
**Response to the consultation on the
“RSPG Opinion on Common Policy Objectives
for WRC-15”**

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RSPG consultation on the Draft RSPG Opinion on Common Policy Objectives for WRC-15

About Arqiva

Arqiva is the communications infrastructure and media services company operating at the heart of the broadcast and mobile communications industry and at the forefront of network solutions and services in an increasingly digital world. Arqiva provides much of the infrastructure behind television, radio and wireless communications in the UK and has a growing presence in Ireland, mainland Europe, the USA and Asia.

The company supports cellular, wireless broadband, satellite, video, voice and data solutions for public and private sector customers.

Arqiva is a founder member and shareholder of Freeview. Arqiva owns and operates the networks for all six of the established Freeview multiplexes and more recently has rolled out a further Freeview multiplex delivering additional high definition programmes on the platform. Of these seven multiplexes, Arqiva is the licensed operator for three of them providing access to the Digital Terrestrial Television platform for Broadcasters and content providers. Arqiva was also a key launch technology partner for Freesat. We own Connect TV, the first company to launch a live IP streaming channel on Freeview. Arqiva is also the licensed operator of Digital One – the national commercial DAB digital radio multiplex.

Arqiva is also a significant Satellite Earth Station operator in the UK, with five operational teleport sites, operating over 80 antennas to geostationary satellites over the orbital arc 61 degrees West to 68.5 degrees East. In the UK, Arqiva is a major provider of permanent satellite services to both Freesat and Sky customers, and from its UK bases and fleet of transportable and flyaway systems, provides services to a range of satellite based platform operators throughout the world. These are for both permanent services and ad-hoc services, such as the Scottish Referendum, the Olympic and Commonwealth Games etc.

We are building and running a national Internet of Things (IoT) network, 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.

Arqiva operates shared radio sites throughout the UK and Ireland including masts, towers and rooftops from under 30 to over 300 metres tall as well as a number of international satellite teleports. In Arqiva Wi-Fi we own one of the UK's largest Wi-Fi hotspot providers that enable us to build a unique proposition for Wi-Fi hotspot and outdoor Wi-Fi provision in the UK. In Arqiva Wi-Fi we work with some of the busiest and best loved brands in the UK, delivering seamless Wi-Fi connectivity for; Travelodge, Enterprise Inns and the majority of airports. Our network of access points spans over 3,000 public locations including city centres, hotels, restaurants, shopping centres, airports, motorway service stations and other premium, high-footfall locations.

Our major customers include the BBC, ITV, Channel 4, Five, BSkyB, NBCU, Turner, Classic FM, the four UK mobile operators, the Metropolitan Police, Airwave, RNLI, and satellite operators including Eutelsat, Inmarsat, SES and Intelsat.

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.

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1. Executive Summary

Arqiva welcomes the opportunity to respond to the RSPG's draft Opinion on Common Policy Objectives for WRC-15.

This consultation seeks stakeholder input on the Common Positions that should be adopted by Europe in preparation and during the World Radiocommunications Conference of November 2015. The key position of interest to Arqiva and the Terrestrial Broadcast community is the position proposed for the 470 – 694 MHz band where the RSPG proposes to;

'support no mobile allocation in the band 470 – 694 MHz'

Arqiva fully endorse this strong position which clearly reflects the strategic importance of terrestrial broadcasting to European Member States.

Arqiva support the position proposed by RSPG for the 700 MHz band (Agenda Item 1.2) but noting the following reservations;

- Sharing and compatibility studies have assumed DVB-T2 operation and if this is not the case then additional interference mitigation may be necessary;
- The channel plan adopted should not be overly restrictive, limited to IMT systems only, and hence offer Member States the flexibility to permit broadcast services to be deployed in the Duplex gap at member state discretion
- Public Protection and Disaster Relief (PPDR) services should not be introduced into the guard band, between the broadcast service in Channel 48 and the IMT service starting at 703 MHz as technical parameters determined for the IMT service assume a minimum 9 MHz separation between the Mobile Service and the Broadcast service to limit disruption caused by interference
- Future developments in receiver technology are needed to minimise disruption caused by LTE in the 700 MHz band we support initiatives to address this and we see this as an important focus for European investment

In the context of C-Band spectrum (Agenda Item 1.1) we welcome the position being adopted for 3.8 – 4.2 GHz, i.e. this is not a suitable candidate band for IMT and hence will not be supported at WRC-15, but there is concern regarding 3.6 – 3.8 GHz and we note that this band is also used extensively for satellite services in Europe and we urge the RSPG to revisit their position on this frequency range.

