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BBC



Response to Ofcom consultation

Maximising the benefits of 700 MHz clearance

20 May 2016

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

Summary of response

Digital UK welcomes the opportunity of responding to this consultation. Ofcom raises two issues highly significant to our strategy and the ongoing delivery of the benefits associated with a competitive Freeview platform during and after the delivery of the 700 MHz clearance programme.

1. *Ofcom proposes to bring forward the point at which the 700 MHz band is nationally available for mobile data to a target of no later than Q2 2020.*

We support the Ofcom proposal on acceleration but also note it increases the level of uncertainty in the timetable due to the increased critical path activity.

As part of our 700 MHz programme work, broadcasters have responded to an Ofcom request to provide an accelerated timetable. On that basis, programme partners are already working towards a Q2 2020 target date to complete clearance.

However, acceleration against Ofcom's original completion date of 2022 involves increased uncertainty in meeting the proposed timetable, driven by the removal of much of the contingency to adjust for unexpected events outside the programme partners' control. In particular, acceleration requires four significant main station antenna replacements to be completed in the summer 2017 build season, with little weather contingency, to ensure those sites can transition at the beginning of 2018. This means the level of certainty in the delivery timetable is lower than in previous programmes (DSO and 800 MHz clearance).

Managing the new timetable will require a flexible and agile approach to programme management and a collaborative approach across all parties to ensure appropriate mitigations are in place. If the accelerated plan puts the principles of minimising viewer disruption and cost recovery at risk, or there was a requirement for greater certainty over programme timescales, we recommend reconsidering the timetable and adding time contingency.

2. *Ofcom also proposes to allocate the longer-term use of the centre gap to mobile data services using SDL technology. To enable this, Ofcom proposes to discontinue DTT multiplexes COM7 and 8 at the end of Q1 2020.*

Ofcom's case for intervention to enable SDL use of the centre gap from 2020 is not supported by the available evidence. It is unclear whether SDL demand will emerge in the next four years. Ofcom's proposals therefore raise a significant risk that centre gap spectrum will remain fallow in the early 2020s, and coordination issues may prevent market players from entering into agreements to enable alternative uses such as DTT. Ofcom should delay a decision on the date centre gap spectrum is assigned for SDL use until it is clearer when MNOs would be able to initiate roll-out. This would enable ongoing DTT use for a time-limited period after 2020. Ofcom should only set an end date for the interim multiplex licences when there is clear evidence of demand for SDL deployment.

In putting forward its consultation proposal, Ofcom takes the view that a developing mobile technology with an unknown use case is likely to deliver significantly greater benefits than DTT, a proven and existing use case.

Harmonisation and standardisation prospects for use of the centre gap for SDL in Europe remain unclear. Mobile equipment manufacturers and network operators may not have sufficient incentives to ensure mass-market support for this spectrum band. Parallels with other bands earmarked for use by non-mature mobile technologies suggest that market mechanisms can fail to deliver beneficial spectrum use in a timely manner, with spectrum potentially lying fallow for years. In particular, we note that today, 5 years since initial

discussions to enable SDL use in the L-band, it remains unclear whether and when operators may put this spectrum into use.

Despite this, Ofcom dismisses a proposal by Arqiva to enable transitional use of the centre gap for DTT. A number of important considerations suggest that it is too early to dismiss DTT continuing in the centre gap for a time-limited period beyond 2020.

