

Arqiva submission to Ofcom's Space spectrum strategy consultation

About Arqiva

Arqiva is a communications infrastructure and media services company operating at the heart of the satellite, mobile and broadcast communications industry. Arqiva provides much of the infrastructure behind television, radio, mobile and other wireless communication in the UK. We are at the forefront of network solutions and services in an increasingly digital world. We provide much of the infrastructure behind television, radio and wireless communications in the UK and have a growing presence in Europe.

Arqiva is a major player in the UK's satellite communications business, operating over 80 antennas to geostationary satellites, providing telemetry, tracking and command support services to some of the leading satellite operators. We are a major provider of permanent satellite services to both Freesat and Sky customers. We also provide global satellite based services to the broadcast, communications, security, oil/gas, and exploration sectors, using our five UK teleports as well as facilities in the Middle East, Asia and the Americas. Our satellite customers include Turner and NBCU.

We are active in the telecommunications sector, providing access to over 8,000 sites and infrastructure for mobile phone operators. We are building and running a national Internet of Things ("IoT") network which is now live, starting with 10 of the UK's largest cities. In addition, our smart metering communications service, connecting 10 million homes using long-range radio technology, will be one of the UK's largest machine-to-machine deployments. This will require sites across northern England and Scotland.

Arqiva is a founder member and shareholder of Freeview. We broadcast all eight Freeview multiplexes and are the licensed operator of four of them. We own Connect TV, the first company to launch a live IP streaming channel on Freeview. In terms of radio delivery, we are the licensed operator of Digital One – the national commercial DAB multiplex. We are also a member of the Digital Two consortium which launched the second commercial DAB multiplex in 2016.

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

Overview

Arqiva welcomes the opportunity to respond to Ofcom's consultation, *Space Spectrum Strategy*, published on 1 March 2016. We are a critical player along the satellite value chain and, as such, have a keen interest that Ofcom makes informed decisions to enable the industry to flourish over the next decade.

We are broadly supportive of Ofcom's initiative to identify likely key trends and developments in the satellite sector and agree in most instances with the proposed approach taken. In coming to this view, we are grateful that Ofcom's emerging approach to this sector appears to have taken into account the views that we expressed in our response to last year's Call for Inputs, *Strategic review of satellite and space science use of spectrum*.

Our overriding view of the role of the regulator in supporting growth and development in this sector is that there needs to be long-term regulatory certainty. This will help underpin the very significant investment decisions faced by the number of players identified by Ofcom in the overall value chain and across a number of sectors. Clearly, the greatest challenge facing all regulatory authorities will be how to achieve this in an environment where there is greater demand for spectrum than supply of suitable frequencies.

We fully support Ofcom's current approach to identifying new bands suitable for future 5G mobile deployment. In particular, we support the approach that these should be identified from bands already allocated to the mobile service in the Radio Regulations. The clear direction of travel set out for discussions at the 2019 World Radiocommunications Conference (WRC-19) whereby valuable higher frequency satellite allocations are not on the agenda for discussion is to be welcomed at this stage. However, we do also note that there are emerging and separate pushes to develop the crucial 28 GHz band, used by satellite operators, for potential 5G use anyway (notably proposed recently by the United States Federal Communications Commission.)

With our Direct to Home (DTH) platforms, Arqiva is a significant player in the UK satellite broadcasting industry. Internationally too, we aggregate channels and uplink to other DTH networks, including in the Middle East and South Africa. Through our international distribution platforms, we are feeding DTH platforms throughout Europe as well as to a number of locations in the Americas, Africa, The Middle East, Asia and Oceania. Ofcom correctly identifies anticipated future growth for DTH services but we believe it should also factor in the technical and economic efficiency that DTH offers in delivering video content to wide coverage areas – this is a valid argument not only for linear TV, watched live, but also for other consumer scheduled recorded programmes and Push VOD. Spectrum policy which can enable this demand to be met is consistent with Ofcom's primary statutory duty to promote optimal use of spectrum.

