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# Three's response to Ofcom's Call for input: UK preparations for the WRC- 23

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Non-confidential

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This is a non-confidential version. Confidential redactions are marked with [X].



**Three.co.uk**

# Executive Summary.

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Three UK welcomes the opportunity to contribute to the UK's preparation for WRC-23. Next year's conference provides a great opportunity for the UK to support harmonisation of two bands which we believe will be critical to enabling UK mobile networks to continue meeting consumer demand in the future.

Our modelling indicates that [X]. In this response, we set out:

- Why Ofcom should support the upper 6GHz band (6425-7025MHz) being identified for IMT. This spectrum's available bandwidths and propagation characteristics make it the standout candidate band to relieve future congestion in urban areas. We are unaware of any other solutions (including network densification) which could feasibly substitute for additional mid band spectrum in relieving future congestion at scale across urban areas.
- Why Ofcom should support a co-primary identification of the 600MHz band (470-694MHz) for mobile and television broadcasting. Although it may believe that the band is currently efficiently allocated to digital television (DTT), the trends clearly indicate a move away from traditional viewing methods. A co-primary allocation would give Ofcom the flexibility to reallocate the band once it becomes clear that it would be more efficient for it to be used for IMT.

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# 1. Ofcom should support the licenced use of the upper 6GHz band for mobile in Region 1.

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## Executive Summary

Three UK's view is that the upper 6GHz band will be critical to ensure that future 5G and 6G mobile networks will be able to provide the services that consumers demand. We expect the spectrum will be critical to provide future congestion relief given its propagation characteristics and available bandwidth.

We expect that other uses, such as licence-exempt use for Wi-Fi, will be far less valuable/efficient than mobile. For this reason, we are seeing 6GHz spectrum being planned for mobile use across the world and ask that Ofcom reflects this by supporting IMT identification of the upper 6GHz band in Region 1.

Taking a 'no change' position and delaying identification of the band for IMT until the subsequent WRC conference (at the earliest) would result in UK MNOs' networks congesting in the mid-2020s to the detriment of customer experience.

In the rest of this section we:

- Provide evidence [REDACTED]; and
- Address Ofcom's apparent arguments for not supporting IMT identification of the upper 6GHz band.

[REDACTED]

Ofcom indicates in its Meeting Future Demand for Mobile Data discussion paper (hereafter referred to as the 'Discussion Paper') that UK MNOs' networks will start to become congested by 2025<sup>1</sup>. [REDACTED]<sup>2</sup>

[REDACTED]

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<sup>1</sup> [Discussion paper: Meeting future demand for mobile data \(ofcom.org.uk\)](#)

<sup>2</sup> [REDACTED]

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**Figure 1:** [✂]

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[✂]

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Source: Three UK

[✂]

**Ofcom's current position on the upper 6GHz band does not reflect the realities of managing mobile congestion**

Ofcom's position<sup>3</sup> appears to be that [✂] it will not support identification of the upper 6GHz band for IMT at WRC-23 on the basis that:

1. The additional spectrum is very unlikely to be sufficient to meet future mobile traffic needs (e.g. beyond 2030) on its own.
2. Use of mmWave spectrum and network densification (e.g. deploying mmWave spectrum on small cells) have the potential to significantly increase capacity to a greater extent than adding the upper 6GHz band to existing site grids.
3. Mobile use would require it to be cleared of existing users such as fixed links, making it unlikely that the band could be used for mobile until towards the end of the decade.
4. There is no clear consensus on the sharing studies with Fixed Satellite Services (FSS) for this band. Ofcom's initial view is that sharing may not be feasible.
5. Licence-exempt use is a credible alternative for the band.

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<sup>3</sup> For example, as reported in its submission to the CEPT meeting on 26-30 September 2022.

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6. Standardisation work for the band was completed this year, providing a basis for industry to develop products for the spectrum without the need for IMT identification.

We address each of these issues in the following sub-sections.

*Mobile operators cannot rely on just one solution to provide additional network capacity*

The implication of Ofcom's view in (1) appears to be that use of the upper 6GHz band for mobile will not be worthwhile since it may not relieve all congestion on a mobile operator's network. This risks fundamentally misunderstanding how mobile networks are built and upgraded to provide additional capacity.

