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Response to Ofcom Consultation

Mobile Data Strategy

30 January 2014

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 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 (40%)[1].

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[2], and post-switchover research demonstrated viewers enjoyed the selection of channels, picture quality and functionality.[3]

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.

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

[1] Source: Ofcom Digital TV Update, Q4 2012
[2] 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.
[3] See the Blinc / Digital UK research report 'Viewer Experiences of Switchover', available on the Digital UK Switchover Insights website.

2. Overview

We welcome the opportunity to respond to Ofcom's consultation on its mobile data strategy as well as the transparent way it is conducting this crucial debate. However, in our detailed answers to Ofcom's questions below we set out a number of concerns which relate primarily to:

- Ofcom's apparent assumption that mobile data demand increases will be of such a magnitude that ever-greater spectrum allocations for mobile services are inevitable;

- The absence of a detailed critique on what type of demand will be the driver of any significant mobile data increase. This would inform which frequencies could be best placed to meet that demand;

- The continuing apparent downplaying of the growing importance of Wi-Fi in Ofcom's modelling of future macro-cellular requirements for mobile services; and

- The assertion, without evidence, that a future release of the 470-694 MHz band would be of significant benefit to mobile services.

Digital terrestrial television (DTT) is the foremost television platform in the UK with 75% of total UK households using Freeview to watch valued programmes. It is an enormous success story. Moreover, a recent report by Communications Chambers demonstrates that not only does DTT provide significant value to the UK economy as a whole in its own right (providing a total economic surplus of approximately £80bn), but it has a higher marginal value in spectrum terms than mobile data services. In other words, DTT would create more value from any additional spectrum allocation than would mobile data services.

We recognise the importance of new and innovative mobile services to UK citizens and consumers. Mobile services are already delivering broadcast content to a growing number of devices such as smartphones and tablets and the proportion of mobile delivery, while relatively small, is set to increase in the coming years. Mobile services also clearly drive growth in other areas of the economy. In that respect, we support the objective of Ofcom and Government to ensure that increases in mobile demand are met through parallel developments in mobile infrastructure.

However, we are concerned that Ofcom may be effectively earmarking now for future mobile services the spectrum (470-694 MHz) which underpins the DTT platform. This spectrum is currently the only way of delivering the significant public policy and social benefits associated with the DTT platform. At the same time, there is no evidence that demand for mobile services will require this same spectrum – spectrum which appears conspicuously unsuited to meet the growth in high capacity mobile data demand that will drive the broader "data crunch" that policy makers and mobile operators claim to be imminent.

There is certainly no evidence to substantiate Ofcom's assertion that the benefits of clearing this spectrum for mobile are "very high". Equally there is no analysis offered to support the

speculative claim “if this entire band were available [for mobile services], it would be hugely valuable.”[1]

Over the past two years an inexorable momentum has built around the clearance of the 700 MHz band. This was initiated by the move to make this spectrum a co-primary mobile allocation in the most recent World Radiocommunications Conference (WRC) in 2012. We fear that Ofcom and Government may trigger the same impetus by supporting a similar outcome on 470-694 MHz in 2015. We remind Ofcom that this move would be on the back of a WRC agenda item to explicitly find more spectrum for mobile allocations. This is no mere enabling measure.

We look forward to engaging constructively on this critical issue on behalf of the many millions of DTT viewers in the UK and hope that well-founded caution will prevail in the coming months and years.

[1] Paragraph 6.80

3. Response to Consultation Questions

Question 1: Have we correctly identified the future characteristics of mobile data demand?

Ofcom has broadly captured the key characteristics of mobile data demand in its consultation. However, we make the following observations on those characteristics which we consider Ofcom needs to more fully take into account:

Wi-Fi

We welcome Ofcom's apparent acceptance of the increasing importance of Wi-Fi downloads in meeting future increases in mobile data demand. That it recently explored the specific role of Wi-Fi in its spectrum sharing consultation[2] appears to recognise the emerging evidence and consensus that Wi-Fi is meeting more data demand than had hitherto been thought. Wi-Fi could be also a key element in reaching the Digital Agenda call for full availability of 30 Mbps broadband to all Europeans in 2020 as it provides much greater capacity at a lower cost.