- Ofcom's view on the interference risks associated with the Arqiva proposal is not based on technical analysis nor testing. On the other hand, we note Arqiva's submission in response to this consultation includes evidence suggesting that interference from DTT transmissions in the centre gap could be manageable and no worse than any interference from SDL use. We encourage Ofcom to consider this.
- As the importance of HD capacity to Freeview increases over time, the impact of discontinuing COM7 and 8 in Q1 2020 is likely to be greater than Ofcom suggests. Ofcom focuses on the current viewing share of channels carried today on COM7 and 8 as a proxy for the value of these multiplexes. Even on its merits, Ofcom's analysis does not consider that choice of content offered is likely to be more relevant than viewing share patterns in determining TV service switching decisions. But more importantly, choice of HD channels is likely to become increasingly important to Freeview audiences over time. As take-up of compatible receivers and average TV screen sizes grow, viewers are likely to expect and consume more HD content. At the same time, demand by channel providers for HD capacity on DTT is likely to grow as the economics of exclusivity of HD channels on pay platforms erode. Ofcom's intervention to discontinue COM7 and 8 in 2020 would, instead, risk the loss of HD channel choice for Freeview audiences. This could create the perception of a shrinking platform, and even a modest influence on the delicate balance between consumers switching in and out of Freeview could have a material impact on platform scale.
- Ofcom does not recognise that the closure of COM7 and 8 in Q1 2020 means that a significant number of viewers will associate the clearance programme with loss of channels. This risks creating challenges in handling viewer communication and support – especially for parts of the country covered by DTT sites that will transition late in the clearance programme.

1. Introduction

1.1 About Digital Terrestrial Television (DTT)

Digital Terrestrial Television (DTT) is the UK's most popular TV platform. At the heart of DTT in the UK 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.

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 per cent of homes.

1.2 About Digital UK

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

We are responsible for day-to-day operational management, including the Freeview electronic programme guide, and lead on developing platform strategy, working with our broadcast partners and industry. We also provide viewers with information and advice about terrestrial TV channels, services and reception.

In September 2015 Digital UK and Freeview launched 'Freeview Play', the new connected TV service which seamlessly delivers on-demand content alongside linear broadcast channels.

Digital UK is owned by the BBC, ITV, Channel 4 and Arqiva.

1.2 Background to our response

A strong and competitive Freeview delivers significant benefits to the UK society and economy, through:

- choice for consumers: Freeview's compelling free-from-subscription TV services sustain competition in TV platforms and support consumer choice in the broader converged market. Freeview's offer ensures UK viewers can continue to enjoy high quality TV without having to be tied to a bundle;
- citizens benefits: DTT delivers universal availability for PSB services in a way that cannot be matched by other delivery technologies over the foreseeable future without significant cost and disruption to viewers;
- un-intermediated, mass market audience reach for broadcasters: Freeview's scale sustains the economics of free to view broadcasting in the UK;
- innovation in consumer electronics through open standards: working with our partners, we coordinate the technical requirements for DTT receivers, across Freeview, Freeview HD and Freeview Play products. This sustains the horizontal market and encourages manufacturers to innovate while ensuring interoperability and broad choice of quality products for viewers.

As the market evolves, ensuring the ongoing delivery of these benefits requires significant efforts by all DTT stakeholders. This needs to include investment by market players, but also regulatory and public policy support. Ofcom acknowledges this point in the Free to View discussion document of 2014. In this documents it notes its *"specific responsibilities for the regulation of DTT [...] go further than our responsibilities for other television platforms,*

reflecting the role that DTT has in making PSB available to all”, while also indicating “a clear [policy] interest in maintaining a balanced broadcasting ecosystem in the UK that provides a choice of platforms and services for viewers”.¹

Digital UK’s strategy focuses on securing the ongoing relevance and competitiveness of Freeview, through initiatives delivered with partnership with industry stakeholders. These include:

- coordinating the successful delivery of the 700 MHz clearance programme: Digital UK has been appointed by the national multiplex operators and Comux to manage and co-ordinate the delivery of the DTT infrastructure programme on their behalf;
- supporting growth of HD take-up in DTT homes: providing choice of HD channels is becoming increasingly important to compete in the TV platforms market, and we recognise that increasing take-up of DVB-T2 compatible receivers is essential to future-proofing the DTT platform. For this reason, Freeview has taken the decisive step that new DTT receivers can only qualify for the Freeview Trademark Licence and Brand if they are DVB-T2 compliant;²
- making hybrid IP / DTT services the new norm for all UK viewers: Digital UK and Freeview have recently launched Freeview Play, bringing together the best of catch-up TV with the popular Freeview service in a simple and integrated product, free from subscription.

This Ofcom consultation raises key issues for the platform’s strategic objectives around 700 MHz clearance, supporting growth of HD take-up in DTT homes and serving the interests of DTT viewers.