Finally, against future agenda items (Agenda Item 10) we note;

- 5G developments are intended to support a broad range of capability and diversity of needs with only limited applications being truly mobile but rather wirelessly connected on a static basis via a very short but high bandwidth link. It is important that this aspect is taken account of when considering the future spectrum needs for this technology; and
- There is a trend towards the consumption of higher resolution content and hence that due consideration should be given to future spectrum requirements for the terrestrial broadcast service.

2. Arqiva detailed response to the draft Opinion

2.1 Introduction

Arqiva has taken a keen interest in the International co-ordination process since WRC-12, taking an active role in the technical programme both at ITU and CEPT levels. We welcome the opportunity to respond to this RSPG draft Opinion and the focus of our response on Agenda Items 1.1, 1.2, 1.3 and 10, with the bulk of our response centred on agenda item 1.1 challenging the need for substantially more spectrum for IMT services.

2.2 Agenda Item 1.1 - additional spectrum allocations to the mobile service on a primary basis and identification of additional frequency bands for International Mobile Telecommunications (IMT)

2.2.1 Mobile Traffic Forecasts are Subject to Challenge

In 2012 Ofcom estimated that the demand for mobile data capacity would have risen 80 fold by 2030. However, in its Mobile Data Strategy statement¹, Ofcom² reflected on alternative forecasts from Analysys Mason that estimated the demand for mobile data in 2030 could be lower at 45 times higher than today, with the traffic carried on mobile networks (after allowing for traffic off-loaded to Wi-Fi networks) increasing by 25 times relative to today's activity.

Mobile data demand forecasts are inherently uncertain and caution should be exercised when taking regulatory action which relies upon them. This is particularly the case where the acknowledged leader in the field of mobile data demand forecasts, Cisco, has twice reduced its mobile data forecasts. The adjusted estimates were challenged by another recognised authority in this field, Analysys Mason³, as still significantly overstating the likely level of future data demand.

The reliability and accuracy of the projections of wireless data demand was recently the subject of a paper⁴ presented at the 42nd Research Conference on Communication Information and Internet Policy in Washington DC. The paper reviewed the accuracy of previous projections of wireless demand and considered the spread of under to over estimates produced. It was noted in the paper that for the past seven Cisco mobile traffic forecasts for North America, overestimates were nearly twice as frequent as underestimates (19 vs. 10). Overestimates were also on average, greater in magnitude than the underestimates (103 vs. 81 PB/month).

As this information suggests, there is growing evidence that mobile data demand forecasts are significantly overstated. Furthermore, the basis for the data growth estimates for mobile have been questioned by some industry sectors with the claim that base assumption regarding population density are two orders of magnitude too high⁵. If this claim is substantiated the high data capacity growth projections for mobile will have to be significantly downgraded and regulatory policy adjusted accordingly.

¹ Ofcom, Mobile Data Strategy statement, 27 May 2014

² Ofcom, 'Consultation on the future use of the 700 MHz band, Cost-Benefit analysis of changing its use to mobile services,' May 2014, section 4.6

³ <http://www.analysismason.com/About-Us/News/Insight/Cisco-mobile-data-forecasts-Feb2013/>

⁴ 'Overestimating wireless demand: policy and investment implications of upward bias in mobile data forecasts,' presented at 42nd Research Conference on Communication, Information and Internet Policy, Washington DC, 13 September 2014

⁵ Review of spectrum requirements for IMT, ITU Radiocommunications Study Groups, Document 4-5-6-7 / 573 E, submitted 13 February 2014, WRC-15 Agenda item 1.1.