Mobile operators increase their network capacity through a combination of deploying more spectrum across different bands, building/upgrading mobile sites **and** improving spectral efficiency. The recent explosion in traffic growth has meant that we must regularly increase our utilisation across all three of these categories and cannot rely on just one. For example, we have recently:

- Purchased 20MHz of 5G **spectrum** in the 2018 3.4GHz auction, a further 20MHz of 700MHz spectrum in the 2022 auction and have an ongoing programme to deploy it alongside our other holdings.
- Undertaken a project to deploy [X] new **mobile sites** to relieve congestion in busy areas and deploy our 5G spectrum holdings across [X] sites.
- Deployed antennas with the greatest **spectral efficiency** [X]. We are also planning to shut down our 3G network to refarm spectrum to the more efficient 5G technology.

We have no expectation that allocation of the upper 6GHz band for mobile use would be a panacea that would obviate the need for any further network investment to increase capacity. Instead, it would be a vital ingredient required alongside other investments we are either undertaking today or planning in the future.

As we discuss in our response to the Discussion Paper, alternative approaches to increasing network capacity to meet forecast traffic are not practical nor economic on the scale required to relieve future forecast network congestion.

- Releasing additional **1400MHz SDL spectrum**, although welcome, will have minimal impact in the non-ECA. The propagation characteristics and small available bandwidths will have little to no impact in the high footfall areas where mid band spectrum is best used to offload traffic.
- We already have plans to **deploy our existing spectrum holdings** across [X] our sites [X].

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- Although we will likely aim to deploy **additional macro sites** to densify our network further<sup>4</sup>, it will become more challenging to do so in the future given a lack of appropriate locations and potential interference. We agree with Ofcom's view set out in its Discussion Paper that further macro cell deployments on the scale required to relieve future congestion will be infeasible.
  - Although **indoor in solutions** (WiFi, Femtocells, in-building solutions) may be useful for offloading traffic in hard-to-reach areas, they will have little impact in the non-ECA.
  - Although we have plans to switch off our 3G network by 2024 to **refarm the spectrum to more efficient technologies** and repurpose some 4G spectrum to 5G (e.g. through dynamic spectrum sharing), this will have a marginal impact on our requirement for further mid band spectrum.

The remaining options to relieve congestion in the non-ECA are either to densify our networks with mmWave spectrum or use additional mid band spectrum such as the upper 6GHz. We discuss the former in the next sub-section.

*mmWave spectrum and network densification will not be used on the scale assumed by Ofcom to relieve future network congestion*

Ofcom's findings in its Discussion Paper that MNOs will not require further spectrum by 2030 to relieve network congestion are predicated on an assumption that MNOs will deploy 'many thousands' of small cells with mmWave spectrum by 2030 and tens of thousands by 2035.

As we set out in our response to the paper, this assumption hugely overestimates the extent to which we will be able to deploy mmWave spectrum for two reasons.

Firstly, widespread small cell deployments are **uneconomic**. Our assessment is [redacted]. Figure 1 illustrates the economic challenges of deploying small cells compared to macro sites. Macro sites are the cheapest solution for all three cost categories and, most notably, opex is far lower on a macro site than small cells.<sup>5</sup> [redacted].

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<sup>4</sup> [redacted].

<sup>5</sup> As recognised by Ofcom. [Ofcom 2022, Mobile Networks and Spectrum: Meeting future demand for mobile data](#), paragraph 5.66.

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## Figure 2: Small cell and Macro site cost comparison [✂]

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[✂]

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Source: Three UK

Small cells are not a cost-effective substitute for deploying additional spectrum on existing macro sites. The number of small cells that would be required to provide similar capacity and speeds to users would be so large as to be uneconomic. In practice, an MNO cannot address a shortage of spectrum through small cell densification. Faced with high costs of small cell deployment, UK MNOs will have less of an incentive to expand capacity and compete aggressively for new customers and are likely to provide inferior services once their networks become congested.

Secondly, small cells are not **practical** for widespread network deployments since they need to be positioned very precisely to efficiently reduce spectrum congestion. In many cases this will not be possible for various reasons (e.g. lack of street furniture, power, transmission or planning issues), requiring an alternative approach to reduce network congestion.

