everything everywhere™

Securing long term benefits from scarce spectrum resources - a strategy for UHF bands IV and V

Everything Everywhere response to Ofcom consultation

Non-confidential

June 2012

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1 Introduction

Everything Everywhere welcomes the opportunity to respond to Ofcom's consultation "Securing long term benefits from scarce spectrum resources, setting out a strategy for UHF bands IV and V."

We note that the issue envisaged by last year's call for input preceding this consultation has been somewhat overtaken by events at the World Radio Conference 2012 (WRC-12). At this conference, it was agreed that the next conference in 2015 will make a new co-primary allocation of approximately 100 MHz for mobile and broadcasting in the 700 MHz band in ITU region 1.

Although a co-primary allocation does not suggest one service over the other, it is highly unlikely that both services can be accommodated in the band. It is likely that further momentum will now build behind mobile in 700 MHz from other European countries, Africa, the Middle East and Russia so that eventually the 700 MHz band will be used for mobile. This illustrates well that the issue of which services to deploy in 700 MHz and other UHF spectrum is not for Ofcom to contemplate in isolation but is one that requires international co-operation. The UK strategy is going to have to be one of engaging in international work and negotiations, involving UK stakeholders in preparations and post-meeting briefings to the widest extent possible - which is what Ofcom is doing ahead of WRC-15 anyway. So the question of a long term strategy for UHF bands IV and V that Ofcom should consider now is not just whether to change use for some of the spectrum subject to international developments, but also importantly how and when. This will enable Ofcom to participate in international fora with a very clear mandate and increase the influence the UK can have on these international negotiations to prevent Ofcom from being overtaken by the agenda of other countries again.

We note that the analysis presented in the consultation document presents a reasonable and plausible case for how the current muxes could be reconfigured and, with the use of the 600 MHz band, provide a similar service to the current Digital Terrestrial TV (DTT) platform whilst releasing the 700 MHz for other purposes. Although that in itself would seem a good argument for releasing 700 MHz for mobile broadband, this seems to us more like the beginning of a detailed plan rather than a strategy. The development of a strategy that delivers long term benefits from use of UHF bands IV and V would assess, at a high level, the case for a change of use for 700 MHz based on costs and benefits and present a preliminary conclusion; and assess the costs and benefits of different timings of a change of use as well in order to set a target date for the change if relevant. Clearly a part of this analysis might be to consider alternatives, e.g. that the impact of DTT of losing 700 MHz may be less if 600 MHz is dedicated to DTT instead. This high level analysis would clarify what further steps, if any, are needed to approve the strategy and enable Ofcom to start making detailed plans and work purposefully in various international fora in order to deliver an agreed UK strategy. There is no need to delay this assessment and work towards a decision.

We explain in this document what we see as the relevant issues in developing a long term strategy, our opinion on those issues and what in our view would be the sensible next steps.

This document is structured as follows:

Section 2 discusses future TV viewing trends in relation to the DTT platform and the continued relevance of Public Service Broadcasting (PSB), Section 3 considers the value of 700 MHz for mobile broadband, Section 4 comments on the use of cognitive radio in TV white spaces, Section 5 outlines our proposal for ensuring efficient use of 600 MHz and how this relates to 700 MHz and Section 6 summarises our conclusions before Section 7 sets our answers to the specific consultation questions.

2 Public service broadcasting and the future of the DTT platform

There is no doubt that, as set out in the Consultation, the Freeview platform has been a successful and valued consumer proposition. It provides a way of delivering PSB content to a wide audience on a near universal basis, and the multi-channel Freeview platform has facilitated the take up of DTT and the analogue switch off.

Having acknowledged that, Ofcom's analysis then seems to leap to the conclusion that the past and current success of Freeview and the DTT platform in its current incarnation[1] means it should be preserved as is. The document is silent on the extent to which the current 'size' of the DTT platform was and is critical to its success. Part of this leap is also the odd way whereby the role of PSB seems to be mixed up implicitly with the role and form of DTT as a platform to deliver PSB content. This leap, along with the technical analysis showing the feasibility of preserving a DTT platform with 6 muxes similar to the current form even if 700 MHz is cleared for mobile but 600 MHz redeployed for DTT, has the effect of concluding, without debate, that the current DTT consumer proposition should be maintained as is.

We would argue that it is quite difficult to assess the value of using a given amount of spectrum in UHF bands IV and V for DTT rather than mobile broadband without a proper assessment of:

- the context within which the DTT platform operates and the likely challenges it will face in any case over the next 10-20 years in light of technology changes and changes in consumer preferences;
- what a reduced amount of spectrum would mean for the DTT platform, consumers and the competitive landscape; and
- in particular how, or whether, the delivery of PSB content depends on the current size of the DTT platform and to what extent PSB content, in particular licence funded content, needs to develop other channels equally in order to remain relevant.

We comment these points in turn below.

2.1 The context and future challenges to the DTT platform

Watching TV is very popular pastime in the UK with the average person watching approximately four hours a day[2] and 35% of households rely on Freeview as their primary form of TV reception.[3] However, a long term strategy is not about current preferences, it is about likely future preferences.

There are a lot of indications that viewers will increasingly want Video on Demand (VoD) and that they will want access to content both on their TV at home as well as on mobile devices such as smart phones and tablets:

- the popularity of VoD catch up services like the BBC's iPlayer and 4OD;
- the use of slots on the DTT platform for time-shifted versions of established channels, such as Channel Four+1, ITV1+1, ITV2+1 etc., which suggests that viewers value more opportunities to view the same content;
- commercial broadcasters developing VoD applications allowing users to assess content on the move, e.g. SkyGo;
- video already makes up about 50% of traffic on mobile devices and is forecast to increase further;[4]
- the increasing use of smartphones and tablets as an additional screen in the home;
- the development of YouView;

[1] We note that a first DTT platform, OnDigital failed.
[2] Ofcom, Communications Market Report: UK, 4 August 2011
[3] Q4 2011, http://media.ofcom.org.uk/facts/
[4] Cisco Visual Networking Index (VNI) Global Mobile Data Traffic Forecast Update, Feb. 2012

- Netflix, the internet TV streaming service launching their VoD services in the UK.