We set out in our responses to specific consultation questions those benefits. However, we emphasise the point here that, by virtue of its one way broadcast nature, satellite DTH is an established and successful technology at delivering TV in a cost-effective way and its distribution costs compare favourably to mobile and/or fixed broadband. Increasing adoption

of spot beam technology (as we set out in our response to question 2) will likely further increase satellite efficiency at delivering services – both technically and economically.

Viewers have come to expect high levels of reliability from their TV services. Broadcasting technologies – terrestrial and satellite – have proven themselves to be the most effective at delivering to those expectations – the investment by the satellite industry in dual and diverse uplinks, coupled with multiple in-orbit co-located satellites results in most of our services having an up time of 100%. Emerging technologies clearly have a part to play in meeting increasingly fragmented viewer demand patterns. However, the ability of fixed and mobile broadband to replicate broadcasting reliability lies in the very longer term and faces some very significant technical and economic obstacles to achieve the established levels provided by DTH and DTT.

Spectrum sharing will become an increasingly important approach for regulators as demand for wireless services grows within a finite supply of suitable available spectrum. While we recognise the potential for increased spectrum efficiencies that such initiative would bring, we also emphasise the importance of measures to protect valuable legacy spectrum use and their users. With that in mind, we support the ongoing Ofcom project to identify sharing opportunities in the 3.8-4.2 GHz band where the principle is enshrined that established agreements for protecting incumbent spectrum users are preserved.

There are clear challenges facing policy makers over the immediate coming years. They will need to balance facilitating the explosion in demand from new mobile services with the established needs of existing and proven valuable services, such as satellite. They will also need to deal with emerging pressures on the wider international apparatus of decision making in the radiocommunications where administrations seek to follow separate bi-lateral and multi-lateral agreements.

In our response to the specific consultation questions below, a number of common themes emerge which we consider Ofcom need to take particular note of. These are:

- The continued importance of Direct-to Home (DTH) satellite TV services for the foreseeable future and its uniquely favourable technical characteristics of broadcasting at delivering TV content – especially linear, live sporting content and events of national prestige - to viewers;
- Related to the above, the growth in the numbers of HD and UHD channels placing greater demand for DTH services;
- The importance of ensuring that there is no disruption to existing end users of satellite services, especially as Ofcom seeks to exploit further spectrum sharing opportunities; and

The potential for future regulatory intervention where misaligned commercial incentives between licence holders prevent co-ordination to make the most effective use of spectrum already released to the market. We set out in this submission how this might apply to the

licensing arrangements of the 28 GHz band in the UK, subject to the legitimate rights of the existing licence holders.

Responses to questions

Question 1: How useful is the interactive data that we have provided on our website and why? How can the presentation and interactivity of the data be improved? How frequently would it be useful for us to update the information and why?

We very much welcome the availability of the interactive data which Ofcom provides on its website. The relevance and comprehensive nature of the data reduces the requirement for more frequent or day-to-day contact between Arqiva and Ofcom for operational issues. Clearly, this is a benefit for both our organisations as it allows us to focus more on issues of strategic importance.

The interface is intuitive but will only remain of benefit to stakeholders as long as it is kept up-to-date.

We further welcome the quarterly satellite stakeholder meetings which Ofcom convenes for relevant stakeholders. These provide a useful update on satellite related regulatory issues and developments.

Question 2: Do you agree with the industry and technology trends that we have identified for the satellite sector? Are there other trends that could have implications for spectrum use?

Ofcom has successfully captured the key trends for the satellite sector. The one addition that we would make to those listed is that of the likely increased use in spot beam technology – fundamental to the deployment and use of High Throughput Satellites. This is of particular importance as it will enable greater spectrum efficiency through greater frequency re-use. We note in our introductory comments that this development will increase our ability to reach ever greater coverage in even more technically and economically efficient ways.

On the issue of reduced orbital separation between geo-stationary (GSO) satellites, we would raise some caution on any moves towards this. In particular:

- There will likely be an increased risk of harmful interference. For example, we have already seen adjacent satellite interference issues with sub 70cm dishes at 2 degrees spacing in Europe;
- Any such changes would require very careful consideration of consumers whose dishes would, as a consequence, be pointing at the wrong part of the sky and would therefore lose reception of their services; and
- Poorly installed pre-existing “working” installation performance may suffer if the orbital separation is reduced.