We also note DTT use of spectrum facilitates a thriving programme making and special events (PMSE) sector, which underpins the creation of original broadcasting content. Ofcom has long accepted that the PMSE sector (of which Digital UK shareholders are a key constituency) makes a significant contribution to the cultural and social well-being of UK citizens and consumers.

¹ Ofcom discussion document on Future of Free to View, paragraphs 3.5 and 3.11

² This requirement applies to all new TV sets models with screen sizes over 32 inches launched after 1 January 2016, and extends to any other new DTT receiver from 1 January 2017.

2. Responses to consultation questions

Question 1: Do you agree with our provisional assessment of the case for accelerating completion of the 700MHz clearance programme by varying the frequencies allocated to the interim multiplexes?

We broadly agree with the case for accelerating completion of the 700MHz clearance programme by varying the frequencies allocated to COM 7 and COM 8 – and we believe the benefits to viewers from maintaining those multiplexes on air beyond the earliest possible date of licence revocation are greater than the benefits from SDL in the short to medium term. However, we note that this proposal does increase the level of uncertainty in the timetable due to the increased critical path activity, as well as increasing complexity in the plan and, as a result, the number of viewer retunes required.

Following a request from Ofcom in September 2015 to investigate accelerating the timetable, Digital UK, the Multiplex Operators and Arqiva have worked to develop a plan that clears all multiplexes from the 700 MHz band by the end of Q2 2020. This plan was adopted as the working plan for 700 MHz DTT clearance on 31 March 2016.

The accelerated plan has moved more of the build activity on to the critical path, which increases the risk to the successful delivery of the proposed timetable. Four significant main station antenna replacements must be completed in the summer of 2017 to ensure the delivery timetable can be met. Without acceleration, this activity would be removed from the critical path, increasing the level of certainty in the delivery timetable. There is little contingency in the plan to mitigate against major events outside the MuxCos or Arqiva's control like, for example, severe weather events or force majeure events that may lead to delays.

We expect this uncertainty to be manageable with collaborative working and agile programme planning, however it may increase unplanned costs in the form of additional mitigations in the event of delays. There is also a risk that programme spend phasing may change. These risks should be considered in line with the costs and benefits that Ofcom identifies. If the accelerated plan puts the principles of minimising viewer disruption and cost recovery at risk, or there was a requirement for greater certainty over programme timescales, we recommend reconsidering the timetable and adding time contingency.

The duration of the clearance plan is not affected by the additional requirement to move COM 7 and COM 8 to new frequencies – without a full replan the number of clearance retune events would broadly remain unchanged at around 50. However, some of the steps in the plan, which require additional viewer retunes, are incremental. We calculate this requirement drives around 9m households to perform additional retunes (around 20% of the total number of viewer retunes in the current plan). Research has shown viewers are now generally comfortable with retuning but this is likely to increase the number of calls for assistance through the process, and for a small minority of viewer it may cause some minor complications.

Question 2: Do you have any comments on our provisional assessment of the implications the proposed accelerated clearance would have for PMSE users?

Clearing the 700 MHz band will have a significant impact on PMSE users, increasingly so because there is still no clear roadmap for transition, confirmation of interleaved spectrum

availability post clearance, or equipment available for new PMSE spectrum between 960 to 1164 MHz (960 MHz).³ The result of this delay is likely to be:

- i. Increased cost of equipment replacement (users cannot guarantee new purchases will be fit for purpose post clearance until availability of interleaved spectrum is confirmed or equipment is made available in 960 MHz).
- ii. Increased financial and budgetary pressures if funding for users is not provided (this is because the cost of replacement will need to be spread over fewer years to meet the accelerated clearance timetable).

