

# digitaluk

arqiva

BBC



**Ofcom consultation:**

**Spectrum management strategy**

**Response from Digital UK**

19 December 2013

This response is submitted by Digital UK on behalf of its Members – the BBC, ITV, Arqiva and Channel 4 - the holders of the terrestrial Broadcasting Act and Wireless Telegraphy Act licences.

## **1. Introduction**

### **About Digital Terrestrial Television (DTT)**

Digital Terrestrial Television (DTT) is the UK's most popular TV platform. At its heart is Freeview – a universally available service offering a range of more than a hundred free-to-air TV, radio and text-based services. It is watched in more than 19 million homes, three-quarters of the total. Freeview is the sole television platform in more than 10 million homes (40%)<sup>[1]</sup>.

Prior to digital switchover (DSO), more than four million UK households could not access Freeview and elsewhere signal strength was variable. Thanks to industry investment in excess of a billion pounds, switchover made Freeview available to 98.5% of homes.

Viewers are overwhelmingly satisfied with the Freeview service<sup>[2]</sup>, and post-switchover research demonstrated viewers enjoyed the selection of channels, picture quality and functionality.<sup>[3]</sup>

### **About Digital UK**

Digital UK supports the UK's terrestrial TV service and its viewers.

The company is responsible for day-to-day operational management, including the Freeview electronic programme guide, and leads on developing platform strategy, working with its broadcast partners and industry. It also provides viewers with information and advice about terrestrial TV channels, services and reception.

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<sup>[1]</sup> Source: Ofcom Digital TV Update, Q4 2012

<sup>[2]</sup> 84% of Freeview viewers surveyed between April 2012 and March 2013 reported that they were satisfied with the Freeview service. Source: Hall & Partners Freeview brand tracker; sample 5,200 homes.

<sup>[3]</sup> See the Blinc / Digital UK research report 'Viewer Experiences of Switchover', available on the Digital UK Switchover Insights website.

## 2. Executive Summary

We welcome the opportunity to respond to this consultation on behalf of our members and the many millions of UK viewers who watch digital terrestrial television. We are aware of the increasing pressures on spectrum availability and recognise the importance of Ofcom's role in ensuring its allocation in ways which benefit citizens and consumers.

As our response makes clear, we are supportive of many of the broad principles set out in the strategy, for example in relation to efficient use of spectrum and the potential benefits of further spectrum sharing. We do, however, have concerns in a number of areas:

- **Recognition of the strength of DTT** – we believe that the strategy lacks emphasis on the on-going importance of DTT as a driver of consumer and citizen value. DTT's appeal is proven and has long-term potential to continue to develop in areas such as expanding channel choice, HD and on-demand services. See Questions 1 and 2
- **Demand for mobile data** – it is increasingly uncertain how the demand for mobile data will evolve over the next decade. This is especially true in light of the rapidly increasing use of wifi in preference to mobile signals to consume video. It is also in direct contrast to the proven demand for DTT which forecasts consistently suggest will remain as strong if not stronger than today to 2020 and beyond. See Question 3
- **700MHz clearance** – the potential clearance of the 700MHz band to deliver more spectrum for mobile broadband is of serious concern to the DTT platform. While we remain of the view that the data demand figures used to support the case for clearance are inherently uncertain, we are pleased Ofcom recognises the importance of detailed planning and minimising consumer disruption if the changes proceed. Essential pre-requisites of any clearance should be to maintain existing DTT coverage and scope for platform growth. See Questions 4 and 7
- **Future access to spectrum** – we do not believe there is a case for a further co-primary designation of the UHF spectrum below the 700 MHz bands (i.e. 470-694 MHz), especially in light of the uncertainty over actual demand for mobile data capacity in the longer term and the limitations of other platforms, including IPTV. A co-primary designation would create consumer and commercial uncertainty which could weaken DTT. See Question 7
- **Spectrum Sharing** – we are supportive of the principles of spectrum sharing but have increasing concerns about Ofcom's approach to this area of development notably in relation to the use of TV White Spaces. Our concerns include coverage, reception and the technical parameters being proposed. See Question 9

We respond in more detail on these issues and others below.