Question 3: Do you agree with the application specific trends we have identified for the satellite sector? Are there other trends that could have implications for spectrum use?

We broadly agree with the application specific trends that Ofcom has identified.

To add to this, we consider that existing technologies are now approaching the Shannon limit. Whilst new propriety technologies could secure some increased spectrum efficiency, this will meet the challenges of legacy consumer equipment which will be unable to receive these more advanced services.

Question 4: Do you agree with the industry and technology trends we have identified for the space science sector? Are there other trends that could have implications for spectrum use?

We are not part of the space science sector and therefore do not offer a view on this.

Question 5: Do you agree with the application specific trends we have identified for the space science sector? Are there other trends that could have implications for spectrum use?

We are not part of the space science sector and therefore do not offer a view on this.

Question 6: Do you agree with the applications we have identified as having particular potential for growth in consumer and citizen benefits?

Ofcom has captured the key applications which will have potential for growth over the coming ten years.

However, we expect that the principal driver of growth for broadband (including satellite broadband) will be video. Long-form video consumption is primarily linear and is forecast to remain a significant element of consumer demand for the foreseeable future¹. Broadcasting technology is uniquely well-suited to delivering linear TV content. It was developed as a "one to all" delivery mode and is unrivalled at delivering TV services to entire populations.

Given this, there will be a clear requirement for DTH for some time to come. This is as a service in its own right with over 11 million subscribers in the UK alone but also as a valuable way of ensuring that broadband networks do not "fall over" as a result of having to bear the technical pressures of delivering increasing video traffic. In that respect, we repeat the point made previously that only broadcasting technology – such as DTH or DTT – can,

for the foreseeable future successfully and efficiently deliver reliable TV services to entire populations.

Question 7: Do you agree with the three priorities that we have proposed for our strategy? Are there other priorities that are as important, or more important, for citizens and consumers and why?

We would add an overarching priority to the three strategies set out by Ofcom. This is to ensure that the impacts on legacy users of satellite services are fully protected by any future strategies. Ofcom will need to recognise that consumers, businesses and wider industry have invested significant amounts in equipment such as receiver units. Any shift in approach to delivering content, whether broadband or DTH, could lead to loss of services. Ofcom should seek to promote a regulatory environment which protects the ongoing interests of all consumers.

Another area which we believe may be significant is so-called Comms on the Move ("COTM"). There is a growing demand for delivering services to vehicles on the move (including goods vehicles, coaches, buses, cars, and taxis). With much of the content of interest being television or radio broadcasting or popular websites, this provides a strong argument in favour of satellite rather than 4G or 5G as the preferred delivery platform. Whilst MSS solutions (at lower frequencies 1 to 2 GHz) work well, these are unaffordable for consumers and also for many businesses. With the advent of electronic steerable flat plate antennas, incorporated into the construction of each vehicle itself, this may become the enabler for satellite based COTM services.

Question 8: Are there other areas where spectrum liberalisation could enable better satellite broadband services and what specific actions should we be considering?

Ofcom states its belief that there will be sufficient 28 GHz band capacity to meet the likely increase of demand for satellite broadband services within the scope of this strategy. However, Ofcom has missed an important element of the way that this band has been licensed in the UK and which could prevent UK operators from meeting that demand.

When the 28 GHz band was awarded in 2008 as a result of an auction, Arqiva was one of the winning bidders for these frequencies. It has been our hope for some time that this spectrum could be used to deliver a number of services, including satellite broadband services. Because the band has been licensed in a way which fragments the frequencies between UK licensees this means that the only way to deliver the entire 28 GHz band satellite services in the UK is for a consolidation of frequencies – ideally through some form of transfer between operators.

Ofcom published a consultation on spectrum sharing, *A framework for spectrum sharing*, in July 2015. That document clearly set out Ofcom's belief that there will likely be occasions

where commercial incentives between spectrum licensees could be misaligned, such that frequencies are used in a way which leads to a sub-optimal outcome. This is a complex issue and it covers a number of different services including satellite broadband so we would welcome discussion with the regulator on this specific matter.

