Arqiva Submission: Ofcom – 'Mobile networks and spectrum: Meeting future demand for mobile data'

Dear Sir/Madam,

We welcome the opportunity to respond to Ofcom's discussion paper, *Mobile networks and spectrum: Meeting future demand for mobile data.*

Arqiva is a communications, infrastructure and media services company at the heart of the broadcast and utilities sectors in the UK and abroad, providing critical data, network and communications services. Arqiva operates the digital terrestrial television (DTT) network that delivers Freeview to 98.5 per cent of the UK population and is the only national provider for radio broadcasting.

Ofcom's discussion paper highlights the significant opportunity for mobile services to meet future demand through greater spectral efficiency, including the densification of networks. We welcome Ofcom's focus on ensuring the UK gets the maximum possible value from limited spectrum resources. This is essential to supporting the use of spectrum to deliver a wide range of services and benefits across the UK, including DTT services which are relied on by millions of people for free-to-view news, information, and entertainment.

The ongoing success of the DTT platform, and the important social and cultural roles it will continue to play in the coming decades, relies on the continuation of its access to UHF spectrum. As Ofcom considers how spectrum demand may change over the longer term, and especially in the lead up to the World Radiocommunications Conference 2023 (WRC 23), it will be important that there is clear regulatory support for DTT's current spectrum arrangements as the UK's leading platform providing universal, free-to-view television.

In this submission, we highlight:

- **Mobile has significant spectrum resources enabling it to meet demand and the opportunity to use spectrum more efficiently.** Ofcom has awarded significant spectrum holdings to mobile and following the announcement by the Department for Digital, Culture, Media and Sport (DCMS) that 2G and 3G services will transition to 5G by 2033, there will be an effective tripling in sub 1 GHz mobile broadband capacity between 2021 and 2033. There is also considerable opportunity for mobile to use spectrum more efficiently, as highlighted in Ofcom's discussion paper. Further, there is no evidence that mobile will require any additional UHF spectrum, as recognised by the Government's decision to extend DTT licences to at least 2034.
- **DTT's use of UHF spectrum enables the delivery of a vitally important service across the UK, which other platforms are unable to replicate.** DTT's spectrum has been reduced by over 40% in the last decade to provide more spectrum for mobile, and it now utilises the 470-694 MHz band to deliver a diverse channel offering available on a free-to-view basis to 98.5% of the UK.[1] The

[1] Over 70 television channels available on DTT.

platform includes all of the public service broadcasters as well as commercial television operators such as Sky and UKTV, providing essential programs such as news and the most popular UK content on a free-to-view basis to millions of viewers. The live TV (delivered via DTT) continues to account for more viewing minutes than any other platform by a significant margin.[2] Other platforms, built around the IP-delivery of content, will struggle to match the availability and affordability of DTT over the coming decades, heightening the importance of protecting the platform's spectrum arrangements.

- **DTT and PMSE share spectrum effectively, enabling a thriving cultural sector.** DTT is the primary user of the 470-694 MHz band but shares effectively with 'programme making and special events' (PMSE) wireless technologies, which are relied on across venues and productions including TV, film, sport, theatre, places of worship, schools, live music, newsgathering, political and corporate events, and others. Mobile cannot share spectrum, as this results in interference. Mobile's use of UHF spectrum could therefore risk the delivery of both DTT and PMSE.
- **Clear regulatory support for DTT's spectrum will further enable the platform to thrive and deliver for UK audiences.** Regulatory uncertainty around spectrum arrangements sends a signal to the wider market that could risk slowing or limiting investment and growth, which could negatively impact UK audiences and in particular, the vulnerable and elderly viewers who have a greater reliance on DTT. As the DTT platform plays an important role for UK audiences and will continue to do so in the coming decades, it is important that the regulator has a clear position on DTT's continued spectrum arrangements and that this is coordinated with the Government's policy position. DCMS has directed Ofcom to renew DTT multiplex licences until at least 2034 and Ofcom's position should clearly align with this decision to avoid mixing messaging that can cause confusion and uncertainty. We expect DTT and its full range of services to play a key role in the TV market to at least 2034 and beyond.

Realising the full potential and benefits of existing services such as DTT and new connected technologies will require services to use spectrum as efficiently as possible. A clear regulatory position supporting DTT's current spectrum arrangements is also important as Ofcom considers how spectrum demand will change in the long-term, particularly now as nations prepare for WRC 23. Adjustment to DTT's regulatory spectrum arrangements, such as by supporting a 'co-primary' allocation between DTT and mobile in the UHF band, risks negatively impacting this important TV delivery ecosystem. Arqiva will provide a response to Ofcom's forthcoming consultation on WRC 23 that addresses these issues.