### 3. Responses to questions

***Question 1: Have we captured all the major trends that are likely to impact spectrum use over the next ten years in this section and the separate Appendix on sectoral developments? Are there other market, technology or international developments that could lead to significant changes in spectrum demand and supply over the next 10 years?***

We believe that while the consultation captures the main trends in spectrum supply and demand, as we set out below, it places too much weight on inherently uncertain forecasts for mobile data and too little emphasis on the enduring importance of DTT.

There is now a strong case for taking a more cautious view of mobile data demand, especially in light of the increasingly widespread use of wifi rather than mobile networks among consumers accessing media on portable devices. It is also worth noting the recent report from the Broadband Stakeholder Group, indicating lower than previously forecast demand for bandwidth by 2023<sup>1</sup>. We provide more detail on this in our response to Question 3.

At the same time, there is increasing evidence to support our view of the continuing demand for the DTT offer, enhanced by an expanding range of HD channels and on-demand catch-up services such as YouView. In these and other areas we anticipate continuing platform evolution with an increasing range of online services and sales of larger TV screens to fuel viewer demand for HD and Ultra HD pictures.

We are pleased that Ofcom is looking at the longer term future of DTT. We believe that subject to sufficient spectrum being made available, the developments outlined above put DTT on course to remain the UK's most popular TV platform over the next decade and beyond. We believe that any forecasts about the future importance of DTT should place due emphasis on its continuing role as the UK's primary free to air television service which ensures cost effective and universal access to high quality television, including the full range of public service channels. It should also be noted that there is little prospect of other TV platforms, including IPTV, being able to deliver these services as widely and efficiently as DTT in the period under consideration.

Alongside these well established social benefits, Ofcom should also consider the positive economic impacts of a strong DTT platform which will continue for the foreseeable future as long as it has sufficient spectrum to operate effectively. These benefits are most notable in the areas of programme competition, innovation and investment in the UK's creative industries allied to programme making.

As the largest free-to-air TV platform, DTT plays a vital role in ensuring healthy competition between platforms – offering an alternative to the main pay services (cable and satellite). Cable networks cover only around half of UK households so in many parts of the UK DTT is the only non-satellite option (and is essential for households without the option of a dish). Platform competition also benefits channels by providing them with various routes to audiences, leaving them less beholden to any one platform operator. Competition between platforms also drives innovation among pay TV operators who need to stay a step ahead of the free DTT platform in order to justify the cost of their subscription.

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<sup>1</sup> Broadband Stakeholder Group, Domestic Demand for Bandwidth, a report by Communications Chambers, 5 November 2013

<http://www.broadbanduk.org/wp-content/uploads/2013/11/BSG-Domestic-demand-for-bandwidth.pdf>

Ofcom may also wish to consider the trend towards triple play bundling and DTT's important role in offering consumer choice and encouraging competition. The Freeview service at the heart of DTT has played a critical role in ensuring that there remains a strong unbundled TV option for viewers. At the same time, it has enabled new entrants such as YouView, which in partnership with BT and Talk Talk, has provided competition in a market otherwise dominated by Sky and Virgin.

DTT's presence in three-quarters of UK homes and delivery of more than 40% of viewing hours makes it the leading platform for UK content, particularly that of the public service broadcasters. By delivering the mass audiences these broadcasters need to invest in new content, DTT helps support a virtuous circle of content creation across the UK's production sector and wider creative industries which are a global success story with the total revenue from the export of UK-originated television shows approaching £1.4 billion<sup>2</sup>.

**Question 2: Do you have any comments on this summary of our approach to spectrum management and on the principles discussed in Annex 5?**

While we agree with the broad principles set out by Ofcom in relation to efficient use of spectrum, we consider DTT to play an important role in the delivery of wider public policy goals which benefit citizens and consumers.