Question 9: Do you agree that existing satellite bands are likely to provide sufficient capacity for considerable growth in satellite broadband and that we do not need to prioritise the identification of new bands? Do you have any comments on the analysis we have undertaken of supply and demand?

It is too early to conclude that existing bands will provide sufficient capacity for growth in satellite broadband demand. However, we are clear that there are risks in further erosion of spectrum allocated to satellite through the international processes, particularly with respect to future World Radiocommunications Conferences in 2019, 2023 and beyond. As we note above, the UK approach to the WRC-19 agenda item on identifying bands for 5G is the correct one. These should, in the first instance, be drawn from existing mobile allocations in the Radio Regulations.

It is unclear how significant the FCC's recent initiative on developing 5G mobile use of the 28 GHz band will be. This relates to the narrower issue of the spectrum itself, but also to any implication for the ITU process which appeared to preclude the development of this band in the short to medium term as a mobile candidate for 5G. With that in mind, we would welcome further discussion with Ofcom on its view of the future of the 28 GHz band in light of the moves from the United States.

Ofcom will be aware that any move to exploit the 28 GHz band for any services will require significant investment decisions from across the communications value chain. This can only be realised with sufficient and clear regulatory certainty over the long-term future of the band.

Question 10: To what extent does the proliferation of filings for "paper satellites" create costs or barriers that hinder the provision of satellite services to UK citizens and consumers?

The satellite filing process creates spectrum inefficiencies. It incentivises the practice of countries reserving satellite spectrum capacity on the basis of (potentially) nebulous "option value" as opposed to genuine commercial need for spectrum to underpin actual services. This risks running contrary to established spectrum management policy whereby users that place most value in spectrum rights are able to secure access to the relevant frequencies.

Question 11: Are there other actions we should be considering that could enable greater benefits from satellite broadband?

To summarise the points made in responses to questions above, we consider that Ofcom should recognise that:

- TV services are driven by asymmetric linear services and are best delivered, at a technical level by broadcast and not broadband technology;
- Existing satellite spectrum allocations need to be protected at forthcoming WRCs; and
- Where fragmentation of licensed spectrum leads to sub-optimal outcomes and where misalignments of incentives mean the market alone cannot prevent such outcomes, Ofcom needs to consider whether regulatory intervention is appropriate.

Question 12: Do you agree that existing bands are likely to provide sufficient capacity for considerable growth in earth observation data downlink and that we do not need to prioritise the identification of new bands? Do you have any comments on the analysis we have undertaken of supply and demand scenarios?

We are not part of the space science sector and therefore do not offer a view on this.

Question 13: What other specific actions should we be considering to facilitate earth observation data downlink?

We are not part of the space science sector and therefore do not offer a view on this.

Question 14: To what extent will access to suitable spectrum for TT&C enable greater use of small satellites and why? Do you agree with specific actions we have identified and what else should we be considering?

We understand this question is driven by those smaller satellites in non-GEO orbits, and the consequential need for TT&C services to support them. Whilst lower orbit paths are still predictable, managing communications to and from spacecraft without interference will continue to be a challenge. We do not feel this to be an issue at GEO orbit.

Ofcom may wish to consider a different approach to TT&C with a combination of limited shared frequencies (using addressable command & control, similar to the approach taken with telemetry) and slotted time sharing. We have some concern that unless care is taken,

TT&C services may well demand a disproportionate amount of bandwidth/spectrum in a rapidly expanding non GEO small satellite sector.

Question 15: What other actions should we be considering to support long-term predictability of access to sensing bands?

We have no comment on this question.

Question 16: Are there other actions we should be considering that could enable greater benefits from earth observation?

We are not part of the space science sector and therefore do not offer a view on this.

Question 17: Are there any improvements we should consider in how we enable existing benefits to continue, whilst exploring sharing new uses?

We are not part of the space science sector and therefore do not offer a view on this.

Question 18: Do you agree that the applications we identify do not need to be a particular focus for regulatory action in the short to medium term?

We are not part of the space science sector and therefore do not offer a view on this.