We welcome the opportunity to further discuss our response to this consultation with Ofcom.

Yours sincerely,

Laurie Patten
Director of Strategy and Regulation
Arqiva

[2] Ofcom, *Media Nations 2021*, 5 August 2021, showed that live TV viewing accounted for the most viewing minutes across platforms, and about 2.5 times the viewing minutes of its nearest rival, subscription video-on-demand, in 2020.

Arqiva's comments on 'Mobile networks and spectrum: Meeting future demand for mobile data'

Future demand for data through mobile networks

Ofcom's discussion paper invites views on the regulator's initial thinking on the future demand for data through mobile networks.

The discussion paper identifies a clear opportunity for the mobile sector to use spectrum more efficiently. Alongside upgrades to network technology and other measures (i.e. the densification of networks) this would enable the mobile sector to meet demand through to the mid-2030s. Given the lack of evidence for mobile requiring additional spectrum, Ofcom should support a continuation of current spectrum arrangements and improved spectrum efficiency measures by the mobile industry. Additional allocations of spectrum to mobile beyond the current pipeline, including below 1 GHz, would dampen any incentive for the sector to use its spectrum more efficiently. Further, this could have a significant effect on the capacity for other services using spectrum to continue to operate and deliver both social and economic benefits to the UK. As highlighted in this response, DTT uses its current spectrum allocation to deliver its diverse, free-to-view television channel offering across the UK and shares this effectively with the PMSE services relied on by UK venues and productions. Any reduction in spectrum could have an impact on the delivery of DTT services to UK viewers, including the elderly, lower-income households, households in remote locations and mobile-only households, who often rely on DTT for their access to news, information and a wide variety of content.

Mobile's spectrum allocation has increased substantially over the past 15 years, with broadcasting's access to spectrum being significantly reduced to support this. Mobile currently has three spectrum bands sub 1 GHz – the 900 MHz, 800 MHz, and 700 MHz bands.[3] There is significant scope for mobile to use this spectrum more efficiently. Mobile currently uses only 71% of its sub 1 GHz spectrum. While it is allocated spectrum between 694 – 960 MHz (a total of 266 MHz), it uses only 60 MHz in the 700 MHz band, 60 MHz in the 800 MHz band and 70 MHz in the 900 MHz band.

Mobile's capacity in the sub 1 GHz bands will also increase significantly through to 2035 as new network technologies are rolled out. The announcement by DCMS that 2G and 3G services will be transitioned to 5G by 2033 will mean that mobile's sub 1 GHz mobile broadband capacity will effectively triple between 2021 and 2033 – with the rollout of the 700 MHz network and the 900 MHz band transitioning from 2G. Further, there will be a significant increase in mobile's mid-band broadband spectrum. The mid-band 2G and 3G services using 1800 MHz and 2100 MHz spectrum are also set to migrate to 5G by 2033.[4] Mobile mid-band spectrum allocated to 4G/5G services further includes 2600 MHz and the new 3.6 GHz band (2021).

Rather than allocate more valuable spectrum resources to mobile, Ofcom's focus should be on ensuring mobile gets the maximum value out of its current allocations. Mobile's current spectrum resourcing combined with investment in suitable infrastructure and upgrading of network technologies would support

[3] The 800 MHz band is widely used for broadband (4G), the 700 MHz band was made available in late 2021 (5G), and the 900 MHz band is 2G.
[4] This increase in spectrum will be accompanied by an even greater increase in capacity as mid-band 5G services can take advantage of enhanced MIMO and AAS.

greater mobile coverage and capacity across the UK. Ofcom's discussion paper highlights that mobile is expected to be able to meet demand with its current spectrum allocation, and there is no evidence presented that mobile needs more UHF spectrum. This was recently reflected in the Government decision to extend DTT licences to at least 2034.[5] Ofcom should provide a clear regulatory position coordinated with the Government's decision.

Frequency ranges considered for mobile access to support capacity provision in the future

Ofcom invites views on whether there are specific frequency ranges which should be considered for mobile access to support capacity provision in the future. Ofcom outlines a pipeline of further mobile spectrum to boost capacity in the mmWave frequencies. As noted in the discussion paper, the 26 GHz band (24.25-27.5 GHz) was globally identified for mobile services in 2019 and the 40 GHz band (40.5-43.5 GHz) was also identified for mobile and as a future 5G band in Europe.