These sentiments are not ours alone. In response to Ofcom's Discussion Paper, all four MNOs presented significant misgivings with Ofcom's views on the scale of future mmWave deployments. Our view is that Ofcom must put sufficient weight on these concerns given that these are the firms with experience of trialling and, in some cases, commercially deploying small cells.

BT stated<sup>6</sup>:

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<sup>6</sup> [BT \(ofcom.org.uk\)](http://ofcom.org.uk)



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*“In summary, the availability of mmWave will not avoid the requirement for additional mid-band spectrum to deliver more network capacity. mmWave coverage range is relatively limited and mid-band spectrum (i.e. U6 GHz) would be the more viable and complementary solution to mmWave for capacity provision in many circumstances.”*

VMO2 stated<sup>7</sup>:

*“In its discussion document, Ofcom suggests that in its medium growth scenario, 30,000-50,000 small cells would be required nationally per operator. In its high growth scenario, it says that this increases by potentially more than an additional 10,000 per operator, possibly in excess of 100,000 per operator, by 2035. Under the existing scenario of four MNOs, this suggests between circa 600 to circa 7700 additional small cells, per operator, every year, for thirteen years. Whilst small cell acquisition and deployment may not be as difficult as that for macro cells, there are still considerable financial and practical considerations involved in meeting these growth scenarios.”*

Vodafone stated<sup>8</sup>:

*“We do not agree with Ofcom’s conclusions that meeting this demand is best accomplished via densifying networks with existing and pipelined (1.4 GHz, 26 GHz) spectrum. We do not believe that such a densification approach is achievable technically, and there is no sensible investment case for introducing up to 50,000 new cells to UK mobile networks, unless consumers are willing to pay considerably more for mobile service.”*

*Existing users of the upper 6GHz band should be no impediment to prompt mobile use*

Ofcom’s view in (3) appears to be that the time taken to clear the band of existing users will mean that it will be unavailable for high power mobile use until later in the decade. Ofcom then contends that, by that time, mobile operators are ‘likely to have needed to implement other measures to deal with traffic growth’.

Firstly, it is not clear that existing use of the band would be an impediment to mobile deployments. The upper 6GHz band is currently primarily shared between approximately 500 fixed link users<sup>9</sup> and Fixed Satellite Services (FSS).

Mobile operators have experience coordinating with **fixed link users** on a case-by-case basis in other spectrum bands (e.g. 1400MHz) with little problem. If coordination is not possible, Ofcom should undertake a cost-benefit analysis to assess whether the benefits of keeping fixed link users in the band outweigh the costs of denying the spectrum to other users

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<sup>7</sup> [VMO2 \(ofcom.org.uk\)](https://www.ofcom.gov.uk/consult/condocs/vmo2/vmo2.pdf)

<sup>8</sup> [Vodafone \(ofcom.org.uk\)](https://www.ofcom.gov.uk/consult/condocs/vodafone/vodafone.pdf)

<sup>9</sup> As reported in Ofcom’s recent consultation on enabling spectrum sharing in the upper 6GHz band.

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- (such as mobile). We note that it has similarly recently consulted on evicting fixed link users from both the 26GHz and 40GHz bands.<sup>10</sup>
  - Contrary to Ofcom's view in (4), our understanding is that studies have shown that 5G deployments can coexist with **FSS**.

The multi-company response to this call for inputs, which we have supported, discusses coexistence with existing users of the upper 6GHz band in more detail.

Secondly, Ofcom's contention that MNOs will find other methods to alleviate congestion if clearing the upper 6GHz band takes multiple years does not reflect the practical and economic implications of doing so. As we discuss above, there are no feasible alternatives to additional mid band spectrum to relieve future congestion at scale. We would, therefore, reasonably expect MNOs to have no alternative but to accept network congestion across their network in the absence of access to 6GHz spectrum.

*Licensed use of the upper 6GHz band for 5G/6G mobile is likely to be more efficient than licence-exempt use*

Ofcom's view in (5) is that licence-exempt use of the upper 6GHz band is a credible alternative to mobile. It, however, has provided no evidence to suggest that it would be more efficient to allocate it to licence-exempt use than mobile.