Like all users of spectrum, the DTT platform has a duty to use this scarce and finite resource efficiently. Due to its scale – offering universal coverage and used in three-quarters of homes – the DTT platform is a highly effective way of delivering a rich mix of high quality television, radio services to the maximum numbers of viewers. Other platforms and newer distribution technologies such as IPTV cannot currently - and may never be able to - meet the simultaneous demands of multiple sets in millions of homes as efficiently as DTT.

It is also worth noting the major efficiency gains that the terrestrial platform has made in recent years. These include digital TV switchover which released 112MHz of spectrum auctioned to mobile operators for approximately £2.4bn and the increasing use of improved transmission technologies such as MPEG4 and DVB-T2. Looking further ahead, Ofcom will need to consider that a future move toward an even more efficient HEVC standard would require sufficient spectrum to be made available for DTT use to facilitate MPEG2 or MPEG4/HEVC simulcasting. It is hard to envisage how such a transition could be possible were the amount of spectrum allocated primarily for broadcasting to be reduced.

However, while efficient use of spectrum remains a priority, we would also highlight Ofcom's role, stated at para 4.3 and associated footnote, in reflecting that efficiency should not be the sole consideration:

*'...if efficient use can only be secured at a significant cost to a particular group of citizens or consumers, then securing that increase might be efficient but we would also need to consider whether this outcome would be optimal'.*

The role of DTT is a case in point. As set out in our response to Question 1, the platform plays a unique role in driving choice and competition, supporting PSB programming and ensuring its universal availability free at the point of use. These enduring strengths make it essential that Ofcom considers the indirect and wider social benefits that the platform delivers when seeking the optimal outcomes for citizens and consumers from its decisions on future spectrum allocation.

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<sup>2</sup> PACT, UK Television Exports 2011 (2012)

**Question 3: Do you think we have adopted the right approach to analysing future trends and developments that could raise the need for future regulatory action?**

The analysis used to shape the approach to future trends assumes that the most significant and urgent changes in spectrum supply and demand concern the delivery of mobile data. As we have suggested in this response and elsewhere<sup>3</sup>, we believe the projections used to forecast future demand for mobile data are highly uncertain.

To summarise our view:

- Mobile data demand forecasts (especially those beyond 2020) are inherently uncertain<sup>4</sup>. This is in direct contrast to the proven and enduring public demand for DTT services.
- Wifi and other high frequency off-loading techniques are set to play a greater role in meeting data demand than previously acknowledged. A recent WIK/Aegis report for the European Commission stated that 71% of total mobile data traffic is being carried over wifi connections. That percentage looks set to grow with the rapid rolling out of, amongst other things, femtocells and metrocells.
- Additional spectrum allocations for wifi are likely to be necessary to meet growth of off-loaded mobile data traffic which will significantly outstrip growth of mobile data traffic carried on macro-cellular networks.
- While we support the principle of spectrum sharing and licence exemption to ensure efficient spectrum use, this must be properly planned and managed to avoid interference to licensed spectrum users, such as DTT. See Question 9
- We also urge Ofcom to consider which is the most appropriate spectrum to allocate for mobile broadband use. While the mobile sector is calling for allocations of low frequency spectrum<sup>5</sup> for macro-cellular networks (in particular sub-1GHz spectrum) – the focus ought to be on higher frequencies which enable more efficient frequency re-use. This approach is significantly more effective at meeting high levels of demand than lower frequency networks.
- We also note that much of the spectrum designated for mobile use is still being utilised by legacy systems to deliver 2G voice and text services and question whether more could be done by the operators to re-use this capacity to meet demand.

**Question 4: What are your views on the results of our analysis of future developments summarised in this section and discussed in greater detail in the Appendix to this consultation? Please provide evidence in support of your views wherever possible**

The consultation rates the significance and/or urgency of spectrum changes affecting DTT as amber. While it is not clear precisely how these ratings are reached, such a rating may not adequately reflect the impact of changes in spectrum allocation. Equally, we feel it is of

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<sup>3</sup> See DTT Stakeholders response to Ofcom consultation on Future Demand for Spectrum, 1 May 2013. [http://stakeholders.ofcom.org.uk/binaries/consultations/cfi-mobile-bb/responses/UK\\_DTT\\_Multiplex\\_Operators.pdf](http://stakeholders.ofcom.org.uk/binaries/consultations/cfi-mobile-bb/responses/UK_DTT_Multiplex_Operators.pdf)

<sup>4</sup> For example, the recent report from Real Wireless

<sup>5</sup> Reference the work of ITU WP5A

the utmost importance that sufficient time and resource is devoted to delivering the changes in ways which minimise disruption to the platform and its viewers.