A decision to accelerate clearance would place a further burden on PMSE users. Acceleration means programme makers will need to stop using 700 MHz and move to alternative spectrum a full 18 months earlier than previously planned (i.e. compared to the timeline in Ofcom's previous statement)⁴, and 15 months prior to September 2021.⁵ This brings forward the clearance date for 700 MHz into the period where PMSE users had an expectation of security of tenure.⁶ Ofcom made this commitment to programme makers in recognition of the need for confidence in availability of spectrum so programme makers could invest in equipment.⁷ The guarantee of access until September 2021 was not unequivocal, but the expectations of PMSE around redress if remediation was required before then was very clear⁸: *"These [security of tenure guarantees] will last until at least September 2021 for all spectrum made available for future PMSE access and be subject to a five-year notice period we cannot activate for spectrum-management reasons without PMSE users having an expectation of some form of redress."* (paragraph 1.7)⁹

Absent compensation, the impact of this ongoing uncertainty and the accelerated timetable would mean an additional financial burden for PMSE users. Normally, users would replace equipment over the natural replacement cycle (between 10 and 20 years, with professional-grade equipment operating in interleaved 700 MHz spectrum likely to be at the upper end of this range). An 'ideal' clearance programme would confirm availability of alternative spectrum with as much notice as possible to allow users to remediate over a longer timeframe. But for 700 MHz clearance PMSE users have fewer than four years notice and are *still* unable to take informed decisions when buying new equipment. Equipment is not yet available for 960 to 1164 MHz and frequency plans for the interleaved spectrum have not yet been finalised.¹⁰ This means replacement costs will need to be absorbed over a much shorter time period.

We note for many years PMSE users have urged Ofcom to set out a comprehensive plan to assist transition and this is increasingly, if not already, critical.

³ We welcome this new PMSE allocation and believe this will be a useful resource for low power use subject to confirmation from manufactures that suitable equipment will be brought to market.

⁴ <http://stakeholders.ofcom.org.uk/binaries/consultations/700MHz/statement/700-mhz-statement.pdf>

⁵ Ofcom's statement gives two dates:
<http://stakeholders.ofcom.org.uk/binaries/consultations/bandmanager09/statement/statement310810.pdf>

⁶ <http://stakeholders.ofcom.org.uk/binaries/consultations/bandmanager09/statement/statement310810.pdf>

⁷ cf Paragraph 6.8 <http://stakeholders.ofcom.org.uk/binaries/consultations/bandmanager09/statement/statement310810.pdf>. The 'guaranteed' period of access was set due to end in September 2021 with a five year notice period: *"not to be triggered before September 2016."*

⁸ Expectations of redress are also in keeping with the conclusion reached by the Lamy Report which said: "Member States should ensure that broadcasters and PMSE users are left no worse or no better off than they would have been without any clearance of the 700 MHz band."

⁹ <http://stakeholders.ofcom.org.uk/binaries/consultations/bandmanager09/statement/statement310810.pdf>

¹⁰ Ofcom had previously highlighted the importance of five years notice, in line with other licence sectors. See for example paragraph 6.32 "This five-year security of tenure period, as provided to other sectors, is likely to be sufficient to allow efficient investment decisions by PMSE under normal circumstances."

Question 3: Do you agree with our provisional assessment that SDL is likely to represent the optimal use of the centre gap?

We do not disagree with Ofcom that SDL demand may emerge over the longer term. However, as we discuss in more detail below, it is unclear whether sufficient demand will have emerged by the early 2020s to put that spectrum into efficient use.

Given this uncertainty, a spectrum award that prevents alternative uses over any interim period between Q1 2020 and the point in time when SDL technology has sufficiently developed may not be consistent with Ofcom's duty to secure optimal use of spectrum.

In the consultation document, Ofcom notes that Arqiva and the MNOs holding licences in the centre gap may reach agreement to extend the period during which the spectrum remains available for DTT. But there could be practical reasons why market participants may not be able to reach such an agreement. For example, Arqiva may need to decide on the business case of moving COM7 and 8 to alternative frequencies before there is clarity on the outcomes of a centre gap spectrum award, leaving no option to evaluate the case for a commercial agreement with an MNO. We also note that, due to the nature of DTT as a free-to-air service, a multiplex operator's ability to monetise spectrum access, and therefore to compete in a market-based spectrum award, is not necessarily comparable to that of an MNO, providing paid-for mobile broadband services to consumers.