In May 2013, the European Commission published a report[3] in which a thorough and up-to-date analysis of the role of Wi-Fi in downloading mobile data demand within the EU was set out. That report came to some striking and far-reaching conclusions:

> *Taken as a whole, the data off-load ecosystem turns out to be much larger, richer, and more complex than expected.*

The report suggested that among the total figure of 71% of mobile data being downloaded via Wi-Fi, between 80-90% of Android smartphone and tablet data demand was met in the same way. This goes some way to aligning with the BBC's statistics that, among iOS users (which represented approximately 85% of all requests from mobile devices in an average week in February 2013), 92% of plays were requested via Wi-Fi compared to just 8% via 3G. The report then went on to say that the total proportion of mobile data traffic carried over Wi-Fi will *increase* over time as the Wi-Fi ecology develops and as further Wi-Fi standards will enable users to download with greater bit rate speed as well as signing into Wi-Fi without the need for self-authentication.

This picture appears to be in contrast with the principal sources that Ofcom is using to inform its approach to meeting mobile data demand. The 2012 Real Wireless report[4] commissioned by Ofcom put a *high level* estimate of Wi-Fi download in 2030 at 60% of total data traffic. A further Real Wireless report in 2013 acknowledged that an analysis of future spectrum requirements for mobile data services would be highly sensitive to assumptions on Wi-Fi offload. One would have expected an eventual downward adjustment in Real Wireless' overall spectrum forecasts for mobile in the face of this new insight and evidence on Wi-Fi.

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[2] *The future role of spectrum sharing for mobile and wireless data services - Licensed sharing, Wi-Fi, and dynamic spectrum access*, 9 August 2013

[3] *Study on impact of traffic off-loading and related technological trends on the demand for wireless broadband spectrum*, WIK/Aegis, 2013

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

However, this adjustment has not happened. Instead, that same 2013 report stated that future spectrum requirements will now largely be driven by "high mobility" users – e.g. those who, by definition, will be unlikely to use Wi-Fi connections. Ofcom continues to adopt the assumptions that sit behind these forecasts. We are doubtful of the veracity of this particular assumption in particular as it sits alongside the Ofcom view (which seems reasonable) that data demand will still likely be driven primarily by video. Indeed Ofcom quotes[5] Cisco's forecasts of two-thirds of total global mobile data traffic will be video by 2017. As noted above, the EC report, backed by the BBC statistics, found video consumption is very much within the home and office domain and very much suitable for Wi-Fi offload.

We suggest that Ofcom, possibly together with international partners, continues to monitor this issue closely and urgently. If the higher prevalence of Wi-Fi is substantiated and grows as the European Commission and others suggest, then this suggests that Ofcom should focus on making more coordinated Wi-Fi spectrum available and puts some of the siren calls for more spectrum for mobile into sharp relief.

End user mobile broadband

We agree that the proliferation of smartphones and tablets will continue to fuel an increase in mobile data demand. However, we expect that this demand will be driven primarily by late adopters to these devices as opposed to more intensive use by users in general. This is because the major constraint on data use will not be availability of faster bit rates but the availability of time. Users have a finite time in which they can access data; they will still need to go to work and sleep. As a result, there will come a time in which demand for data will inevitably "tail off". The rate of increase cannot logically increase at the same rate indefinitely – or even in the longer term.

Consumers' willingness to pay for adequate data tariffs will also play a part in constraining demand and this has contributed to recent downward revisions in mobile data forecasts from industry analysts.[6]

Furthermore, the point on the importance on Wi-Fi meeting increased mobile data demand as set out above can be demonstrated further here. Ofcom's own 2013 Communications Report[7] states that only 20% of tablet owners in the UK have a 3G subscription for their devices. Doubtless, those 20% will still make extensive use of Wi-Fi to download data. This strongly suggests again that the vast majority of data download in those devices driving the increase in data demand is being met by means other than macro-cellular.

Data demand will be "80 times higher in 2030 than it was in 2012"

We do not know what the level of mobile data demand will be in 2030. Neither does Ofcom nor any other policy maker. Forecasts from different consultancies reach markedly different conclusions even over a five-year period. Anything which purports to model mobile data demand over a ten-year period involves margins of error so great as to render the forecasts close to meaningless.

