UHF bands.

UPC Ireland believes that a similar agreement should be put in place within the Irish market, with the key pillars of that agreement being:

In summary, UPC Ireland requests ComReg to;

1. Ensure that appropriate specific coexistence usage conditions with current radio and non-radio, licensed and non-licensed users of the UHF band are included in future 700MHz (and UHF) licences. These conditions should be aimed at minimising harmful interference with current UHF band spectrum users and rectifying any problems that occur in a timely manner.

2. Implement a model similar to that in the Netherlands for UHF spectrum coexistence and resolution of harmful LTE interference issues on both 700MHz and 800MHz bands.

UPC Ireland is happy to meet with ComReg and elaborate further on this matter as and when appropriate.