Fundamentally, VoD services cannot be delivered using broadcast technologies. Broadcast is by definition one way communications.[5]

Another indication that viewing patterns may change can be found by considering demographics. The Freeview platform has a disproportionately high proportion of viewers over 65.[6] Younger people on the other hand consider their smartphone more important than TV.[7]

The consumer survey commissioned by Ofcom, does not explore to what extent viewers value having certain programmes served to them at given times through traditional linear broadcasting. 16% of respondents said they wanted to have "VoD/catch up TV" as an improvement to the DTT platform whilst 6% stated that they would value Internet TV. This is not overwhelming when compared to the share (21%) who said they want "lots of SD channels" but it represents a greater share than the 14% of respondents who said they want the DTT platform improved with "lots of HD channels". The desire for 'more channels' could also be interpreted as viewers stating a preference for 'more content', and it is not clear that this would translate into more SD channels in 10 years time with greater usability and awareness of alternatives such as VoD. As VoD also provide greater amount of content to watch for the individual viewer at any given point in time, it is worth noting that VoD would in effect also give viewers the three key attributes that respondents in the survey did react most favourably to when asked which improvements they would like to see on the DTT platform: "Record/pause live TV" (26%), "Lots of SD channels" (21%) and "VoD/catch up TV" (16%). Freeview has recently conducted its own consumer research which similarly asked respondents which new technologies they would like to see. The ranking produced by that research suggested the following top preferences: VoD streamed directly to TV (62% of respondents), services offering a selection of on-demand programmes (59%), and an enhanced electronic programme guide allowing viewers to scroll backwards to stream a show that has already been broadcast as well as looking forwards (51%).[8]

In conclusion, we see several clear signs that, TV will remain important, but consumer preferences are moving towards VoD as opposed to traditional, linear broadcast multi-channel TV. The iPlayer for example, which is effectively VoD is very popular and the integration of such services into the main TV screen, e.g. with a smart TV or a Youview box is likely to increase the popularity of such services even more. It may be questionable how relevant what consumers state they want now is in the context of a five to 10 or 20 year strategy. We could reach a tipping point where consumer preferences change rapidly as has been the case for example with the adoption of smartphones.

From a policy perspective, it is also worth noting that delivery of VoD services over high speed internet connections would also create demand for such connections. The consumption of video over both fixed and mobile high speed connections helps ensure that there is clear consumer demand for high speed internet connections and this will assist in achieving the European Commission's Digital Agenda [9] for the availability of such services (by ensuring that business cases for investing in the new networks required are able to factor in suitable levels of demand). Creating wider availability of high speed broadband will in itself also have wider societal benefits.

2.2 The current 'size' of the DTT platform and consumer benefits

[5] Although consumers may have the impression that there are some interactive services present on the Freeview platform through the 'red button' services, these are just a different way of packaging linear broadcast.

[6] Ofcom, Communications Market Report: UK, 4 August 2011. Assuming that the households showing as "Analogue only" in the 2001 report are probably most likely to switch to DTT upon Digital Switch over, the share of viewers over 65 may be greater in the coming year or two when the full effects of analogue switch off become clear in the statistics.

[7] Market research conducted for Everything Everywhere

[8] also http://www.guardian.co.uk/media/2012/apr/18/freeview-3d-turns-off-viewers

[9] All citizens to have access to 30 Mbps by 2020, and 50% to subscribe to 100 Mbps. See Communication from the Commission (26/08/2010):

Ofcom states that the success of Freeview as a consumer proposition has been "at low cost"[10] and part of the success of the DTT platform as a multi-channel one has been derived from the low cost to consumers of accessing the platform. A large amount of the content broadcast over the DTT platform can be accessed simply by purchasing a suitably enabled TV or set top box (which are available at low cost).[11] Other than this up-front cost, consumers are not required to incur any further charges to access content.

However, the set-up of the DTT platform with a multi-channel offering available for free under the Freeview banner also means that we have no basis for understanding to what extent the value derived from the Freeview platform is contingent on the exact 'size' it has currently. By size, we mean the number of slots representing 'a channel' to consumers that the six muxes are able to provide within the current configuration, or the number and types of slots that could be provided within the current spectrum endowment. In other words, we have little empirical data to show the value that viewers place on incremental spectrum dedicated to DTT. Or put differently, what would be the impact of providing fewer, or more, channels than currently on the DTT platform? In particular the 'willingness to pay' concept often used may not apply to services that consumers are used to consider 'free'. Asking respondents whether they would want something for free, generally generates a 'yes' response. We note that whilst Ofcom's consumer survey concluded that respondents would prefer to see DTT improvements rather than MBB improvements, it also concluded that respondents would not be willing to pay for such improvements but they would be willing to pay for MBB improvements.

This may indicate that consumer willingness to pay for additional content on the DTT platform is relatively low and it could suggest that what consumers like about the DTT platform, more than anything, is the 'free-to-air' content. When choosing to subscribe to pay TV rather than watch free-to-air content, satellite and cable TV seem to have better traction than DTT but this is of course a complicated issue that must also consider the desirability of content to a mass audience.

However, in considering a long term strategy for the use of valuable scarce resources, such as the UHF Bands IV and V, a social cost needs to be taken into account and not simply the cost incurred by individual consumers. The opportunity cost of using this valuable spectrum for broadcast use also needs to be factored into any calculation of the most efficient use of the band. It seems reasonable, as Ofcom's consumer research identifies, to assume that there is additional demand for further channels and enhanced services (such as further HD channels, 3D TV channels and VoD services). However, over the timeframes being considered by this consultation, it is not clear why the DTT platform would be considered as the most appropriate way in which to deliver such enhanced services.