[5] Para 3.8

[6] http://www.analysysmason.com/About-Us/News/Insight/Cisco-mobile-data-forecasts-Feb2013/

[7] http://stakeholders.ofcom.org.uk/market-data-research/market-data/communications-market-reports/cmr13/

To illustrate this point, in its 2012 report for Ofcom, Real Wireless stated the following:

> *We do not set out to accurately forecast demand. Instead we examine a wide range of potential demand scenarios to capture plausible outcomes at a varying level of challenge, which are consistent where appropriate with current and near-term forecasts from other sources.*

It then went on to posit a range of demand scenarios from a times-23 increase to a times-297 increase. Despite the careful caveat of the consultants and the strikingly wide range of demand scenarios, policy makers have adopted one of these uncertain scenarios – the times-80 – to inform decisions of enormous consequence for a number of industries.

Nearly two years have elapsed since this Real Wireless report was published, during which time the trend has been for industry analysts to reduce their short- and medium-term forecasts. During that time, the importance of Wi-Fi download has been shown to exceed previous assumptions. Yet, the times-80 "forecast" persists to the extent that it is liberally quoted in various industry fora and is now quoted in this consultation without the careful caveats originally attached to it:

> *Looking forward, data consumption by mobile devices over mobile and Wi-Fi networks might, according to one study, be as much as 80 times higher in 2030 than it was in 2012*[8]

We object to this line as being misleading. Any attempt to quantify the level of data demand increase between now and 2030 – especially in light of other uncertainties over how *any* increase will best be met – could lead to poor short-term decisions on spectrum allocations before we understand how a number of variables will develop over time.

Machine to machine communications

We agree with Ofcom's assessment that machine to machine communications are likely to become increasingly important and prevalent over the coming years. We note that those applications which may require a high coverage layer would likely not require significant bandwidth and would expect that a number of options could be explored as to how best to meet any demand that emerges. Those options would need to ensure that existing services are not significantly disrupted.

Q2. Do you agree that there is a prospect of significant continuing growth in demand for mobile data services?

Yes, we think that demand for mobile data services will increase significantly over the coming years although the *rate* of growth has now been slowing for a number of years[9]. We reiterate the point made above that the significance of this increase cannot be known with any meaningful level of precision over a timescale much beyond five years.

However, this statement misses some of the important details that Ofcom and other policy makers will need to consider when making key decisions about spectrum allocations. Most

[8] Paragraph 3.5

[9] 11Institut für Rundfunktechnik, Growth of the mobile data volumes in France and Germany 2009 - 2012

importantly, what *type* of demand is likely to drive growth in mobile data demand? For example, the common assumption is that growth will be driven by demand for video which is typically characterised by indoor nomadic[10] use. That scenario would lend itself to a higher frequency off-loading approach to meeting demand since Wi-Fi is better for indoor penetration and can be re-used much more efficiently than lower frequency macro-cellular approaches.

On the other hand, the Real Wireless assumption that high-mobility demand will fuel growth in mobile data demand may require somewhat different approaches. As stated above, we therefore consider it is important to substantiate this assumption more clearly before key regulatory decisions can be made.

Q3. Have we identified all the challenges in realising future growth in citizen and consumer benefits from use of mobile data services and do you have any comments on the nature or the scale of the challenges we have identified?

Ofcom has captured most of the key challenges in securing citizen and consumer benefits from use of mobile data services.

Ofcom may further wish to consider as a criteria for its policy objectives the wide availability, high capacity, low cost and ease of access to broadband data that Wi-Fi offers compared to other methods of access.

On competing demand for spectrum, Ofcom refers to the number of initiatives (at ITU and EU levels) aimed at securing further spectrum for mobile services. This is clearly a challenge for policy makers but has exposed a further issue that should be of concern. An agenda item such as WRC-15, 1.1 creates enormous uncertainty in industry, affecting a number of sectors including, but not limited to, terrestrial broadcasting. Ofcom is aware of UK broadcasting's view on the dangers of making 470-694 MHz a co-primary allocation at WRC-15. However, the danger of undermining future investment decisions for both broadcasters and viewers is mirrored in other industries. The uncertainty created by the perceived threat to long-term spectrum access is potentially immensely damaging for key sectors.

We would therefore suggest that open-ended initiatives such as WRC-15 Agenda Item 1.1 are not repeated where there is such a chilling effect on those important investment decisions. World Radiocommunications Conferences generally work to more focussed agenda items with more certainty over what potential outcomes will be and we would suggest that this practice is adopted again in future.

Q4. Have we correctly identified all the areas where Ofcom has a role in addressing the challenges of growing demand for mobile data services?

Yes. Although we would note that network deployment and infrastructure is an important issue that covers much more than just backhaul.

[10] Nomadic use differs from truly "mobile" use as it does not rely on handover between cells. It is typically served by Wi-Fi.