Ofcom should therefore take steps to ensure centre gap spectrum does not remain fallow, which would be the result of the current plan if demand for SDL did not materialise in 2020. In the absence of significant evidence, we believe Ofcom should delay taking a decision on the date centre gap spectrum is assigned for SDL use and retain the option of enabling DTT use of the centre gap for a time limited period after 2020. The end date would then be set only when evidence was available to determine when SDL technologies would realistically be rolled out by MNOs.

Question 4: When is the demand for spectrum for SDL first likely to arise?

Question 7: Do you agree with our working assumption that there will be significant demand for SDL spectrum in the centre gap in the early 2020s?

The available evidence does not support Ofcom's working assumption.

SDL is a developing technology and there is significant uncertainty as to whether harmonisation and standardisation conditions will be in place to allow for demand from mobile operators to emerge by the early 2020s. This is stark contrast with the known and proven use case for maintaining centre gap spectrum available for DTT over an interim period in the early 2020s.

Conditions for use of the 700 MHz centre gap are not fully harmonised. It is very unlikely that a single harmonised band plan for the 700 MHz centre gap will be adopted in Europe in the foreseeable future. The recent EC decision on 700 MHz harmonisation conditions gives Members States flexibility on use the centre gap, allowing four possible uses of the centre

gap (or some combination of the four).¹¹ We also note that work on technical standards for SDL use of the centre gap is still at an early stage¹² and that the practical implementation of this technology in mobile devices and networks could present technical challenges.¹³

Widespread adoption across Europe and standardisation are key conditions for the economies of scale required to support SDL demand. But it is unclear whether these could be in place by 2020.

On the networks side, operators have multiple technology solutions to meeting increasing mobile data demands. All of the following are likely to be more readily available than the use of 700 MHz centre gap spectrum:

- full use of 800 MHz and 2.6 GHz spectrum allocations for 4G;
- re-farming of 2G and 3G spectrum;
- wider support of LTE-A enhancements in base stations to make full use of the capabilities of new devices;
- greater use of small cell sites to address demand in high population density areas; and
- FDD deployments at 700 MHz post clearance.

On the device side, SDL support in the centre gap by global manufacturers such as Apple and Samsung may be, at best, slow to emerge – as they may prioritise the spectrum bands discussed above. We note Ofcom's own technology research suggests only a limited number of core bands are likely to be supported in mass market consumer devices due to technical constraints likely to persist over the foreseeable future.¹⁴

Parallels from other bands illustrate that the (networks and devices) ecosystems required to ensure optimal use of bands allocated to mobile use can be slow to emerge, especially where the relevant technologies are not yet mature and widely established. For example:

- the L-band, which Ofcom uses as a proxy for value of SDL use in the centre gap, was first awarded in the UK for mobile TV use in 2008. Discussions on its potential re-purposing for SDL use emerged in 2011, with a harmonisation decision by CEPT following in 2013. Despite being harmonised, and recently sold by Qualcomm to Vodafone and H3G, there are still no mass market consumer devices that support this band, and it is unclear whether and when operators may put this spectrum into use;
- the 2.6 GHz centre gap was harmonised for LTE TDD use in 2008, and awarded as part of the 4G auction in the UK in 2013. We note that although compatible mass-

¹¹ We note the uses alternative to SDL discussed in the EC legislative proposal include PPDR, PMSE, M2M, but also DTT under exceptional circumstances and for a transitional period. For countries known to the evaluating other uses of the centre gap e.g. France and Germany with PPDR, potentially alongside SDL, we note that considerable further work is required to determine if this will be technically possible given interference risks.

¹² The latest version of 3GPP Release 13 refers to SDL use of band 67, but real world simulations of the early specification are yet to take place.

¹³ [§<]

¹⁴ http://stakeholders.ofcom.org.uk/binaries/research/technology-research/2013/RF/Future_Mobile_Handset.pdf

market consumer devices were already available in the UK market in late 2014,¹⁵ as of July 2015 the bands were not yet in use.¹⁶

These cases illustrate that even where harmonisation conditions are in place, timescales required to put into economically beneficial use bands assigned to non-mature mobile technologies can be long and uncertain. In the case of SDL at 700 MHz, lack of clarity over adoption across Europe compounds these uncertainties. The Ofcom proposals therefore risk leaving spectrum in the centre gap fallow in the early 2020s.