5G services are more efficient in higher frequency spectrum bands than in sub 1 GHz spectrum. In general, mobile services are most effective and efficient using mid-band spectrum or high-frequency bands. As a result, consideration of any future need for mobile's access to spectrum should first involve fully exploring how these bands may be used. Further, there are environmental factors to consider when deciding which technology and frequency band is used to deliver services. Due to the physical constraints of mobile devices, mobile services are generally less efficient in lower frequency bands, and this means it would require more energy to operate the network in addition to potential infrastructure upgrades.

DTT's spectrum allocation has been reduced by 40% over the past 15 years to provide additional spectrum for mobile. It now operates on a minimum, using the 470-694 MHz band to deliver a diverse channel offering across the UK. Ofcom should provide clear support for the continuation of DTT's current spectrum arrangements to provide the regulatory certainty that helps enable this important TV distribution ecosystem to thrive.

Support for broadcasting's current primary allocation of UHF spectrum is especially important now in the lead up to WRC 23. As at previous WRCs, mobile network operators (MNOs) are arguing for additional UHF spectrum. This could potentially be facilitated through a 'co-primary' allocation between mobile and DTT (and PMSE). A co-primary allocation raises a range of risks – including risks of interference across borders[6] (and ongoing negotiation between nations on spectrum use), and undermining confidence in the DTT platform across the market, as historically a co-primary allocation has precipitated a reallocation of spectrum from DTT to mobile. This could send a signal that risks limiting or slowing investment, and should be avoided to support the continued success of the DTT ecosystem in delivering its universal service across the UK. Arqiva will respond to Ofcom's consultation on its approach to WRC 23 in due course.

[5] Department for Digital, Culture, Media and Sport, *Consultation outcome: Consultation on the renewal of digital terrestrial television (DTT) multiplex licences expiring in 2022 and 2026*, 17 August 2021.
[6] ITU studies have shown DTT and mobile cannot operate in the same frequency band unless there is a significant geographic distance between the services. See ITU-R BT.2337 *Sharing and compatibility studies between digital terrestrial television broadcasting and terrestrial mobile broadband applications, including IMT, in the frequency band 470-694/698 MHz*; ITU-R BT.2301 *National field reports on the introduction of IMT in the bands with co-primary allocation to the broadcasting and the mobile services*.

DTT remains the best use of UHF for the UK and this will remain the case

DTT provides a socially and culturally important service and will continue to do so over the coming decade and beyond. This section describes the benefits obtained from DTT's current spectrum arrangements in the UHF band, and the risks posed by regulatory uncertainty around spectrum arrangements:

1. **The social and cultural value of DTT:** DTT provides a universally accessible, diverse, and free-to-view channel offering relied on by millions of people across the UK. It includes over 70 channels delivering public service media and other broadcast programs. It is relied on by many, especially vulnerable audiences including the elderly, lower-income households and households in more remote locations. Further, DTT shares effectively with PMSE, which plays a vital role in the UK cultural and creative sectors.
2. **No other universal platform:** It is not feasible for broadband or any other platform to deliver a service that can match DTT's universal coverage in the foreseeable future. DTT will remain especially important for the approximate 1.5 million households that are mobile-only, households without decent broadband connectivity, and people unwilling or unable to pay for access to alternative online services.
3. **The negative effects of reducing DTT's spectrum and regulatory uncertainty:** Any reduction in DTT's spectrum could have a negative impact on UK audiences, reducing the value delivered by the platform and potentially impacting choice for viewers.

1. The social and cultural value of DTT

Millions of people across the UK rely on DTT. The DTT platform delivers services to about 17 million homes and includes over 70 channels that provide wide-ranging content including trusted news programming, sport, light entertainment and more. It underpins the universal delivery of public service broadcasting services and supports shared cultural moments through live television programming.

DTT is the most watched platform by a significant margin and has continued to attract the highest number of viewing minutes in recent years even as the content market has expanded to include several global online content platforms, such as Netflix, Disney+ and Amazon Prime. Ofcom's 2021 Media Nations reports show that in 2020, live TV viewing per person per day was on average 162 minutes. This was about 2.5 times the average viewing minutes for the second most watched platforms, subscription video-on-demand (with 65 minutes).[7] The free-to-view offering of DTT continues to be the core of TV viewing, with subscription streaming platforms and other online content services complementing this viewing for those that have suitable broadband connectivity and willingness to pay.

The DTT platform is, and will continue to be, especially important for the UK's more vulnerable audiences, including lower income households and the elderly. These individuals are less likely to have the skillset, willingness, or ability to pay to adopt new technologies for other content services. According to data from BARB, D & E socio-economic groups represent 30% of DTT only households compared to an average of

[7] Ofcom, *Media Nations 2021*, 5 August 2021.