There are a number of reasons why such additional and enhanced services could be better delivered by alternative means. It is more allocatively (economically) efficient to deliver such services where consumers themselves contribute to the costs of delivery, to ensure that overall efficient amounts of such services are consumed. This is not about ensuring access to basic PSB content (where there is a potential external benefit to society from ensuring wide low cost inclusion) but about providing additional private value to consumers, whose cost of provision they should face. Pay TV platforms and delivery over high speed broadband connections is therefore a reasonable approach to ensuring that scarce spectrum resources are used most efficiently. Whilst it is valuable to have an attractive DTT platform as a competitive challenge to satellite and pay TV platforms, it could also be argued that it hinders the development of an IPTV platform.

[10] Paragraph 4.52

[11] Hence it is in our view somewhat of a misrepresentation when mux operators suggest that consumers have made "significant investments in the DTT platform" (see "Joint response from the BBC, ITV, Channel 4, Channel 5, Arqiva and SDN to second Ofcom 800 MHz Coexistence consultation", 19 April 2012). For many households, the investments made in TV reception equipment is quite small compared to the investment made in for example mobile phones.

From a supply side perspective, it will also be important for the efficient use of scarce spectrum that the broadcasters and the mux operators have a strong incentive to use spectrum efficiently.[12] In practice, they will not easily be able to add or detract from the total amount of spectrum that is available to DTT but it should be ensured that within the given amount of spectrum allocated to DTT, broadcasters and mux operators have an incentive to adapt the size and shape of the DTT platform in line with viewer preferences by deploying new and more spectrally efficient technologies such as DVB-T2 and MPEG4 or ultimately transition to a single frequency network. The development of an HD mux within the given spectrum allocation is a good example of this.

Notwithstanding the above, we agree with the headline conclusion in section 4 of the Consultation that the DTT platform in some shape or form will remain an important delivery mechanism for TV content, and especially PSB content, over the time periods for which Ofcom is constructing a strategy for UHF bands IV and V. Over the course of the next decade or so, alternative ways of providing TV are likely to be complementary to DTT rather than substitutes for it. That is, they will provide enhanced services and competition to DTT, but will not be able completely to replace it in providing basic PSB content at low cost to a substantial group of end consumers.

2.3 The continued accessibility of PSB and licence funded content

With a change in future viewer habits towards VoD, we expect that increasingly people will want to access content not just as and when, but also where it suits them whether that involves using their computers, smart TV, tablet, or smart phone. Commercial as well as PSB broadcasters have acknowledged this as demonstrated by the efforts that have gone into developing for example the BBC's iPlayer, Channel 4's 4oD, SkyGo and Youview. This is particularly relevant when considering the BBC and the notion of public (licence fee) funding. Publicly funded PSB content must be delivered through relevant platforms if it is to continue its justification in the long term. Although linear, TV broadcasting will remain important, it is not sufficient to rely on TV broadcasting (including free–to-air DTT as a main broadcasting platform) as the principle distribution channel for publicly funded content. For example, we believe that a younger audience will want VoD access on their smartphones and tablets.

It is disappointing that Ofcom has not explored how the benefits of PSB and the benefits of DTT as a platform are linked before implicitly concluding that the DTT platform should be preserved in its current size. For example, it may be relevant to explore to what extent the benefit of the PSB muxes depend on the size of the commercial muxes? This may be appropriate for the next review of PSB to consider.

We believe that Ofcom and the Government should work with the grain of the market and technology changes that we are very likely to see over the next 10 to 20 years. It may consider simplifying the PSB regime and distinguish between PSB content and delivery of PSB content, such that PSB is recognised as being primarily concerned with subsidy for the generation of content that is considered of particular value to society and which would not be delivered by the market. Where non-cash privileges persist (e.g. privileged access to valuable spectrum for a particular delivery platform) these should be properly valued and accounted for. This would promote a mechanism to ensures that the opportunity cost of using valuable UHF spectrum for DTT broadcasting, and in particular 700 MHz spectrum that is likely to have a clear and high value alternative use, is transparent and understood - and consequently rationed.

[12] The mux operators do not currently pay spectrum licence fees (although we understand that it is Ofcom's intention to introduce annual licence fees for the Wireless Telegraphy licences associated with the mux broadcasting licences from 2014) and whilst muxes and individual slots on muxes can and have been sold, mux operators cannot sell the spectrum to alternative use. In particular, this means that mux operators may not be exposed to the full opportunity costs of the very significant amount of valuable spectrum they have access to.

3 The value of 700 MHz for mobile broadband

In this section we explain the significant benefits that we see attached to using the 700 MHz for mobile broadband, how valuable it might be and the additional competitive benefits to the mobile industry that could and should be delivered by the release of further sub-1 GHz spectrum for mobile broadband.

3.1 The particular benefits of 700 MHz for mobile broadband - a virtuous circle

As explained in the consultation document, the mobile industry is undergoing significant change with customers accessing the mobile internet more often, for longer and downloading more and more data. The rapid take up in smart phones and tablet computers has seen the demand for capacity and coverage grow at unprecedented rates. The often cited mobile traffic forecasts from Cisco's Virtual Networking Index have turned out to be accurate. More importantly, there is no sign of this growth slowing down. As customers gain access to increased data speeds through HSPA+ and LTE, they are likely over time to demand even more capacity. This is what the evidence from fixed internet suggests, where increasing speeds have brought increasing data traffic. Hence we agree with Ofcom that more spectrum needs to be allocated to mobile broadband in order to support the delivery of services, which consumers value highly. Indeed a range of frequencies are being considered by the ITU for the longer term for discussion at the next World Radio Conference in 2015 (over and above 700 MHz and those listed in table 1 of the Consultation, which are relevant for the short to medium term).