Q5. Do you agree that the main additional area that our mobile data strategy needs to address is in relation to potential future spectrum options?

Yes. However, as Ofcom notes in section 5 and question 8 of the consultation, looking at spectrum options is intimately tied up with issues of technology and infrastructure, therefore it cannot be looked at in isolation.

Q6. Is Ofcom doing all that it needs to do in other areas identified as being relevant to the mobile data challenge?

As part of any future clearance of the 700 MHz band, the use of UHF broadcasting spectrum will need significant reconfiguration if existing coverage levels and number of channels are to be maintained. Part of that work may involve increased take up of T2 receivers by consumers. We would be keen to explore further with Ofcom what role it could play in ensuring that this happens. For example, there may be a case for mandating T2 receivers at a retail level in TV sets or set-top boxes.

We also believe that Ofcom could have a role to play in driving greater efficiency of mobile handsets. More efficient handsets have a direct effect on the amount of spectrum required to carry the same levels of voice and data traffic. We believe device manufacturers and MNOs could be given greater encouragement to improve handset efficiency given the knock-on effects on other spectrum users, notably DTT.

Finally we would like to note the key difference in assessing the benefits of licenced and licence-exempt spectrum. It is easy to assess the benefit calculation of licenced spectrum as licence holders are able to monetise their spectrum, however this is clearly not as straightforward for licence-exempt spectrum. It is important that the significant value this spectrum offers is not underestimated simply because it is not easy to calculate, and if there is further work to assess this we would be keen to see how this could factor into the future spectrum strategy discussions.

Q7: Do you agree with our high-level assessment of likely technology and topology trends and their implications for future spectrum use? We are particularly interested in views on:

a) the potential demand for spectrum above 10 GHz;

The attractiveness of using 10 GHz and above to meet mobile data demand is that there is a much greater availability of spectrum in those frequencies than in the 1-3 GHz range. To that end we are encouraged by the ongoing trials being carried out by Samsung in the 20 GHz band and are interested in the outcome of these.

Our expectation is that, for technical reasons, these higher frequencies could potentially act as a valuable complement to mobile services at lower frequencies rather than as a substitute. In particular, there could well be scope for meeting high data demand in dense

urban or suburban areas. It is this demand profile which we believe will largely drive total mobile data demand increases.

b) the potential impact of integrating broadcast capability into mobile networks;

We are aware of discussions within the European Union relating to the possibility of establishing some form of converged infrastructure in the spectrum between 470-694 MHz.

Using eMBMS could, in theory, be a way of achieving this. However, it is difficult to have a clear view on this initiative until there is more clarity on what precisely is meant by "converged networks". It is highly likely that any type of radical change would come at a very high price – there would be significant costs for any major network infrastructure change, as well as cost considerations for consumer equipment and aerials. When we have more information on what is meant by "convergence" and the need it is seeking to meet, we can then assess the technical and commercial viability of such an approach to delivering broadcasting content.

c) whether the technical and commercial challenges of supporting additional frequency bands in mobile devices drives interest towards bands close in frequency to existing bands;

From a technical perspective this is obviously true although there may be challenges for device antennas to receive the entire UHF band effectively given the space limitations imposed by handset size. The consequence of this could be more flexible use of handsets, enabling more choice and lower costs for consumers.

However, bearing in mind our experience with the policy work underpinning the proposed 700 MHz clearance, we would urge a much more circumspect approach to this issue. We are concerned that harmonisation is increasingly being seen as a good thing in itself and not as a means to meeting growing consumer demand. Cheaper handsets are one of a number of benefits that need to be weighed up against the costs involved in repurposing other users of spectrum. The 700 MHz clearance programme has gained startling momentum within Europe, bearing in mind no costs appear to have calculated for clearing broadcasting in the spectrum.

With regards to any future moves toward clearing all or part of the spectrum below 700 MHz, we are clear that the costs of removing an established industry with a total audience of close to 20 million households in the UK and 200 million in the EU would be very great indeed. This sits alongside benefits which are unknown, even in the long term, but likely to be of a much lower magnitude.

d) the relative importance of large contiguous blocks of spectrum versus aggregation of smaller blocks

Again, this would clearly be of benefit to mobile network operators and device manufacturers although we note that wasteful guard bands are required to enable multiple mobile operator networks to coexist in the same spectrum. Smaller diverse spectrum blocks may actually be more attractive and spectrally efficient. We reiterate the point made previously that this would need to be set against any costs related to repurposing spectrum to enable this

aggregation. If large contiguous blocks are to be considered then they are more easily found in frequency bands higher than 1 GHz.