As we discussed in response to Ofcom's Discussion Paper, we believe the most efficient use of the upper 6GHz band would be to licence it for mobile spectrum from 2025 onwards. Other uses could be supported by the lower part of the band.

This view is supported by a cost-benefit analysis undertaken by the GSMA.<sup>11</sup> They assess the use of the 5925-6425MHz and 6425-7125MHz bands for licensed or licence-exempt use. The study concludes that allocating the upper 6GHz band for licensed mobile use – when the lower 6GHz band is allocated for licence-exempt use – would drive the greatest socio-economic benefits even with extremely high-speed fixed broadband availability.

We would invite Ofcom to undertake a comparable study of its own before taking a view on whether it should support licensed mobile use or licence-exempt use in the upper 6GHz band.

*Mobile operators require IMT identification of the upper 6GHz band to push the ecosystem*

In (6), Ofcom appears to consider that support for identification of the upper 6GHz band for mobile use is not necessary in WRC-23, since standardisation work for the band via 3GPP is already complete. Its view is that industry can,

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<sup>10</sup> [Ofcom 2022, mmWave consultation](#)

<sup>11</sup> [The socioeconomic benefits of the 6 GHz band \(gsmaintelligence.com\)](#)

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therefore, already develop products for this spectrum without the need for IMT identification.

The development of mobile ecosystems for a particular band only starts once there is demand from the mobile operators. For example, equipment manufacturers typically require MNOs to commit to a minimum order before they develop units which support new bands.

This cannot happen if a band is standardised but not harmonised since there can be no realistic expectation that the band will be allocated to mobile in a country without harmonisation. No rational MNO would place orders for equipment that supports a band which is unharmonised in its region and, therefore, has no prospect of being allocated to mobile in the medium term.

**Ofcom should support the upper 6GHz band being identified for mobile use at WRC-23**

WRC-23 will play an important role in determining future access to the upper 6GHz band (6425-7125MHz). It provides an opportunity to harmonise the band across large parts of the globe to help continue development of the 6GHz ecosystem so that it can be ready to alleviate significant network congestion in the mid-late 2020s. We urge the UK to support the licensed use of the upper 6GHz band for mobile in Region 1 and then for Ofcom to subsequently allocate the spectrum for wide-area deployment of mobile networks in a timely manner, to keep up with forecast demand growth.

## 2. Ofcom should support identification of the 600MHz band for mobile use.

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### Executive summary

The 600MHz band is currently used for Digital Terrestrial TV (DTT) services. DTT use in the UK is in long-term decline as consumers increasingly watch content online, while demand for mobile services continues to grow rapidly. As a result, we believe that this band should be allocated for mobile use as soon as possible and ask Ofcom to support measures at WRC-23 which will enable it to do so once the usage of DTT services no longer warrants the use of the band.

Below, we summarise our position in response to Ofcom's Discussion Paper on the future of the 600MHz band which similarly applies to the UK's position at WRC-23. In particular, we provide evidence that:

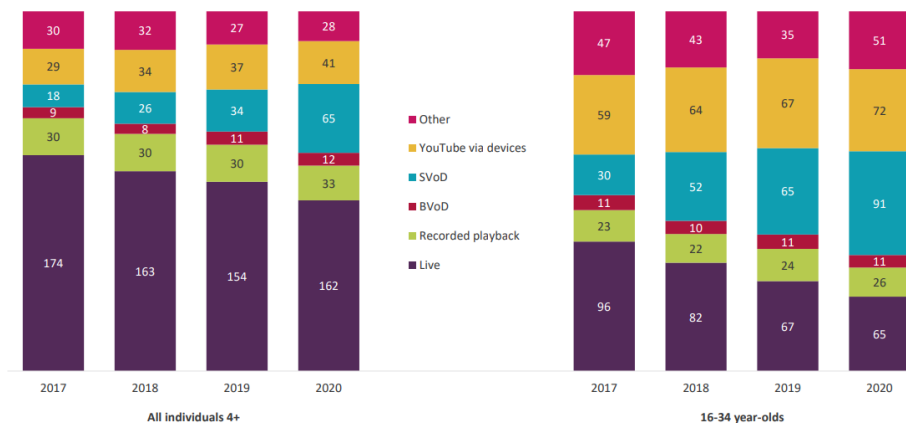
- DTT services are in long term decline, indicating that the value of allocating the 600MHz band to DTT is falling over time.
- The case for the use of the 600MHz band for mobile is become increasingly compelling as mobile networks in hard-to-reach areas become more congested over time.