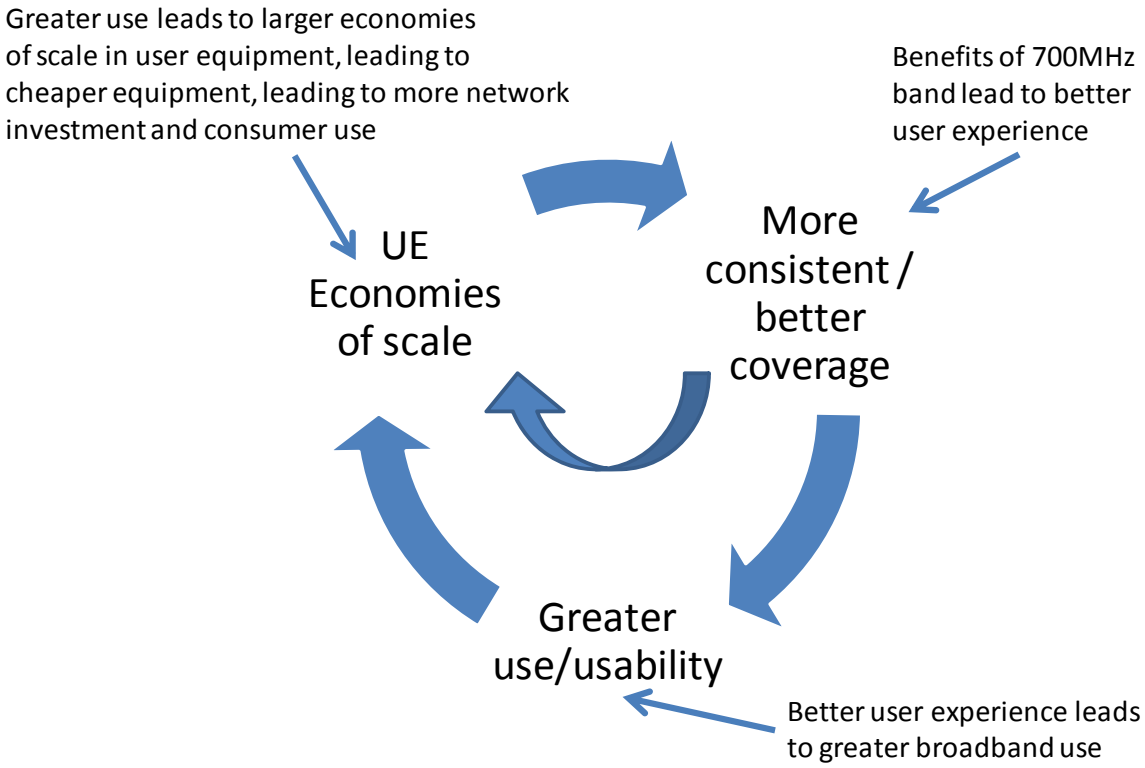
Of the frequency ranges under consideration (beyond those quoted in table 1 of the Consultation) the 700 MHz is the most attractive. There are two key reasons why the 700 MHz band would be extremely valuable as additional spectrum for mobile broadband in the medium to long term:

- **The superior propagation characteristics of sub-1 GHz compared to other suitable frequency ranges.**
  Everything Everywhere has on several occasions submitted evidence on the superior characteristics of sub-1 GHz spectrum compared to other bands designated for mobile. See for example our response from May 2011 to Ofcom's first consultation on the Combined Award of 800 MHz and 2.6 GHz including evidence on a) the relative propagation characteristics of low and high frequencies; and b) the proportion of indoor locations which can only be reached with sub-1 GHz spectrum. See also our response to Ofcom's second consultation on the Combined Award submitted in March 2012, in particular Section 3 commenting on Ofcom's technical analysis.
- **The possibility of global economies of scale in equipment and particularly end user devices.** Because the 700 MHz band is also going to be used for mobile broadband in ITU region 3 (Asia Pacific) and region 1 (the Americas), there is a potential for global economies of scale in equipment and particularly in devices.[13] This could be significant compared to for example 800 MHz, which may only be used for mobile broadband in the European Union Member States.

This leads to a virtuous circle as illustrated in Figure 1 whereby the particular coverage benefits leads to better capacity in hard to reach places and hence a better mobile broadband user experience, which in turn leads to greater mobile broadband use that leads to more demand for user devices and more investment in network equipment, which leads to even better and more consistent coverage etc.

[13] Although the economies of scale may require a restrictive band plan and at this point it is not clear whether the benefits of the global handset economies are greater than the benefits of a more extensive band plan.

Figure 1: Benefits of 700 MHz for mobile broadband



3.2 How valuable is 700 MHz for mobile broadband?

In terms of how valuable the 700 MHz is for mobile broadband, Ofcom can start by considering the revenue achieved in auctions of 700 MHz in the US, 800 MHz in Europe and if available, benchmarks for 900 MHz where it has been re-auctioned recently for mobile broadband.[14] Looking at the 700 MHz in the US and 800 MHz auction prices in Europe would suggest a value of EUR 0.4 – 0.8 per MHz per capita or £1.5-3.2 billion for say, 80 MHz of spectrum awarded in the UK.

However the benefit of converting 700 MHz to a higher value use is clearly much greater than the spectrum price achieved in an auction. That price merely indicates the willingness to pay of the marginal bidder. The surplus that consumers derive from mobile communications services are well in excess of the price they pay for services in a competitive market, it is estimated at £24 billion pa. An estimate derived in 2006 and which we believe could be greater today.[15]

3.3 Distribution of valuable sub-1 GHz spectrum amongst mobile network operators

Our support for a change of use in 700 MHz comes with a significant caveat relating to the highly asymmetric distribution of sub-1 GHz spectrum in the UK. Unlike other countries in Europe, sub-1 GHz spectrum is currently concentrated across only two players in the UK. Currently, Vodafone and Telefonica hold between them all available sub-1 GHz spectrum (2x35 MHz of 900 MHz). This has always provided a competitive advantage over other operators and this competitive advantage

[14] The recent Swiss multi-band auction awarded 800 and 900 MHz alongside other frequencies. However, because of the package bids, the value placed on these band cannot be separated from the value placed on other bands such as 1800 MHz, 2.1 GHz and 2.6 GHz.