Finally, it has been recognised that a significant proportion of 'mobile' data consumption is static and facilitated by traffic offload on to Wi-Fi⁶ somewhat questioning the need for additional sub-1GHz spectrum for Mobile Networks. Moreover, the expansion of the use of small cells or network densification in the Mobile Networks to increase data capacity is better addressed by access to higher frequency spectrum whether the user equipment is static or mobile.

2.2.2 Studies emphasise the importance of 470 – 694 MHz for Terrestrial Broadcasting

Policy makers in Europe have explored extensively the future use of the UHF band through several independent study missions involving the European Commission, European Administrations and industry stakeholders;

- TG6 study group⁷
- EU convergence study⁸
- High level group⁹

2.2.2.1 TG6 Study Group - Long Term Vision for the UHF broadcasting band

Amongst the conclusions reached¹⁰ we note the following:

- Broadcasting services will continue to evolve as can be seen by improvements in picture quality and user experience through the introduction of HDTV, UHD TV, 3DTV, etc.;
- Linear viewing will remain the main way of viewing TV content for the foreseeable future. Time-shifted and on-demand (non-linear) viewing will continue to grow, driven for example by services such as YouTube, Netflix, BBC iPlayer and Boox TV;
- Currently the majority of the TV viewing, both linear and non-linear, occurs in the home and this will not change. Viewing outside the home is growing but it will remain marginal to the in-home viewing;
- Most of the TV viewing will remain on the large screen, while viewing on handheld devices will increase. In the home, the latter will be driven by the growing availability of Wi-Fi;
- Migration of services from SDTV to HDTV, and the introduction of additional HDTV services; The content offering will continue to increase;
- In many European countries, HDTV programmes are already offered on the DTT platform, and this could be expected to become the norm in the short to medium term. In order to allow the services described above to be delivered to the viewer's efficiently the DTT networks need to continue to evolve and have access to a sufficient amount spectrum;
- Hybrid broadcast-broadband services will become commonplace, possibly including wireless broadband, to allow increased access to non-linear as well as linear content;
- Evolutions in DTT technology will support larger SFNs therefore increasing efficient use of spectrum

⁶ Wik/Aegis, Study on Impact of traffic off-loading and related technological trends on the demand for wireless broadband spectrum, <http://bookshop.europa.eu/en/study-on-impact-of-traffic-off-loading-and-related-technological-trends-on-the-demand-for-wireless-broadband-spectrum-pbKK0113239/>

⁷ TG6 Terms of Reference, <http://www.cept.org/ecc/groups/ecc/tg6/page/terms-of-reference>.

⁸ Challenges and Opportunities of Broadcast-Broadband Convergence and its Impact on Spectrum and Network Use" - SMART 2013/0014, <https://etendering.ted.europa.eu/cft/cft-display.html?cftId=252>.

⁹ 'Mandate of the High Level Group on the future use of the UHF band (470-790 MHz),' Neelie KROES, Member of the European Commission, Brussels, 16 December 2013.

¹⁰ CEPT ECC Report 224; Long Term Vision for the UHF broadcasting band

These observations developed collectively by European Administrations and industry stakeholders clearly demonstrate the sustained importance of DTT to the European media landscape and hence the need to secure long term access to this spectrum for DTT

2.2.2.2 EU Convergence Study

Plum Consulting, on behalf of the European Commission, has undertaken a detailed study programme involving industry stakeholders to consider the 'challenges and opportunities of broadcast-broadband convergence in the UHF band.'

The findings¹¹ from their work emphasise the complexity and cost of the displacement of the incumbent High Tower DTT service with a Low Tower / Low Power converged broadcast alternative – noting a significant increase in cost with no obvious benefits or economic driver for such a change.

2.2.2.3 High Level Group on the future use of the UHF band (470-790 MHz)

The high level group was formed by the European Commission and sought to bring industry stakeholders together from the Broadcasting and Mobile sectors under the chairmanship of Pascal Lamy to consider;

- the political and technical aspects regarding the future use of the 700 MHz band in the EU
- the strategic challenges facing Europe in addressing the growing spectrum demand for wireless broadband;
- the policy implications of wireless demand on the future use of the entire UHF band (470-790 MHz)

The Chairman's report¹² clearly notes a long term need for Europe to secure access to the UHF band for DTT to 2030 and recommends a consistent EU position at future World Radio Conferences (starting from WRC-15) against co-primary allocation of the spectrum below the 700 MHz band to the mobile service.