As we set out in our response to Ofcom's call for inputs on the Cost Benefit Analysis for 700MHz Clearance, spectrum changes need to take account of the DTT platform's importance to viewers and role in the success of the UK television sector.

- DTT is the most popular UK television platform, used in over three-quarters of all UK homes, providing universal and free-at-the-point-of-use access to PSB services;
- A key driver of platform competition and innovation which has helped generate investment in high quality UK content and technical innovation;
- An efficient user of spectrum, having completed a switchover programme which enabled the release of 112MHz of UHF spectrum and launching HD services which incentivise the take up of the most efficient broadcast technologies currently available; and
- A unique TV service delivering a range of benefits for which there is no viable substitute in the foreseeable future.

In terms of urgency, we would highlight the costs and complexity of making spectrum changes to the DTT platform. We acknowledge the planning processes already put in place but would urge Ofcom and Government to recognise the need for timely decisions and sound planning if a clearance process is to be completed in an orderly way. Clearing DTT from the 700MHz band would be a lengthy, complex and resource-intensive process. As with DSO and the Channel 61/62 clearance programme, a change on this scale carries risks and needs to be managed carefully by all relevant parties. Extensive planning and programme management resources would be required from all project partners, including (but not limited to) Digital UK, Arqiva Transco, broadcasters, multiplex operators, Ofcom and Government.

Informed decision about the timing of any transition requires certainty in a number of areas, in particular a stable frequency plan agreed with broadcasters, an agreed transition plan and due consideration of the impact on other users, including Programme Making and Special Events (PMSE), Local TV, White Space Devices and radio.

In terms of costs, planning will need to consider technical planning and implementation, programme management costs and consumer issues, such as the provision of public information, support and equipment changes, including the cost of aerial changes for viewers with DTT on secondary sets. Early clarity on how these costs are to be met is essential.

We note at Table 4 the designation of the 470MHz-1GHz bands as having a 'High' probability for changes in spectrum use. While Ofcom has already undertaken a process to consult on the potential clearance of the 700MHz band, this is not the case for the lower bands (470-694MHz). Assuming DTT was relocated to these lower bands as part of a 700MHz clearance process, we consider it vital that DTT remains the designated primary use for these bands. Co-primary designation with mobile broadband would risk viewer and commercial uncertainty which would damage the platform's prospects for continuing as an important provider of social and commercial value, including platform competition.

**Question 5: Do you agree that a consideration of mobile and wireless data demands should feature as a priority area in our work programme for the next ten years? Have we captured all the major issues that we should consider within this area?**

We believe for the reasons set out in our response to Question 3, Ofcom should make proper scrutiny of mobile and wireless data demands a priority. If spectrum is to be taken from licensed users, such as the DTT multiplex operators, to meet anticipated demand, it is vital that those forecasts are based on sound assumptions, especially in relation to the increasing importance of wifi offloading and the potential for alternatives to sub 1GHz spectrum to provide additional mobile capacity.

**Question 6: Do you agree that the future of PMSE spectrum access should feature as a priority area in our work programme for the next ten years? Have we captured all the major issues that we should consider within this area?**

Digital UK welcomes the focus that Ofcom is placing on the future of the PMSE sector in its future spectrum management approach. The members of Digital UK rely either directly or indirectly on spectrum being made available for wireless microphones, talkback, wireless cameras and short term links. These crucial services ensure that high quality productions can be made and sustain the content which underpins broadcasting services in the UK.