[15] See Everything Everywhere's response to Ofcom's Notice of a proposed variation of Everything Everywhere's 1800 MHz spectrum licences to allow use of LTE and WiMAX technologies

has been extended to 3G with the liberalisation for UMTS of the 900 MHz licences in the hands of the existing holders in January 2011. Our strong belief is that the intention of the Government Direction[16] was that this was acceptable only because the upcoming award of 800 MHz for mobile would give the opportunity to rectify this distributional issue without having to reallocate 900 MHz spectrum. However, in the current proposals for the Combined Award of 800 MHz and 2.6 GHz spectrum, Ofcom has not done enough to ensure that the mobile operators who currently do not have sub-1 GHz spectrum get access to 800 MHz spectrum and it has also allowed Vodafone and Telefonica to each acquire a further 2x10 MHz of 800 MHz. These proposals represent a very real risk of sub-1 GHz holdings remaining very concentrated for the foreseeable future, despite the release of an additional 2x30 MHz of 800 MHz spectrum.

If the outcome of the Combined Award is such that Vodafone and Telefonica win 2x5 MHz or 2x10 MHz of 800 MHz spectrum, they will be able to offer LTE services in a 2x20 MHz carrier of sub-1 GHz spectrum through carrier aggregation, available in LTE Advanced from 2014 onwards. We see a considerable risk of bifurcation in the provision of mobile broadband services whereby two operators will be able to provide LTE services in a 2x20 MHz sub-1 GHz carrier offering superior indoor coverage and capacity.

This risk should be mitigated in the Combined Award design, and if it is not, the release of 700 MHz could be followed by a process that is as difficult for Ofcom as the Combined Award has proved because competition concerns around the sub-1 GHz distribution will still need to be addressed.

[16] The Wireless Telegraphy Act 2006 (Directions to OFCOM) Order 2010

4 White spaces

There has been a great deal of discussion about white space devices both in Europe (albeit mainly in the UK) and the US. Ofcom is adding to the activity in this area by its active approach, setting out a statement on how to implement a regulatory framework for the use of white space devices in the UK. Aside from the talk and the theory, we are aware of two trials of white space technology in the UK.

Everything Everywhere agrees that cognitive radio is an interesting prospect as part of a broader quest to find ways of using spectrum more intensively, which may involve the emergence of additional ways of sharing spectrum than we know today, through technological advancements.

The services which have so far been proposed delivered using cognitive radio in TV white spaces are services such as: machine to machine communications ('M2M'), wireless rural broadband, broadband hot-spot type services and mobile or nomadic voice and data communications. These are not innovative services but alternative ways of delivering services, which are already provided with one or more existing technologies. As such, the value of white space technology and white space devices relates to the value that can generated by providing these services using white space technology compared to the provision of these services using alternative technologies. For example, wi-fi technologies in unlicensed spectrum can be used to provide hot spots and mobile networks can with the benefit of sub-1 GHz spectrum provide M2M services and rural broadband with LTE800 in a cost effective way.

We note that although there has been technical trials demonstrating to some extent the technical feasibility of white space technology, we would suggest that the business case for white space deployment is unproven and questionable. This is precisely because there are alternative and probably more cost effective ways of delivering those services, even when taking into consideration that those alternative deployments also have to pay the opportunity costs of the spectrum they use.

An often quoted benefit of white space technology is precisely that it uses spectrum, which would otherwise not be used and hence help to promote spectrum efficiency overall. However, we would argue that it merely addresses the symptom of inefficient spectrum use not the underlying problem. The underlying issues is that current terrestrial broadcasting networks in the UK (and many other European countries) use spectrum inefficiently for multi-frequency DTT networks, when there are other alternative uses for at least some of the spectrum. One such candidate is mobile broadband in harmonised spectrum in the 700 MHz band.

It is also worth noting that although the opportunity costs of spectrum for white space devices may be negligible in the current set up, mux operators are set to start paying administrative incentive pricing (AIP) spectrum fees for their Wireless Telegraphy licences from 2014. This means that if white space devices are deployed in interleaved DTT spectrum, mux operators will in effect be paying opportunity costs on behalf of white space deployments. This is not a problem as such however we note that it may not be a sustainable incentive mechanism in the longer term. If the AIP fees on mux operators have the desired effect, they may incentivise mux operators and broadcasters towards the deployment of single frequency broadcasting networks. This would presumably greatly reduce the amount of unused spectrum for white space deployments and pressure may develop for white space users to contribute towards the opportunity costs of using valuable sub-1 GHz spectrum for DTT broadcasting. In any case, it is important that white space deployments do not become a practical and technical impediment for the deployment of single frequency DTT networks and there is a clear risk that allowing the deployment of white space technology could create a new incumbent user base that would hinder the deployment of more efficient broadcasting technologies through lobbying and possibly litigation.

We would encourage Ofcom to prioritise its efforts to address the underlying issues in promoting the long term benefits of scarce UHF spectrum by working towards a change in the primary use for

700 MHz and encourage broadcasting networks to deploy spectrum efficient technologies in the remaining DTT spectrum. We believe these use have the proven scope to produce much more value. Promoting white space technology should be third priority after those more important objectives,

5 600 MHz – and making a decision with respect to 700 MHz now

At this point in time when 600 MHz is used for DTT across Europe and there are no immediate signs of this changing,[17] and for the reasons outlined by Ofcom in the consultation document, it seems uncontroversial to suggest that the most valuable medium to long term use of 600 MHz is likely to be DTT and moreover that the 600 MHz band can play a role in facilitating the clearance of 700 MHz for mobile broadband. This leaves the question of what to do about the cleared 600 MHz spectrum in the short to medium term, in order to make sure this spectrum does not lie fallow.

We note the discussion in the Consultation about how the potential for more efficient broadcast use of existing UHF spectrum would mean that substantially similar DTT services could in future be provided with less spectrum (or alternatively that the same spectrum could be used to supply better services, e.g. more channels). Clearly, it is in the general economic interest of the UK economy to promote and incentivise such more efficient use of scarce spectrum resources.