### **DTT Services are in long-term decline as consumers increasingly watch content online.**

Traditional TV viewing via DTT is in long-term decline as consumers increasingly watch TV via their internet connection. The shift from traditional to online viewing is even larger for younger viewers (aged 16-34 years old).

### Figure 3: Ofcom viewing minutes statistics (2017-20)

Figure 2.10: Average minutes of viewing per day on all devices, by type (2017-20)



Source: Ofcom estimates of total audio-video viewing. Modelled from BARB, Comscore and TouchPoints data.

Source: Figure 2.10 from Ofcom's Media Nations: UK 2021 report

In Ofcom's Media nations: UK 2021 report<sup>12</sup>, it discusses further the rise in IP TV and notes that the Covid-19 pandemic has accelerated the trend in watching on-demand services. Ofcom notes that:

- 65% of UK households used superfast or ultrafast services in Q1 2021 (in addition, Ofcom's 2021 Connected Nations report states that superfast broadband is available to 96% of UK households);<sup>13</sup>
- 74% of households used a BVoD service such as BBC iPlayer and 75% used an SVoD service such as Netflix, whereas only 42% of households used traditional TV;
- Nearly half of UK adults now consider online video services to be their main way of watching TV and film;
- There has been an increase in the number of smart TVs, with 79% of households connecting their TV to the internet; and
- Public Service Broadcasters (PSBs) are repositioning their businesses for an online-first future:

<sup>12</sup> [https://www.ofcom.org.uk/data/assets/pdf\\_file/0023/222890/media-nations-report-2021.pdf](https://www.ofcom.org.uk/data/assets/pdf_file/0023/222890/media-nations-report-2021.pdf)

<sup>13</sup> [https://www.ofcom.org.uk/data/assets/pdf\\_file/0035/229688/connected-nations-2021-uk.pdf](https://www.ofcom.org.uk/data/assets/pdf_file/0035/229688/connected-nations-2021-uk.pdf)

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- Channel 4 set out a new five-year plan to double viewing on All 4 and is increasing the number of series that are available in full as soon as the first episode becomes available;
  - ITV has restructured its broadcast business by positioning a new on-demand unit as its vehicle for growth, to cater for audiences that do most of their viewing online;
  - Channel 5 restructured in 2021 to combine two VoD assets into a single, new division and has been expanding the My5 content library;
  - The BBC is continuing to evolve iPlayer by making more programmes and films available for longer and ahead of broadcast schedule, among other improvements; and
  - According to reports, PSBs have discussed the development of a single, free streaming app that would aggregate all their live broadcasts and on-demand content in one place, accessible via a single sign-on.

We believe a reasonable case could be made for a mass-market switch to IP TV. In its 2014 document, *The Future of Free to View TV*, Ofcom considered the conditions needed for a mass-market switch to IP TV.<sup>14</sup> Below, we set out Ofcom's list of factors along with what Ofcom stated needed to be done for each, and we have added a column containing the latest data. We note that this is historic data and so the current position is likely an even larger switch from DTT to IP TV.

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<sup>14</sup> Figure 5.3, [https://www.ofcom.org.uk/\\_data/assets/pdf\\_file/0015/32640/Future-of-Free-to-View-TV.pdf](https://www.ofcom.org.uk/_data/assets/pdf_file/0015/32640/Future-of-Free-to-View-TV.pdf)