Ofcom appears to have captured all of the key elements which need to be addressed in its forthcoming details consultation on PMSE spectrum management. We look forward to seeing what provisions will be put in place to secure the future of the sector. In particular, we hope that sufficient security of access can be found for wireless microphone use of UHF spectrum – an arrangement which can only be facilitated by sharing arrangements with DTT as the primary user.

**Question 7: Do you agree that the implementation of our 700 MHz strategy and the longer term future of DTT should feature as a priority area in our work programme for the next ten years? Have we captured all the major issues that we should consider within this area?**

As expressed earlier, we believe the forecasts underlying Ofcom's 700MHz strategy are open to question. However, should a clearance of the band proceed and DTT be reassigned to alternative spectrum, Ofcom rightly notes the need to address a number of areas such as the regulatory steps in relation to existing users, notably DTT and PMSE; infrastructure and roll out; the allocation of costs; and the auctioning of released spectrum.

In planning its approach to 700MHz over the next 10 years, we believe there are further key considerations, specifically:

- The principles and outcomes which should shape the approach to 700MHz clearance
- The limits of IPTV - even in the longer term
- The need for DTT viewers and platform operators to have reasonable certainty about spectrum allocation

We consider it essential that any planning for 700MHz clearance starts from a principle that broadcasters, multiplex operators and consumers should not bear the burden of additional costs for a process from which they derive no benefit. Specifically, we would urge that Ofcom seeks the following outcomes:



1. That the Freeview platform is not damaged by the process of 700MHz clearance and retains its appeal to viewers and ability to provide competition in the UK market.
2. That DTT coverage is maintained – both for PSB and commercial multiplexes – and that frequency planning scenarios are predicated on maintaining existing platform coverage of 98.5% of households.
3. Viewers affected should be fully supported, in both the provision of information and practical support, especially where equipment such as aerials may need to be replaced.
4. The platform retains scope to grow and deliver more choice for viewers, especially where that creates opportunities to drive the take up of spectrum-efficient technologies and standards such as DVB-T2.
5. In the event that a migration of Freeview to DVB-T2/MPEG4 broadcast standards is required in the timeframes discussed for 700MHz clearance, disruption could be minimised by aligning the timing of this transition with clearance of the 700MHz band.

Ofcom suggests that in the longer term universal take-up of IPTV is a possibility and that this in turn could become a viable distribution method for television as an alternative to DTT.

We believe that internet-based television services, such as streamed channels and catch up, will play an increasingly important role in the future of DTT, providing additional choice and flexibility, complementing rather than substituting a strong linear line-up of broadcast channels.

There remain very significant technical hurdles to be overcome before IPTV could deliver a service even close to that offered by DTT, especially in relation to efficiency, universal availability and being free at the point of use. The consumer demand for watching television via IPTV is also far from proven. Ofcom Communications Market Report 2013 states that 90% of viewing remains linear. This uncertainty about the potential for IPTV – set against the proven and enduring appeal of DTT to viewers – prompts us to believe that there are simply too many unknowns to make decisions in this area.

Looking to the longer term, Ofcom's Strategy Statement stated that harmonising the 700 MHz band globally for mobile and broadcasting on a co-primary basis would lead to DTT being relocated to the 470-694MHz band. Ofcom also notes in its appendix to this consultation that 'further international discussions on the allocations of the bands currently used for DTT are likely to take place ...This could, over the very long term, raise the potential prospect for further changes to the frequencies used by DTT.'

Such changes may involve the designation of these lower bands as co-primary usage with mobile broadband. We feel that the need for a future co-primary designation of these lower bands is far from clear, especially in light of the uncertainty over actual demand for mobile data capacity, as set out in our response to Question 3. What is certain, however, is that such a move would create uncertainty for viewers and industry which in turn could weaken the appeal of DTT and undermine its ability to continue to deliver for citizens and UK television.

We therefore feel it is vital that the UK adopts a position which provides consumer and commercial certainty over the future of the platform. We are aware that the European Commission is already looking at the longer term issues of spectrum allocation, including

the 470-694MHz band – with the prospect of co-primary status with mobile being discussed at WRC 2015.