However, the ultimate conclusion in section 6 of the Consultation is that there is a risk to the existing levels of DTT services if the amount of spectrum to which it has access is substantially reduced. Further, Ofcom identifies the 600MHz band as one which could be used to ensure that this risk is mitigated if not eliminated. A key issue therefore becomes a comparison of the additional benefits of which the 600MHz band could provide to the DTT platform as an addition to existing spectrum compared to the situation where the 600MHz band replaces 700MHz spectrum. As noted in Section 2 above, we do not think that the current size or shape of the DTT platform, beyond the basic PSB services, should be assumed automatic protection. Hence with harmonisation of 700 MHz for mobile coming up, we think there is an overwhelming case for a change of use in 700 MHz for the reasons outlined in Section 3 even if it meant incremental changes to the DTT platform. The alternative scenario to use 600 MHz as replacement DTT spectrum for 700MHz spectrum is the benefit which 600MHz could provide in an alternative use for other services. Everything Everywhere agrees with the conclusion in paragraph 6.48 of the Consultation that there is considerable uncertainty about the additional value which could be created by 600MHz spectrum under either scenario. Alternative uses and technologies for the 600MHz band are still highly speculative and it is unclear whether any valuable such uses will develop. A fortiori, it does not seem the case that were any such uses to develop they would not be able to be developed in alternative bands. This uncertainty provides a good reason for market testing which is the most valuable use and as we explain below, we believe there is a good way of market testing this hypothesis.

For all the reasons set out above and in paragraph 6.48 of the Consultation, EE does not consider that additional DTT enhancements through use of greater amounts of UHF spectrum should be guaranteed. Such highly uncertain benefits need to be set against the real and much more certain gains achievable from harmonised use of the 700MHz band for mobile broadband, as discussed in section 3 of this response.

We would therefore propose the following:

Ofcom should determine now that the 700 MHz will be cleared for mobile broadband, subject to the skewed distribution of sub-1 GHz spectrum amongst UK mobile operators being addressed, and of course subject to other European countries also agreeing a change in use as well as granting the PSB muxes some protection against loss of spectrum. Ofcom does not need to await international developments to assess the case for this change in use and make a decision, it need only wait to implement such a decision. Ofcom should also analyse costs and benefits with respect to different timings of the change of use. We would expect that the conclusion of such an assessment would support a change of use as early as possible, say by 2018.

[17] We note that the agenda point for WRC-15 to identify additional spectrum for IMT will consider any band, and hence it is not beyond possibility that further sub-1 GHz spectrum in addition to 700 MHz could be considered for mobile broadband.

Against the clarity that this decision would provide for both commercial mux operators, MNOs and other stakeholders, Ofcom could then award the available frequencies in 600 MHz band by auction. This might be done for example by offering the available spectrum in lots of 8 MHz suitable for DTT broadcasting. MNOs are unlikely to be interested in this spectrum but it would allow potential DTT users to be pitched against other alternative users to decide which provides the most efficient use. Commercial mux operators would have clarity going into the auction that capacity corresponding approximately to 100 MHz in 700 MHz would be terminated by 2018 the latest and hence it would be clear to them that they should include the value of mitigating against this loss in capacity in their valuations for 600 MHz.

This would necessarily squeeze the DTT platform as a whole on its spectrum endowments in the long term because approximately 100 MHz would have to be given up in 700 MHz but 56 MHz is available in 600 MHz. This would encourage mux operators and broadcasters to deploy more spectrum efficient techniques such as DVB-T2, MPEG4 and potentially single frequency networks. If one or more mux operators won the 600 MHz spectrum, it is worth noting that in the medium term (e.g. 2013 to 2018), there would be 56 MHz more available for DTT than today, which could be used to simulcast services over DVB-T2 for a period of time or for other initiatives that encourage consumer take up of DVB-T2 compatible receivers etc. This would leave the broadcasters and mux operators to work out the most efficient transition as surely they are best placed to do. Mux operators could also be allowed to relinquish unused DTT spectrum channel by channel ahead of 2018 in order to save on AIP fees.

The clear benefits of deciding a future change of use 700 MHz now and then auction 600 MHz soon thereafter, are that it would give:

- both MNOs and broadcasters certainty with respect to the change of use and the timing of a change;
- mux operators and broadcasters the right incentives and flexibility to deploy more efficient broadcast methods if they deemed that worthwhile; and finally
- a clear mandate to Ofcom in the international work leading up to WRC-15 and if necessary, incentives to work towards a new multi-lateral agreement for high power broadcasting being negotiated as soon as possible so as to make sure mobile broadband in 700 MHz can be deployed in the UK by 2018. A clear mandate would maximise the influence of the UK in international negotiations.

6 Summary conclusion

- Everything Everywhere supports the release of 700 MHz for mobile broadband as soon as possible subject to the skewed distribution of sub-1 GHz spectrum amongst UK mobile network operators being addressed. It is not necessary to await international developments before considering the case for a change of use in the UK. A decision can be made now, which would produce valuable clarity and good incentives to stakeholders, but it can of course not be implemented ahead of other European countries.
- Ofcom should take a step back from the detail and consider to what extent the benefits of PSB are mixed up with the benefits of DTT as a platform. Whilst PSB muxes might be protected, commercial muxes are not and Ofcom has not supported the case for preserving the DTT platform in its current 'size'.
- Ofcom and government should work with the grain of recent market and technology changes (particularly likely move to IPTV, smart TVs and demand for VoD) and simplify the PSB regime, such that it is recognised as being primarily concerned with a public subsidy for content generation for distribution on all relevant platforms. Where non-cash privileges persist (e.g. privileged access to valuable spectrum), these should be properly valued and accounted for. This would in turn ensure that the opportunity cost of using 700 MHz for DTT is transparent and understood - and consequently rationed when there are other higher valuable use.
- Mux operators and broadcasters need to have a strong incentive to adopt spectrum efficient technologies and methods for the DTT platform (such as the deployment of DVB-T2, MPEG4, and perhaps ultimately single frequency networks). It might be that a little squeeze on their spectrum endowment is what they need to do this. The development of the current HD mux within given spectrum endowments is a good example of such innovation by the broadcasters/mux operators within given resources.
- The urgent issue presented in this consultation is what to do with 600 MHz? On the basis of the above, we suggest that:
    - Ofcom makes a decision now that 700 MHz will be cleared for MBB by, say, 2018 and have an auction for 600 MHz soon where broadcasters and mux operators can compete with other potential users for 600 MHz to use it as a band for mitigating the impact of losing 700 MHz. An auction of 600 MHz, in which mux operators are able to factor the loss of 700 MHz into their valuations for 600 MHz would allow a good market test against other alternative users when, as Ofcom suggests, the value of these alternatives are quite uncertain.
    - Whilst this will squeeze the DTT platform a little on its spectrum endowment in the long run, it could give it additional spectrum in the medium term which could be used for simulcast or other initiatives that could increase the take up of DVB-T2 and other more spectrally efficient technologies.
    - A clear benefit of this proposal is to give both MNOs and broadcasters certainty with respect to timing of the change of use. It would give mux operators incentives to deploy more efficient broadcast methods if that was worthwhile and it would give MNOs extra information to make efficient decisions on network densification or other capacity mitigating measures ahead of 700 MHz becoming available. It would also provide a clear mandate for Ofcom in international work, i.e. to make sure mobile broadband in 700 MHz can be adopted in the UK by 2018 the latest.