26% across all TV households. Further, individuals aged 65 years and over alone represent 39% of DTT only households.[8]

DTT is also of heightened importance for individuals that do not have broadband. Ofcom estimated in its 2021 Connected Nations report that around 123,000 premises in the UK do not have access to a "decent" broadband service[9], either from a fixed connection or from a wireless network. Ofcom has further estimated that 1.5 million or 5% of households only access the internet through a mobile phone or other mobile broadband device[10].

There are also affordability issues to consider in relation to broadband. DTT is a free-to-view service, ensuring that UK audiences have access to a wide range of channels and content no matter their income or access to broadband. Accessing broadband services could introduce new costs for some households, such as the cost of a new broadband service. Ofcom recently found that around one-in-five households had experienced at least one affordability issue with a communications service (about 4.2 million households in a month) and estimated that in the average month around 2 million households report an affordability issue in relation to internet access.[11] Further, Ofcom estimated between 100,000 and 300,000 households do not have internet at least partially due to cost.[12] DTT plays an important role by enabling access to news, sport, entertainment and other TV programming to households that may otherwise not be able to access this content.

An insight into how UK audiences would be impacted by a reduction in, or loss of, DTT services was provided late last year. In the last quarter of 2021, the Bilsdale mast was irreparably damaged by fire. The mast provided DTT and radio broadcast services to around 650,000 households in urban and rural areas across North Yorkshire, the Tees Valley and County Durham. While Arqiva took steps to replace services as soon as possible, the impact was still felt across the community. The loss of services had a huge impact on viewers solely and heavily reliant on DTT and highlighted the important role that DTT plays particularly in the lives of elderly, rural and more vulnerable audiences.

An additional important aspect of DTT is that it shares spectrum effectively with PMSE. PMSE wireless technologies (including microphones and in-ear monitors) play a vital role in venues and productions, including TV, film, sport, theatre, places of worship, schools, live music, newsgathering, political and corporate events, and others. It is key to supporting the UK's creative industries. While DTT and PMSE share spectrum effectively, mobile is unable to share spectrum due to interference risks. Reductions in available UHF spectrum will introduce uncertainty and risk around the delivery of both DTT and PMSE.

2. No other reliable, universal platform

While broadband connectivity is gradually improving, there are ongoing challenges in rolling out high-quality broadband on a universal basis across the UK. This and the associated additional costs for consumers,

[8] BARB, *BARB Establishment Survey October 2019 to September 2020 Annual Data Report: Volume 1 Total Network and Appendices*, August 2021.
[9] Ofcom defines "decent" broadband as having a speed of 10 Mbit/s download and 1 Mbit/s upload. Households with a decent broadband speed should be able to make a high definition video call using applications like Zoom, Teams, WhatsApp or Facetime. They should also be able to download a one hour HD TV episode (1GB) in almost a quarter of an hour. The other (faster) types of broadband are Superfast, Ultrafast and Gigabit.
[10] Ofcom, *Affordability of communications services: Summary of findings*, 22 July 2021.
[11] Ofcom, *Affordability of communications services: Summary of findings*, 22 July 2021.
[12] Ofcom, *Affordability of communications services: Summary of findings*, 22 July 2021.

alongside the enduring reliance and value people place on DTT services, means an alternative service capable of matching DTT is not feasible over the coming decades.

As outlined above, there are ongoing challenges in providing universal coverage of broadband. If DTT services are impacted, this would disadvantage a significant number of people across the UK who do not have access to alternative services or are unable or unwilling to pay for alternative services. For the foreseeable future, DTT is the only platform that can support universal coverage for television services.

Further, DTT is a highly reliable form of TV transmission. The DTT network is non-rivalrous and one household's viewing of TV does not affect the quality or ability of other households to watch the same or other TV services. DTT broadcasts do not suffer any drop in resolution during busy periods or as a result of other use within the home.

DTT's universal reach and free-to-view offering is central to public service broadcasters being able to meet their mandates. The DTT platform guarantees high quality and reliable delivery of public service media such as news, live events, and sport at scale. It supports the widespread distribution of trusted news and information; the importance of which has been heightened most recently with the Russian invasion of Ukraine and the COVID-19 pandemic.

In addition to the practical challenges of providing universal, high-quality connectivity across the UK to support a service similar to what DTT currently delivers, there are a range of public policy and regulatory issues requiring further consideration. This includes assessing the likely impact of changing distribution models on social cohesion and shared cultural experiences, access and availability of trusted news, funding of the UK creative industries, and prominence of public service media.