Given the platform's ongoing importance to the UK television sector and to viewers, we would therefore urge Government and Ofcom to make the case for DTT to retain primary access to this spectrum.

**Question 8: Do you agree that a consideration of competing demands for spectrum at 450 -470 MHz should feature as a priority area in our work programme for the next ten years? Have we captured all the major issues that we should consider within this area?**

- *No response*

**Question 9: Do you agree that spectrum sharing should feature as a priority area in our work programme for the next ten years? Have we captured all the major issues that we should consider within this area?**

We recognise the importance of efficient use of spectrum and the role that spectrum sharing can play. DTT has successfully shared spectrum with other users, including PMSE, for many years and is open to proposals to extend the practice further.

Dynamic spectrum access could help ensure efficient use of spectrum by allowing wireless devices to make use of TV white spaces. While we support the concept of utilising TV white spaces, we have concern over the way Ofcom is currently approaching implementation which could ultimately cause noticeable disruption to TV viewing.

Our concerns centre on four areas in particular:

- The proposed levels of DTT coverage
- The proposed levels of DTT reception
- Coexistence parameters; and
- Sustainability

We summarise our concerns below, and will provide further detail in our response to Ofcom's consultation on this subject.

### **DTT Coverage**

- Ofcom's aim of protecting the headline 98.5% PSB coverage and 90% commercial multiplex coverage does not reflect the reality that virtually every household in the UK currently has access to terrestrial television and that coverage (and potential use) of individual multiplexes is much higher than the core coverage
- The model does not address the fact that coverage of some transmitters already has a lower than required protection from international interference or the transmission modes in use and their differing susceptibility to interference

## DTT reception

- Ofcom has previously required that potential changes to the pattern of DTT reception are the subject of careful planning and checks to ensure that no adverse consumer impact occurred, for example in relation to 800MHz clearance and changes to the FEC mode used by commercial multiplex operators.
- Ofcom's approach appears to have been influenced by the so far lower-than-predicted levels of 4G interference despite the fact that we are still in the early stages of roll out and full interference numbers are not yet known.
- Reception using indoor aerials will not be protected and it is not evident that suitable levels of protection have been taken for the additional HD multiplexes or Local Television.

## Coexistence parameters

- There is no explanation why the proposed co-existence parameters are significantly different from those discussed at length in the Ofcom Technical Working Group meetings.
- We do not agree with Ofcom's proposal to treat a prospective licence-exempt service as if it were a licensed service.

## Sustainability

- The future for TV White Space is uncertain as licensed use of the DTT spectrum increases and possibly further spectrum is removed from broadcasting use in the future.

We also wish to register our concerns in relation to TV white spaces and PMSE. Although Digital UK does not directly use PMSE services, broadcasting relies on content which can often only be produced with the support of PMSE equipment. We therefore strongly support PMSE use of the spectrum and believe that it should be rigorously protected from White Space Device operation.

***Question 10: Do you agree that, in future, we should consider whether and how to play a greater role in supporting improvements to the performance of RF transmitters and receivers? What are your views on the potential future role for regulation in this area?***

We welcome Ofcom's recognition that the developing trend to increase the intensity with which spectrum is used requires that:

- a) the technical performance of every element in the transmission chain be optimised for the application; and
- b) the transmission chain should be considered as a system

This is the case not only when planning a radio service but also when considering issues of coexistence with other services operating in the same and adjacent spectrum.

We agree that technical standards should be forward-looking, rather than short-termist, and that regional or global harmonisation is an important factor, providing this does not lead to standards of performance being limited by the least-demanding requirements, vested commercial, national or regional interests, or the needs of the slowest-moving player, i.e.

being constrained to the lowest common denominator. In some cases it is neither necessary, beneficial nor appropriate to seek a single, global, standard.

We do not agree that technical performance improvements should be demanded at any cost, or that the cost of delivering one service should, through technical performance requirements, directly or indirectly subsidise the introduction of a future new service in the same spectrum, other than at the margins. We believe that existing standards bodies and industry are best-placed to drive standards development which best suit likely applications and the commercial environment, but within a regulatory framework devised to incentivise good equipment performance and to prevent unreasonably poor equipment performance.