With mobile services now assigned to the 700 MHz band and the likelihood that IMT could expand into a significant number of other bands following WRC-15 the need to access the UHF spectrum that is currently utilised in a spectrally efficient manner by DTT cannot be justified. As a result the UHF band currently utilised for terrestrial broadcast services should retain the assignment at least until 2030.

The justification for the retention of UHF spectrum for terrestrial broadcast services is further strengthened when the results of recent studies and statistics for the platform in Europe is considered. Key points to note are;

- Terrestrial networks are a primary means of receiving TV services for 120 million households or 53% of the European population
- This penetration is significantly greater than other forms of delivery; cable (35%), satellite (21%) and broadband (4%)¹³

¹¹ Challenges and opportunities of broadcast-broadband convergence and its impact on spectrum and network use (SMART 2013/0014), December 2014, <https://ec.europa.eu/digital-agenda/en/news/challenges-and-opportunities-broadcast-broadband-convergence-and-its-impact-spectrum-and-0>

¹² Pascal Lamy, Report to the European Commission; Results of the work of the high level group on the future use of the UHF band (470-790 MHz), 1 September 2014

¹³ CEPT ECC Plenary meeting in Bratislava, 5th – 8th March 2013

- A report by Aetha¹⁴ on co-primary allocation of the 470 – 790 MHz band found that the costs of clearing DTT from the spectrum (EUR38.5bn) significantly outweigh the potential value of using the spectrum for mobile (EUR10.3bn) by a factor of almost four. As a result it concluded that there was no economic case for switching-off existing DTT networks across Europe on the grounds of spectral efficiency
- Similarly, a report by Communication Chambers for Digital UK¹⁵ considered the potential economic value of the 470 -790 MHz band for mobile data services. Their findings demonstrated that the economic value that could be derived for the mobile data service was £0.19bn/MHz which is some 60% lower than the value of the spectrum when utilised for the DTT service at £0.47bn/MHz. Again, releasing spectrum utilised by DTT for mobile data services cannot be justified on economic grounds

In summary Arqiva fully endorse the strong position adopted in the draft Opinion,

‘support no mobile allocation in the band 470 – 694 MHz’

which clearly reflects the strategic importance of terrestrial broadcasting to European Member States.

We also welcome the position being adopted by the RSPG for 3.8 – 4.2 GHz, i.e. this is not a suitable candidate band for IMT and hence will not be supported at WRC-15, but we remain concerned that the 3.6 – 3.8 GHz range is still being actively considered for future IMT use as this frequency range is also extensively used for satellite services in Europe and we urge the RSPG to revisit their position on this frequency range.

2.3 WRC-15 Agenda Item 1.2

Arqiva note that this agenda item was created to determine the lower band edge and an effective channel plan for IMT services in the 700 MHz band, whilst ensuring protection of the terrestrial broadcast service in Channel 48 and below. Arqiva has been extensively involved in the detailed technical process to achieve this outcome both within the ITU-R and CEPT processes and consider it important to emphasise that the technical operating conditions that have been adopted to enable IMT services in the 700 MHz band (starting at 703 MHz) whilst protecting the broadcasting service in Channel 48 and below are based on a compromise agreed and recognises the need for improvements to receiver performance. Hence studies / development should be encouraged to ensure that future technology is fit for purpose and minimises the risk of service disruption.

Furthermore, the technical operating conditions for the IMT service, i.e. Out of Band Emission (OOBE) characteristics have been determined based on modelling where DVB-T2 is the DTT system in service. If DVB-T systems remain in service after the displacement of the DTT service out of the 700 MHz band there may be excessive disruption¹⁶ to the DTT service and additional local interference mitigation arrangements may be necessary.