7 Consultation questions

Future mobile broadband spectrum requirements

Question 1: Do you agree that meeting the future growth in demand for mobile broadband capacity will deliver significant benefits to citizens and consumers?

Yes. The consumer surplus associated with mobile telephony and broadband is very large. It is currently estimated at £24 billion p.a.,[18] which we believe could well be a conservative estimate.

Question 2: Do you agree that additional harmonised mobile broadband spectrum will play an important role in meeting the future growth in demand for mobile broadband capacity? What are your views on the overall quantity of harmonised spectrum that will be required to meet future demand? How does this compare with the expected increase in spectrum for mobile use discussed in this section?

There is little, if any, value to mobile operators of additional spectrum that is not harmonised. We believe that mobile operators could absorb a very large amount of additional spectrum over the next 10-20 years.

The specific amount is less relevant to this consultation as it exceeds what can plausibly be cleared from UHF bands IV and V but it is being considered within the ITU working groups preparing for the next World Radio Conference 2015, agenda item 1.1.

Question 3: Do you agree that additional harmonised spectrum provided by the 700 MHz band could play an important role in meeting the future growth in mobile broadband capacity?

Yes. We note that the 700 MHz band is not only about capacity. Sub-1 GHz spectrum has particularly good propagation characteristics and is ideally suited to provide additional capacity **with good coverage.** Hence, the 700 MHz band is by far the most preferable band of any of the bands discussed that could provide additional capacity because it provides such capacity with good coverage.

As discussed in the consultation document, there are a number of techniques mobile operators can adopt (albeit at an increased cost) to mitigate capacity shortfalls. However, it is very difficult to mitigate against indoor coverage short falls.

It is also worth bearing in mind that, unlike other countries in Europe, in the UK sub-1 GHz spectrum is currently concentrated across only two players with Vodafone and Telefonica each holding 2x17.5 MHz of the 900 MHz mobile allocation. Given the current proposals for the Combined Award of 800 MHz and 2.6 GHz spectrum, Ofcom has not done enough to ensure that the mobile operators who currently do not have sub-1 GHz spectrum get 800 MHz spectrum. There is a very real risk of sub-1 GHz holdings remaining very concentrated for the foreseeable future despite the release of an additional 2x30 MHz of 800 MHz spectrum. Should Ofcom persist with its unfavourable proposals for the Combined Award of 800 MHz and 2.6 GHz, a 700 MHz band award could be as difficult for Ofcom to design as the Combined Award has proved.

Question 4: Do you agree that the value of the role played by the 700 MHz band in meeting the future growth in mobile broadband capacity would be greater if it becomes available before other capacity enhancing techniques have been exhausted at existing mobile sites?

Yes the sooner the better, and by 2018 at the latest.

[18] Consultation para. 3.14.2

Note also the answer to Q3 above, about the opportunity to promote competition by enabling all mobile operators to have a reasonable allocation of sub-1 GHz spectrum. In order to achieve this benefit, the 700 MHz would also have to be made available as soon as possible, and before 2018. If the outcome of the Combined Award is such that Vodafone and O2 win 2x5 MHz or 2x10 MHz of 800 MHz spectrum, they will be able to offer LTE services in 2x20 MHz of sub-1 GHz spectrum through carrier aggregation in LTE Advanced available from 2014 onwards. Indeed this outcome is likely with Ofcom's current proposals for the Combined Award. We see a considerable risk of bifurcation in the provision of mobile broadband services whereby two operators will be able to provide LTE services in a 2x20 MHz sub-1 GHz carrier offering superior indoor coverage. This risk should be mitigated in the Combined Award design, and the release of 700 MHz could offer additional pro-competitive effects provided that the distribution of sub-1 GHz spectrum is addressed in a more appropriate manner than appears to be case for the Combined Award. These pro-competitive effects require early availability.

Question 5: What timing of 700MHz release would maximise the benefits associated with its use for mobile broadband?

As soon as possible, for example 2016 but at the latest 2018.

Future DTT spectrum requirements

Question 6: Do you agree that DTT will continue to play an important role in providing universal low cost access to PSB content over at least the next decade?

Yes. That is not to say that the DTT platform will or should be the only platform by which PSB content is delivered. Clearly, as consumer habits and tastes evolve over time alternative methods of delivering PSB content will be important complements to broadcasting. A broadcast platform which uses significant amounts of valuable spectrum should only be used to deliver such content where it is the most efficient and socially beneficial way to do so. The wide availability of the DTT platform, and its ability to achieve this availability at low cost to the end user, means that it has a particular role to play in ensuring digital inclusion. This important role should not be expanded to provide more premium services (such as HD, 3D TV and VoD) without taking full account of the costs of so doing, including the opportunity costs of using spectrum in such a way.