Question 5: Do you agree with our provisional view that the interim multiplexes should not operate in the centre gap beyond the end of Q1 2020 (that is, shortly before we expect the 700MHz band to become available for mobile data, in line with our proposals)?

We do not believe there is sufficient evidence to support Ofcom's provisional view. We believe, based on available evidence, that demand for SDL is unlikely to emerge as early as 2020 and there is therefore a risk spectrum will go unused. We also believe Ofcom's proposal underplays the impact on viewers linked to likely loss of HD channel choice.

Ofcom takes the view that discontinuing COM7 and 8 would not materially impair the platform's ability to compete effectively. This view relies on a static assessment of the channels that are available today on those multiplexes, and the fact that they currently attract a viewing share that Ofcom puts at 0.5%.

Three sets of considerations indicate that the impact of discontinuing COM7 and 8 would be greater than Ofcom suggests.

First, the 0.5% figure Ofcom cites underrepresents viewing to COM7 and 8 channels:

- BARB data on DTT viewing in recent months indicates higher share (0.7%), suggesting that consumption of those channels is growing as consumer awareness and T2 enablement increases;
- some channels on COM7 and 8 do not participate in BARB measurement, suggesting viewing share of all channels carried on those multiplexes could be higher than reported by BARB;
- viewing of channels on COM7 and 8 is constrained by T2 receiver penetration that we estimate at circa 50% of main sets, and household coverage of COM7 and 8, which, at c76%, is lower than for commercial (c90%) and PSB multiplexes (98.5%). By normalising recent BARB-measured viewing share (0.7%), we estimate that COM7 and 8 channels tracked by BARB could be achieving 1.6% share in homes that can receive them.

Second, we consider that viewing share patterns are an inaccurate proxy for the value attached to channels carried on COM7 and 8. Ofcom's argument that channels amounting to 0.5% are not significant to the competitiveness of DTT imply, by extension, that Sky could

¹⁵ These include the iPhone 6, launched in 2014 with TDD LTE support to ensure Apple could effectively target the Chinese market, where, contrary to Europe, TDD technology is widely adopted.

¹⁶ <http://www.analysismason.com/Research/Content/Comments/TD-LTE-emerging-markets-Jul2015-RDTN0/#08%20July%202015>

afford to close 70 of its 320 main (BARB-tracked) channels with no discernible impact.¹⁷ This is not credible. Our research illustrates that the choice of content offered by TV platforms¹⁸ is an important factor in driving consumer switching decisions. Viewing share, instead, is not necessarily as relevant.¹⁹

Third, Ofcom takes its view based on a static analysis, but a dynamic assessment of future market changes would be more relevant to this policy decision.

It is likely that choice of HD channels will become increasingly important to DTT viewers over time:

- As average TV screen sizes continue to grow,²⁰ more consumers are likely to expect HD content as a core part of the service offered by TV platforms.
- Viewing to HD channels will grow in part thanks to increasing take-up of compatible receivers,²¹ supported by action to ensure no new Freeview-branded TVs and STBs incompatible with DVB-T2 standards are sold from 2017 onwards.

Since launch of Freeview HD in 2010 the number of HD services on DTT has steadily grown. As HD becomes a standard part of the offer of pay platforms, it is likely that the premium associated with making HD channels pay exclusive would erode over time. This, together with the availability of spare DTT capacity, could lead more broadcasters to seek to make HD channels available on Freeview over time.²²

Ofcom's proposals, however, raise a significant risk of loss of HD channel choice for Freeview audiences in 2020. [redacted].

The Ofcom proposal would also raise risks for the successful delivery of the 700 MHz programme. Discontinuing the interim MUXes during the clearance process would link the programme to loss of TV channels for viewers. Unlike DSO, which had clear consumer benefits, and 800 MHz clearance, which had no material effect on viewers, 700 MHz clearance may lead to loss of channels for a significant proportion of DTT homes.²³ If we account for those performing clearance retunes up to 6 months before or 3 months after the closure of COM 7 and COM 8 around 31 March 2020, this equates to around 7m DTT homes (over 35% of those affected by clearance) that may link the closure of the COM 7 and 8 channels with clearance itself. This would create challenges in handling viewer communication and support for those homes.