Q8. Are there any additional technology or topology trends that we need to consider that could have an effect on spectrum use?

The favoured technology for delivering mobile services in most (though, not all) countries is frequency division duplex (FDD). This involves separate uplink and downlink frequency blocks and a significant guard band between the uplink and downlink portions of a band plan. Mobile operators face challenges in deploying more efficient generation technologies within this eco-system (transitioning from 2G and 3G to LTE, for example). However, we also believe that some investigation is merited as to whether FDD is the most efficient form of mobile service delivery in the longer term when time division duplex (TDD) could also be deployed and appears to offer greater spectral efficiency.

Ofcom should also assess the impact of technologies used by other services and the effects that these have on spectrum demand. In the case of broadcasting, this would involve the potential use of DVB-T2 or HEVC standards. While these represent a more efficient use of spectrum, new HD and UHD services would require more bandwidth. Moreover, any transition from earlier legacy standards would involve a period of simulcasting which would also require sufficient spectrum to maintain services to DTT viewers.

Q9. Do you agree with the short list of bands we have identified for more detailed consideration?

The band 470-694 MHz is currently used by DTT together with the 700 MHz band (694-790 MHz). On 20 January 2014 we published a report[11] commissioned from Communications Chambers which assessed the use of this spectrum by the DTT platform. Among its key conclusions were:

- Only broadcasting use of the UHF spectrum between 470-694 MHz can provide all the significant public policy benefits associated with the DTT platform, namely:
  - Universal coverage;
  - Unmediated access to content;
  - Regionality;
  - Choice; and
  - PSB prominence in the electronic programming guide (EPG)

- The incremental value of broadcasting use of the spectrum between 470-694 MHz is *greater* than that for mobile data services; and

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http://www.digitaluk.co.uk/__data/assets/pdf_file/0015/87000/The_Value_of_DTT_in_an_era_of_increasing_demand_for_spectrum_20-1-14.pdf

- The total value that is created by the DTT platform in the UK is approximately £80 billion.

In this context, it is hard to argue for any of this band being cleared for mobile use and certainly it is entirely premature to create uncertainty in its continuing availability for DTT. To repeat the point made above, the costs of clearing this spectrum of broadcasting are known and very high. The benefits of releasing it for mobile are unknown but likely to be of a far lower magnitude.

We welcome Ofcom's reaffirmation in paragraph 6.28 to the principle of maintaining the benefits of the DTT platform. We also note its recognition that there may be support for it becoming a co-primary mobile and broadcasting allocation from WRC-15 (though we also note that Ofcom still does not proffer a view on whether the UK should support such a position).

Ofcom sets out a number of possible alternatives to DTT such as IPTV and satellite. We look forward to discussing these with them in its forthcoming consideration of scenarios for the future of the free-to-air platform. As we set out above, any discussion on the DTT platform must be informed by the significant public policy benefits that it delivers, even in the very long term. We would also argue that in a future world where mobile data services have access to the 700 MHz, 800 MHz, 900 MHz, 1.4 GHz, 1.8 GHz, 2.1 GHz, 2.3 GHz and 2.6 GHz bands it is very unclear what pressing need there is ***even in the longer term*** to release more sub-1 GHz spectrum if primarily for coverage purposes. This is particularly the case where a number of the mobile licences in these bands have associated coverage obligations. At a time when the focus of the mobile industry is looking up the frequencies where peak demand can be more efficiently met, there appears to be little evidence that would justify the clearance of even more sub-1 GHz spectrum.

In this environment of uncertainty, any regulatory decision in the short term must err on the side of caution or a significant regulatory failure could result. In particular, we repeat our view that a co-primary allocation between mobile and broadcasting in this band from WRC-15 would represent a premature outcome. This scenario could have costly unintended consequences for citizens and consumers who expect to continue to enjoy the benefits of accessing the wide range of choice offered by terrestrial broadcasting, for no additional cost. As noted earlier, the importance of Wi-Fi would suggest that the focus should be on ensuring the availability of licence-exempt spectrum to address the increased data demand.

Q10. Do you agree with our methodology for prioritising potential bands for mobile data use?