The EC Digital Agenda has set a target that by 2020 superfast broadband (30 Mbps) should be available to all Europeans and half of European households should subscribe to at least 100 Mbps. IPTV can provide a good demand stimulus to help meet these targets. 30 Mbps is plenty to stream SD and HD. So to say that "barriers to the take-up of broadband and IPTV could fall away over much longer timeframes (e.g. post 2030)"[19] is the same as admitting that the UK will not reach the targets set in the European Commission's Digital Agenda, which does not seem right for Ofcom to do at this point.

Question 7: Do you agree that, absent major changes in available spectrum, DTT would continue to remain attractive to viewers and deliver important benefits to citizens and consumers over at least the next decade?

Yes.

Question 8: What are your views on the future technical evolution of the DTT platform? Are there other relevant factors affecting future DTT spectrum requirements that we should

[19] Consultation, para. 4.24

consider as we develop an approach to secure benefits from UHF band IV and V over the long term?

Please refer to Section 2 of the response.

Question 9: Do you agree that a longer term approach to secure benefits from UHF band IV and V should consider how to safeguard benefits delivered by the DTT platform?

Yes, but as set out in the main body of this response (and in answer to Consultation Question 6), a longer tem approach needs to take into account all relevant factors. This includes the opportunity cost of using particular bands of spectrum for DTT compared to the consumer surplus this generates.

Other uses of UHF bands IV and V

Question 10: Are there other material factors affecting the future requirements of PMSE that we should consider as we develop an approach to secure long term benefits from UHF band IV and V?

No comment

Question 11: Are there other material factors affecting the future requirements of Local TV that we should consider as we develop an approach to secure long term benefits from UHF band IV and V?

No comment

Question 12: Are there other material factors affecting the future requirements of WSD applications that we should consider as we develop an approach to secure long term benefits from UHF band IV and V?

Please refer to Section 4 for our views on white space applications.

Question 13: Aside from WSDs, are there other innovative ways in which to use UHF bands IV and V to deliver services and, therefore, material benefits to users

We do not believe that there are.

Question 14: Are there other material factors affecting the future requirements of emergency services applications that we should be aware of as we develop an approach to secure long term benefits from UHF band IV and V?

Yes in particular whether there is funding available to operate dedicated emergency services networks, a dedicated spectrum assignment is only part of the picture.

Question 15: Do you agree that the approach that is most likely to secure significant benefits from UHF band IV and V over the long term is one that enables the release of the 700 MHz band for mobile broadband whilst also ensuring the role of the DTT platform is safeguarded?

Yes although it should be properly analysed what the role of the DTT platform is and to what extent that relies on its current ‘size’.

Question 16: Do you believe there is a material risk that the DTT platform will have insufficient spectrum to continue to deliver important benefits (including providing universal low cost access to PSB content) if the 600MHz band is not used for DTT when the after clearance of the 700 MHz band?

This question can be market tested in a reasonably straightforward manner as we have explained in Section 5.

Question 17: Do you believe that using the 600 MHz band for DTT after clearing the 700 MHz band would reduce the risk that the DTT platform will not be able to continue to provide important citizen and consumer benefits?

That may be the case but it is not clear from the analysis presented by Ofcom so far.

Question 18: Do you agree that the future benefits for citizens and consumers of enabling the release of the 700 MHz band whilst maintaining the role of DTT are likely to outweigh the loss in benefits of the 600 MHz band not being able to be used for other services in the long term?

Yes. Again, this question can be market tested as we have explained in Section 5.

Question 19: Have we identified correctly the possible short-term uses of the 600 MHz spectrum? Are there other short-term uses we should consider?

No comment.

Question 20: Which option(s) for releasing 600 MHz in the short term would maximise its value whilst supporting our proposed longer term objectives?

We believe our proposal as described in Section 5 would maximise its value whilst supporting 700 MHz release.

The wider impacts of changing the use of the 700MHz band

Question 21: Do you agree that the wider impacts of a future change of use of the 700MHz band could be managed to prevent them having a detrimental impact on consumers and the services operating in this band?

Yes. The change of use will overall have a positive impact on consumers, see also Section 3

Proposed approach for securing future benefits and next steps

Question 22: Do you agree that the approach set out in this consultation is likely to secure significant benefits for citizens and consumers over the long term?

We think the release of 700 MHz for mobile broadband will secure significant benefits for citizens and consumers. The sooner it is released, the greater the benefits. It seems obvious the 600 MHz band should be used to facilitate the release of 700 MHz for mobile broadband. However, we think the detailed discussion about the mechanics of re-planning DTT broadcast networks are premature until a fuller discussion has been had about how much spectrum is necessary for PSB via DTT and how to promote the adoption of more spectrum efficient broadcast technologies.

Question 23: Have we correctly identified the main areas of future work that could follow this consultation process subject to its outcome?

No. Whilst the title of this consultation purports long term, strategic thinking, it lacks that. It considers in detail how the DTT platform might be reconfigured to provide the current level of service whilst also clearing the 700 MHz band for mobile broadband. The long term, strategic question is about:

- The extent to which the future delivery of PSB content is tied to the DTT platform given the popularity of video-on-demand, smart TVs etc.;
- If the DTT platform is essential for the future delivery of PSB content, in what form? What is the incremental cost/benefit of less/more spectrum for the DTT platform;
- How can the DTT platform be incentivised to adopt technologies that offer better spectrum efficiency, such as DVB-T2 and MPEG4 and consider a transition to single frequency networks?

Some of these questions could be addressed in the next PSB review.

In the meantime we think Ofcom needs to:

- prepare the high level analysis to support it taking a decision as soon as possible on the possible change of use of 700 MHz; and
- consider how the costs and benefits of a change in use depend on different dates for that change of use, e.g. 2016, 2018 or 2020.

A decision on the most beneficial use in the UK does not need to await WRC-2015, which will merely decide a co-primary allocation. Ofcom would still have to decide between DTT and mobile broadband in the UK as a matter of policy. It is the implementation of a decision that has to await a wider European decision, not the decision itself. Taking a decision for the UK now would also allow Ofcom to work within international fora to promote a coordinated European change of use in support of the timetable Ofcom had found to be most beneficial. In other words, taking a decision now on the preferred strategy for the UK would maximise the influence of the UK in the European decision.