¹⁷ Source: BARB / TRP Research Ltd, based on viewing on DSAT Platform with Sky, period 1605-1608 (01-02-16 - 28-02-16)

¹⁸ [redacted]

¹⁹ [redacted]

²⁰ In 2010, 30% of Freeview TVs sold had a screen size of 32 inches or above. In 2015, this proportion had grown to 57% (source: GfK). Manufacturers ongoing focus on HD and UHD screens is likely to sustain this trend over time.

²¹ [redacted]

²² The recent launch of Channel 5 HD on Freeview and Freesat illustrate this trend. This is the latest of a series of commercial PSB HD channels that, since the launch of Freeview HD, has become available free-to-air while lifting of encryption on pay platforms at the same time.

²³ If 80% of primary DTT homes have T2-compatible receivers in 2020 (cf 3R estimate for end 2019) and *conservatively* assuming that homes within COM7 and 8 coverage (76% of UK households) are no more likely to have a T2-compatible receiver (even though the availability of additional channel is likely to play a part in consumers equipment purchasing decisions), then over half of DTT primary sets may lose channels on COM7 and 8

Question 6: Do you have any evidence/analysis on the scale of the risk of DTT services in the centre gap causing harmful interference to mobile data services in the paired part of the 700MHz band?

Ofcom concludes that *“there is likely to be a material risk that DTT transmissions in the centre gap would cause harmful interference to mobile data services in the paired part of the 700MHz band.”* and therefore dismisses the option outright.

We note that this view has been reached without technical analysis or testing. This runs counter to the usual approach adopted by Ofcom in considering boundary coexistence between services (e.g. 800MHz LTE/DTT; PMSE/DTT; TVWS/DTT; various 450 – 470MHz users/DTT) where extensive theoretical analysis and practical testing has been conducted prior to a conclusion being reached.

Ofcom rightly observes that it has a *“duty to ensure efficient management and use of the spectrum”* and we would note that in previous cases where questions of coexistence have arisen, Ofcom has commissioned a set of detailed coexistence measurements using available equipment, before reaching a conclusion. We believe that Ofcom should do likewise in this case.

In particular, we note Arqiva’s submission in response to this consultation includes evidence suggesting that interference from DTT transmissions in the centre gap would be manageable and no worse than any interference from SDL use.

Paragraph A6.3 1) questions *“whether base stations will be deployed with sufficient filtering to ensure an acceptable level of performance in the network alongside DTT”*.

We would argue that limiting the use of the centre gap to applications which can co-exist with base stations operating with the lowest possible form of filtering would not necessarily represent an efficient use of spectrum. There is a risk in this scenario that the base station characteristics will unnecessarily constrain the utility of the centre gap both now and in the future, particularly since it is not yet certain that SDL services could or would be deployed in the spectrum, raising the possibility of it being allocated to other services at a later date.

A6.10 also suggests that *“there is a material possibility that DTT interference will be more aggressive than interference from SDL services - for example because DTT’s radiated power is higher”*. We contend that that the higher radiated power of DTT is not necessarily a factor; the key issue is the level of signal received by the victim device. As seen in the 4G coexistence work, LTE base stations are generally located close to the populations they serve and hence the received signal strength is similar to, if not higher than, the DTT signal. Further, the most aggressive forms of interfering signals tend to be of a bursty nature as may be the case for SDL, whereas DTT transmission levels are stable.

Paragraph A6.3 2) questions *“whether mobile handsets are robust to DTT interference”*. We agree that handsets may experience a level of interference from DTT and that there is less control over handset performance, but we note that co-existence studies could be undertaken using available equipment to test the likelihood of handset/DTT coexistence being an issue in practice. We also re-iterate that Arqiva’s technical analysis suggests that any interference to handsets would be no worse than that caused by SDL.

Question 8: Do you have any further comments or views on other aspects of this consultation which are not covered above?

No other comment.