**Table 1: Ofcom's view (in 2014) on the conditions required for a mass-market switch to IP TV and the latest data**

	<b>What needs to be done?</b>	<b>Latest evidence</b>
Universally available superfast broadband	<ul style="list-style-type: none"> <li>• 30Mb/s broadband available to 95%</li> <li>• Solution for remaining 5% to receive sufficient broadband for IP TV</li> </ul>	<ul style="list-style-type: none"> <li>• 96% superfast (30Mb/s) availability<sup>15</sup></li> <li>• 0.4% (123,000) of premises can't access decent broadband (10Mb/s) but Ofcom expects this to fall to 100,000 in next year and broadband USO will provide connections to some of these premises<sup>16</sup></li> </ul>
High broadband take-up	<ul style="list-style-type: none"> <li>• Expect at least 90% households to have broadband by mid 2020s</li> <li>• Potentially up to a quarter won't have superfast broadband by mid 2020s</li> </ul>	<ul style="list-style-type: none"> <li>• 86% had broadband in 2021<sup>17</sup></li> <li>• 69% of those that can get superfast or faster broadband did so in 2021<sup>18</sup></li> </ul>
Near universal take-up of IP TV equipment	<ul style="list-style-type: none"> <li>• Estimated that 27% of TV sets were connected to internet, need more IP-capable equipment in households by mid 2020s</li> </ul>	<ul style="list-style-type: none"> <li>• 79% of households connected their TV to internet as of Q1 2021<sup>19</sup></li> </ul>
Solution for those unable to receive IP TV	<ul style="list-style-type: none"> <li>• Better satellite internet coverage</li> </ul>	<ul style="list-style-type: none"> <li>• 99.6% of premises can receive at least 10Mb/s (as only 0.4% cannot) which is sufficient for IP TV<sup>20</sup></li> </ul>
Broadband infrastructure capable of mass-reach IP TV	<ul style="list-style-type: none"> <li>• Considers it "unlikely" that OTT services will be able to deliver reliable enough service</li> </ul>	<ul style="list-style-type: none"> <li>• As above, 99.6% of premises can receive sufficient broadband speeds to stream IP TV in HD</li> </ul>
Sufficient protection for broadcasters against unwarranted traffic management	<ul style="list-style-type: none"> <li>• Notes that existing framework could prevent significantly unwanted traffic management processes</li> <li>• More consideration needed as to whether further protections for broadcasters may be needed</li> </ul>	<ul style="list-style-type: none"> <li>• We are not aware of any concerns in this area and note that PSBs are investing heavily in IP TV</li> </ul>

Commercial agreements between broadcasters and ISPs	<ul style="list-style-type: none"> <li>Relationship between ISPs as distribution platforms and broadcasters as content providers not yet tested, concern that ISPs could be gatekeepers</li> </ul>	<p>This concern has not been borne out (see page 25):<sup>21</sup></p> <ul style="list-style-type: none"> <li>PSBs are repositioning their businesses as online-first</li> <li>Broadcasters discussing single free streaming app with single sign-on</li> </ul>
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It is inevitable that the migration from traditional to IP TV will continue. A recent Government publication<sup>22</sup> explains that government is committed to ensuring that by 2025, at least 85% of premises have access to gigabit-capable networks and will seek to accelerate roll-out further to get as close to 100% as possible. It notes that at the same time, new product launches from platforms including Sky, Virgin and BT and the further development of Freeview Play-enabled devices are extending the take-up of IP TV services to a greater number of households than ever before.

The Government also notes that were IP TV to replace DTT over time, this could free up the spectrum for other uses, similar to when analogue TV was switched off due to migration to DTT. It notes that decisions on the future methods of distribution should be reviewed by Ofcom in its 2025 review of DTT services. We also note that government is aiming to ensure a level playing field between traditional broadcasters and providers of IP TV services, by bringing IP TV services within the scope of regulation by Ofcom, which removes a barrier to a mass-market switch to IP TV.

When Ofcom reviews DTT services in 2025, we would not be surprised if it found that a mass-market switch to IP TV was achievable, given the historic trends and the expected continuation of the move to IP TV.

### **Allocation of the 600MHz for mobile use would deliver significant consumer benefits**

While DTT services are in long-term decline, demand for mobile data has continued to increase rapidly and is expected to continue growing, including both in rural areas and within buildings.