Whilst we note that considerable activity has centred on optimising the channel plan to maximise its impact for IMT services. It is important to acknowledge that the 700 MHz band will continue to benefit from a primary allocation to terrestrial broadcast and hence sufficient flexibility should be introduced to the final channel frequency plan to allow for other services, e.g. Programme Making and Special Events and DTT to be accommodated within the band in particular within the Duplex Gap where Member States consider necessary.

¹⁴ Future use of the 470–694MHz band, Aetha report, 31 October 2014

¹⁵ Communication Chambers, The Value of DTT in an era of increasing demand for spectrum, January 2014

¹⁶ ITU-R JTG4-5-6-7 Doc 418, ‘Measurements for assessing the impact of OOBE as well as short pulse interferences from IMT user equipment to DTTB reception’, France, 7 February 2014

Finally, it is worth acknowledging that the detailed technical analysis undertaken to determine the appropriate co-existence arrangements for the IMT service in the 700 MHz band adjacent to the Broadcast Service in Channel 48 and below has determined that a minimum guard band of 9 MHz is required between the lower block of IMT (starting at 703 MHz) and the broadcast service in Channel 48. These findings therefore preclude any use of the guard band for IMT based systems and hence no further consideration should be given to Public Protection and Disaster Relief (PPDR) in the guard band.

In summary, we support the lower band edge being set at 694 MHz and the compromise position that has been adopted to secure broadcasting in Channel 48 and below. Furthermore, we support access to the band for PMSE but also continued access for the broadcasting service which remains a primary service in the Radio Regulations.

2.4 WRC-15 Agenda Item 1.3

Arqiva support the RSPG position to seek no obligation on the use of specific technology and specific frequency bands for PPDR in Europe. In addition we note the following;

- Broadcast services provide emergency information in times of need alongside 24 hour news services, and hence this important aspect needs to be acknowledged.
- Administrations have diverse requirements for PPDR services and hence there does not appear to be a compelling need for dedicated and harmonised spectrum Europe wide
- The UK position on additional spectrum for Broadband PPDR is to accommodate the service within the commercial launch of LTE services, e.g. 900 / 800 / 700 MHz further endorsing the lack of need for harmonised bands.
- The UK is in the process of co-ordinating its future requirements for PPDR via the ESMCP programme which will utilise available spectrum assets.

Finally, as noted in section 2.3 above the 700 MHz guard band is not able to accommodate PPDR systems that are IMT based and hence any such developments should seek to avoid this guard band.

2.5 Future WRC Agenda Items, WRC-15 Agenda Item 10

Arqiva support the RSPG opinion to focus the future spectrum needs for the fifth generation of mobile networks (commonly known as 5G) above 6GHz. Acknowledging the evidence that establishes the need for long term security of access to the 470 – 694 MHz band for the terrestrial broadcast service alongside the detailed studies that show incompatibility between IMT and DTT systems in this band we urge Member States to seek to ensure at WRC-15 that this band is not included for further consideration at future conferences. Furthermore, in light of the huge disruption caused to industry by having such a wide frequency range for consideration at WRC-15 we urge Member States to identify priority frequency ranges above 6 GHz that would be worthy of consideration due to their frequency, bandwidth and potential availability.

It is worth noting that 5G as a standard is being developed to offer a broad range of capability to potentially support a diversity of needs and very few applications will need to be mobile but rather wirelessly connected via a very short / high bandwidth link. It is important that this aspect is taken account of when considering the future spectrum needs for this technology.

Finally, with ever increasing demand for higher resolution formats for audio-visual content consumption, e.g. High Definition, Ultra High Definition (4k & 8k), due consideration should be given to the future spectrum needs for this type of consumption which may be served via 5G systems in future or via terrestrial broadcast networks, the spectrum inventory work undertaken by

the European Commission¹⁷ clearly highlights this anticipated increase in demand for spectrum for audio-visual content consumption.

¹⁷ Report from the Commission to the European Parliament and the Council on the Radio Spectrum Inventory, Brussels, 1.9.2014, COM(2014) 536 final. <http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1409838760033&uri=COM:2014:536:FIN>