We recognise that the transmitter and receiver industries are not always completely aligned so there may be a role for Ofcom and equivalent regulatory bodies to facilitate the alignment of technical objectives and co-operation in striving for “best in class” performance consistent with good business economics. We agree that this is particularly important in areas of spectrum which are, or are likely to be, highly congested, but this is not to say that similar work would not be beneficial in other spectrum bands where demand is currently lower since this may not always be the case.

We agree that it would be beneficial to commence or maintain ongoing improvements in receiver performance (depending on the sector) and reference designs may have a role to play in this. However, we note that Ofcom are not experts in equipment design and are unlikely to become so, so this would inevitably require a discussion with industry which reiterates the role for existing standards processes. For Digital Terrestrial Television we note that the Digital Television Group already provides a co-ordination and standardisation function through its various working groups, culminating in the “D-Book” which sets out the minimum performance and interoperability standards for DTT in the UK. We note that compliance with the D-Book, and indeed any other ad-hoc minimum performance standard is not mandatory, although is a pre-requisite for the use of certain Trade Mark Licences, such as Freeview. Were Ofcom to consider proposing minimum reference standards, it would need to consider how to address three issues:

- 1) prevention of poorly performing equipment from entering the market
- 2) the receiver replacement cycle for any platform where the service provider does not control the ownership of the reception equipment
- 3) end user (consumer expectations) of equipment longevity, noting that for services such as DTT, purchase of a new receiver generally does not remove the older receiver from use; rather it changes the deployment location and purpose for which the receiver is used

Managing user expectations of reception performance in open platforms is challenging and Ofcom would be well advised to carefully consider how it might achieve success before seeking to move into this area.

***Question 11: Are there other issues or potential future challenges that you consider should feature as a priority in our work programme for the next ten years? Please provide evidence in support of your views wherever possible***

- No response

**Question 12: Do you consider that tracking these metrics could be a useful way to help monitor the effects that our spectrum management strategy has on the nature of spectrum access and how this changes over time? Are there any other indicators that we should be seeking to track for these purposes?**

We agree that Ofcom should monitor the effects of its spectrum management strategy on the nature of spectrum access. While the proposed metrics provide a sensible starting point, we consider that they do not fully reflect the consumer and citizen benefits that could arise from spectrum access.

Most notably, the first proposed metric (Market access vs. Public Sector access to spectrum) appears to be overly simplistic, and does not capture the use of spectrum by broadcasting services. For instance, the DTT multiplex operators' use of spectrum is characterised by:

- Use by the BBC, under the BBC Charter and Agreement, and under Ofcom licence.
- Use by ITV and Channel 4 (through the Digital 3and4 joint venture) of reserved spectrum, with part of D3and4's capacity reserved for use by Channel 5.
- Use by SDN and Arqiva of spectrum awarded through a tender of multiplex licences, with part of SDN's spectrum reserved for use by Channel 5.

Therefore, DTT spectrum use is characterised by a combination of capacity reservations to reflect public service broadcasting (PSB) commitments and purely commercial spectrum awards, with licence holders comprising both private sector and public sector entities. It is therefore unclear how Ofcom's simple "Market access vs Public Sector access" metric can properly capture the complexities of DTT spectrum use.

More broadly, in considering metrics relating to spectrum use, Ofcom should not rely solely on quantitative measures, but should also consider the implications of its spectrum management strategy for wider consumer and citizen benefits. For instance, tradeability and liberalisation of spectrum use should not be considered ends in themselves. Such measures could have positive or negative effects on factors such as platform competition, consumer choice or PSB benefit – as a result, Ofcom's tracking activity should be able to recognise and track these wider impacts.

**Question 13: Do you consider that targeted spectrum utilisation measurements could be useful in informing future spectrum management initiatives? What type of specific uses or bands could be the subject of future measurement studies, and why? Please provide evidence in support of your views wherever possible.**

- No response