[X]<sup>23</sup>

<sup>15</sup> 2021 Connected Nations, [https://www.ofcom.org.uk/\\_data/assets/pdf\\_file/0035/229688/connected-nations-2021-uk.pdf](https://www.ofcom.org.uk/_data/assets/pdf_file/0035/229688/connected-nations-2021-uk.pdf)

<sup>16</sup> Ibid

<sup>17</sup> [https://www.ofcom.org.uk/\\_data/assets/pdf\\_file/0020/224192/uk-home-broadband-performance-technical-report-march-2021-data.pdf](https://www.ofcom.org.uk/_data/assets/pdf_file/0020/224192/uk-home-broadband-performance-technical-report-march-2021-data.pdf)

<sup>18</sup> 2021 Connected Nations

<sup>19</sup> [https://www.ofcom.org.uk/\\_data/assets/pdf\\_file/0023/222890/media-nations-report-2021.pdf](https://www.ofcom.org.uk/_data/assets/pdf_file/0023/222890/media-nations-report-2021.pdf)

<sup>20</sup> BBC iPlayer recommends 5Mb/s for "our best HD quality", <https://www.bbc.co.uk/iplayer/help/questions/features/hd-information#:~:text=We%20recommend%20an%20internet%20connection,for%20our%20best%20HD%20quality.>

<sup>21</sup> [https://www.ofcom.org.uk/\\_data/assets/pdf\\_file/0023/222890/media-nations-report-2021.pdf](https://www.ofcom.org.uk/_data/assets/pdf_file/0023/222890/media-nations-report-2021.pdf)

<sup>22</sup> Section 5.4, <https://www.gov.uk/government/publications/up-next-the-governments-vision-for-the-broadcasting-sector/up-next-the-governments-vision-for-the-broadcasting-sector>

<sup>23</sup> Areas which can only be served with low frequency spectrum.



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The 600MHz band is perfect for relieving this congestion since its propagation characteristics mean that it can penetrate into buildings and cover large rural areas. It is for this reason that the 600MHz band has been identified for mobile use in other countries: the US and Canada have auctioned 600MHz spectrum<sup>24</sup> and Mexico is planning an auction in 2022.<sup>25</sup> T-Mobile launched the first nationwide 5G network in the US using the 600MHz band, which started to drive the device ecosystem for the band.

We understand that the US uses 617-652MHz paired with 663-698MHz which is standardised by 3GPP as band B71 (4G use) and band n71 (5G use). We also understand that:

- There are 251 devices (including CPEs, MiFis and smartphones) available that support the 600MHz band, up from 19 devices in 2019; and
- There are 80 smartphones that support the 600MHz band, including Apple iPhones, Google Pixel phones and Samsung phones since 2020.

*600MHz is the only realistic way to achieve deep rural connectivity*

Increased access to high-quality internet in deep rural areas can improve the economic wellbeing of people, improve their lives through access to health facilities, education and other essential services. A study by Plum Consulting<sup>26</sup> has stated that in order to encourage mobile operators to increase the coverage of networks, and to roll out the benefits of connectivity to as many people as possible, the cost of deployment must be reduced. This can be achieved by using lower band spectrum, lengthening the distance between base stations (since additional base stations will not need to be commissioned to add the capacity needed for high performance) and reducing the amount of equipment needed.

This is especially true where there is some coverage already in place offering low-speed services; operators will not be willing to invest more money in new base stations to expand capacity, as doing so will likely lead to no increase in revenue. The only way to guarantee that these areas get fast, reliable connectivity is to provide operators the ability to add more spectrum to the already-existing stations. This additional spectrum will need to be in the UHF band to maintain the cell radius and make use of existing networks.

*Ofcom should support a co-primary status between television broadcasting and mobile telecommunications at WRC-23*

Above we have presented evidence that DTT use is in continued decline as consumers increasingly watch content on different platforms. We have also

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<sup>24</sup> <https://www.gsma.com/spectrum/wp-content/uploads/2019/10/600-MHz-for-mobile-broadband.pdf>

<sup>25</sup> <https://www.mobileworldlive.com/featured-content/top-three/mexico-pencils-in-5g-spectrum-auction-for-2022>

<sup>26</sup> [The future use of UHF in ITU Region 1 - Plum Consulting](#)

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shown that the use of the band for mobile is becoming more compelling as data traffic in hard-to-reach areas increases.

Ofcom clearly considers that a tipping point where mobile use in the 600MHz band is more efficient than DTT has not yet been reached. However, it is apparent that such a time is not far away, and likely before DTT licences expire in 2034.

By supporting a co-primary allocation of the 600MHz band, Ofcom will retain the flexibility to react to changes in the optimal user of the band as these dynamics play out over the next ten years.