In a worrying repeat of the process for the 700 MHz band, we note that Ofcom does not attempt to quantify the benefits of clearing each of the bands for mobile data use, but suggests benefits relating to improved handsets or coverage will justify any future clearance. This is regrettable, as an attempt to actually quantify the benefit would go some way to assessing the likely consumer demand for services that may wish to deploy in that spectrum.

In terms of the assessment for 470-694 MHz, we strongly disagree with the assessment that the benefit is "V. High". Similarly, we reject the unevidenced assertion in paragraph 6.80 that releasing the 470-694 MHz band would be "hugely valuable" to mobile. If Ofcom genuinely

believes this to be the case then it must provide the analysis that substantiates this in light of:

- The uncertainties around future demand for mobile data;
- The increasing role of Wi-Fi in meeting any increase in demand; and
- The role of other bands which will be released in the meantime to meet coverage requirements (i.e. the 700 MHz and 800 MHz bands). In this respect, we note that the stated coverage of 470-694 MHz would be 99%, or a full 1% greater than the coverage obligation attached to one of the assignments in the 800 MHz band and with a possible roll out of the 700 MHz band still to come.

We suggest that a more accurate representation of the benefits should be, at best, "not yet known".

We also disagree with the assessment of domestic constraints on realising benefits in this band, marked as "Medium-High". Again we suggest that this be altered, this time to "High" bearing in mind that no other platform can replicate the benefits delivered by DTT.

Q11. Do you agree with our provisional assessment and the results of our band prioritisation?

For the reasons set out in question 10, we fundamentally disagree with the provisional assessment of the 470-694 MHz band in Ofcom's prioritisation work.

Q12. Do you agree with the possible timelines we have identified in this section?

Where a decision had been made to that effect, 2020 is currently a reasonable assumption for any potential clearance of the 700 MHz band, although this would likely change as international constraints relating to complications emerge in clearing DTT in some EU countries.

In our view it is unlikely that, following clearance of the higher-priority bands, clearance of the 470-694 MHz band for mobile services will fulfil the requirements of any remaining future data demands. However if after further analysis it is found to be critical, it is not likely to be feasible before the 2030s. We note that Table 8 states the desirability of 470-694 MHz for coverage purposes once more. We therefore repeat that there is no evidence of any significant incremental benefit of this spectrum for mobile in light of the future potential availability of the 700 MHz band and the continued availability of the 800 MHz, 900 MHz, 1.4 GHz, 1.8 GHz, 2.1 GHz, 2.3 GHz and 2.6 GHz bands (those mobile bands which are in lower frequencies and therefore well suited to meet coverage objectives).

Q13. Do you have any comments on the capacity implications outlined in this section?

Given the significant role that Wi-Fi has to play when looking at capacity issues, this section does not consider it and its policy implications in adequate detail. In particular, if Ofcom does "not anticipate Wi-Fi capacity will be a major constraint for offloading mobile traffic"[12] that means where Wi-Fi is available there is the potential for *all* mobile data demand to be met. With the additional Wi-Fi spectrum at 5 GHz and Hotspot 2.0 this has significant implications for the spectrum which will be required. For example, Ofcom believes the specific attraction of 470-694 MHz is its suitability for in-building penetration and rural coverage. Therefore, the parallel effectiveness of Wi-Fi combined with the government's commitment to universal broadband[13] would surely mean that the relevance of 470-694 MHz to meeting policy objectives is actually relatively insignificant.

Q14. Do you agree with the next steps we have identified for further domestic work based on the proposed priorities?

We agree with the next steps as they relate to 470-694 MHz and look forward to engaging with Ofcom on its review of the free to air platform and future DTT scenarios.

Q15. How do you think we should adjust our support for international harmonisation based on our proposed priorities?

For the reasons set out elsewhere in this document, we consider that international harmonisation of the 470-694 MHz band for mobile should not be supported by the UK at WRC-15 and should, perhaps, be reassessed at a later WRC when:

- Further work has been undertaken on how or whether the benefits of DTT can be replicated on an alternative platform;
- The significant uncertainties over the benefits of clearing this band for mobile are clarified; and
- The significant risks of regulatory failure are reduced as a result of the two factors above.

[12] Para 7.21

[13] "everyone in the UK able to access broadband speeds of at least 2 megabits per second (Mbps) and 95% of the UK receiving far greater speeds (at least 24Mbps) by 2017"
https://www.gov.uk/government/policies/transforming-uk-broadband (Accessed 21 January 2014)