3. The negative effects of reducing DTT's spectrum and regulatory uncertainty

DTT uses the 470-694 MHz band to deliver its current rich and varied content offer universally across the UK. In the future and in the timescales adopted by Ofcom, we expect a transition to increased HD services to meet consumer demand, enabled by use of improved compression technology. In a scenario where DTT's spectrum is further reduced, this could negatively impact the platform and its capacity to deliver a high-quality, diverse service across the UK.

UK audiences value the availability, quality and range of content provided on the DTT platform, and we expect audiences will continue to turn to DTT for many years to come. It will be important for Ofcom to provide a clear position, coordinated with DCMS' message, on DTT's spectrum arrangements to support the ongoing success of the platform.

As Ofcom highlights in its discussion paper on its future approach to mobile markets[13], a clear regulatory approach is important to create as much certainty as possible to encourage investment. This is true also in the broadcasting market in relation to spectrum arrangements. The infrastructure and equipment that delivers DTT have long service lives and uncertainty around spectrum arrangements could impact potential investments which could help the upgrade and support the platform over the longer-term. Further, regulatory uncertainty could undermine the confidence of TV set manufacturers and broadcasters, which could have a detrimental impact on DTT services before alternatives reach acceptable levels of availability, affordability, and resilience. The government decided to extend DTT licences to at least 2034, recognising the important role the DTT platform has to play in the UK. Ofcom should provide clear regulatory support for the

[13] Ofcom, *Discussion paper: Ofcom's future approach to mobile markets*, 9 February 2022.

continuation of DTT's current spectrum arrangements in line with this decision to reduce regulatory uncertainty.

Further, DTT is a shared network and needs to be considered holistically. The network would cost broadly the same to operate regardless of the number of multiplexes as the overall network structure and operations, monitoring and maintenance will still be required. Regulatory uncertainty, and how this drives decision-making by industry, could impact the costs of users that continue to use the DTT network in order to deliver universal content services as well as radio broadcasting services.

Conclusion

Mobile's future use of spectrum cannot be considered in isolation as any future spectrum allocations will impact the availability of frequencies for other important services and technologies. The DTT platform plays important social and cultural roles in the UK, providing a universal, diverse and free-to-view channel offering including trusted news, UK stories, sports, and entertainment. It will continue to do so in the decades ahead, complemented by online content offers. This service is enabled through its current spectrum arrangements in the UHF band, and it is important for Ofcom to provide a clear position on the continuation of these arrangements and to coordinate this with the DCMS, in order to minimise regulatory uncertainty and support the platform to thrive.

About Arqiva

Arqiva is at the heart of the broadcast and utilities sectors in the UK and beyond, providing critical communications infrastructure and media services. Arqiva is the only national provider of terrestrial television and radio broadcasting and provides a machine-to-machine connectivity network for smart metering within the utilities sector.

Arqiva's history can be traced back to 1922 when it broadcast the world's first national radio service. In 1936 it carried the BBC's first television broadcast. In 1978 it enabled Europe's first satellite TV test. By the 1990s Arqiva was working with the UK's mobile operators to bring mobile telecommunications to UK businesses and consumers. In this decade we also launched the UK's national DAB radio and Digital Terrestrial Television networks. Most recently, Arqiva has played a pioneering role in the roll-out of the national smart energy and water metering networks.

Arqiva was a founder member of Digital UK (DUK), Freeview, YouView and Digital Radio UK (DRUK). Freeview is the largest TV platform in the UK delivering over 100 TV and Radio channels to the UK public. Arqiva owns and operates the networks for all of the Freeview multiplex licence holders and is the licence holder for two of the national DTT multiplexes as well as the DVB-T2 multiplex Com 7. DRUK works to promote digital radio via liaison with the UK supply chain, business-to-business and consumer marketing. We are also a member of WorldDAB.

We are a shareholder and operator for both commercial national DAB radio multiplexes and transmission provider for the BBC national DAB radio multiplex. We also provide end-to-end transmission services for analogue and digital radio networks for customers including BBC, Global Radio, Bauer Media and Wireless as well as other independent radio groups.

Through our wholly owned subsidiaries, Now Digital Ltd and Now Digital (Southern) Ltd, and our joint ventures Now Digital (East Midlands) and South West Digital Radio, Arqiva operates 25 local DAB digital radio multiplexes. These multiplexes cover a number of regions of the UK, predominantly in the Midlands, South West and the south of England.

Our major customers include the BBC, Bauer Media, Global Radio, Wireless, ITV, Channel 4, Five, Sky, UKTV, AMC, QVC, and Al Jazeera Networks.

Arqiva is owned by a consortium of infrastructure investors and has its headquarters in Hampshire, with major UK offices in London, Buckinghamshire and Yorkshire and operational centres in the West Midlands and Scotland.