BBC response to **Ofcom**'s call for input: *3.8 GHz to 4.2 GHz band: Opportunities for Innovation*

9 June 2016

Overview

1. The BBC welcomes the opportunity to respond to Ofcom's '3.8 GHz to 4.2 GHz band: Opportunities for Innovation' call for input. We support Ofcom's sharing initiatives[1] and welcome the opportunity to consider what opportunities there are for innovation in this band.

2. The BBC has a direct interest in the 3.8 to 4.2 GHz band. This spectrum is used by both BBC Monitoring and BBC World Service. We hold grants of Recognised Spectrum Access (RSA) in this range for Receive Only Earth Stations (ROES) and we have invested considerably in large antennas at UK sites.

3. These operations access a large range of frequencies across satellite spectrum used by broadcasters around the world. Access across the entire band is required by BBC Monitoring for gathering content and other purposes so whatever frequencies are being used can be received. Because we have no control of the frequencies used by other broadcasters, flexibility is essential in order to be able to pick up the required national and international satellite television and radio broadcasts and to be able to change when they change.

4. In addition, BBC World Service uses frequencies in the range 3.8 to 4.2GHz for its international content distribution. A number of these services are uplinked from the UK where the service providers also monitor the transmissions at their earth stations. As noted in paragraph 2.33 "the wider 3.6 GHz to 4.2 GHz band is used for downlink communications, often paired with the 5825 MHz to 6725 MHz range for uplink communications." The services are also downlinked in the UK for onward transmission and performance monitoring. Some, but not all, of these sites are directly licenced by the BBC. Currently, the Fixed Satellite Service from 3.8 GHz to 4.2 GHz provides satellite communications for the UK which are of an international nature with links which cross international boundaries. The BBC also uses downlinks in 3.8 to 4.2 GHz outside the UK, with the vast majority being receive-only and therefore unlicensed or unregistered.[2]

5. As Ofcom rightly recognise the analysis of the bands' uses and their characteristics of use is an essential part of the sharing process. To take account of the full value use of this spectrum an analysis of usage characteristics in the band would need to include not just licenced transmission, but also downlink and receive only use cases. Without acknowledgement of both uplink and downlinks (inside or outside the UK) an incomplete picture of UK use would emerge. This could lead to poor planning, unintended consequences and harm to existing users.

6. We have previously experienced the impact of sharing implemented without full consideration of incumbent spectrum use: BBC Monitoring had to change operations after licences for broadband

---

[1] The BBC shares its spectrum holdings (e.g. PMSE licences for peak demand events) and has committed significant resources to assisting Ofcom with new spectrum sharing opportunities through the White Space Devices project.

[2] Typically there is no requirement or facility for receive only uses to be licensed or registered. Within the UK, after RSAs for ROES were introduced in 2011, the BBC's monitoring facilities were provided with a mechanism to limit the possibility of interference from sharing with terrestrial services.   All other sites used by BBC are subject to the relevant licences or RSA for ROES as appropriate to the service provider and location.

wireless access were awarded in 2003 without considering the impact on incumbent spectrum use. One of the problems with RSA with respect to spectrum below 3.7 GHz however was the timing of its introduction. It came into effect after *Broadband Wireless Access* licences had already been issued, and therefore only protects against interference from new licences holders, and not from existing ones – despite the fact the BBC was an incumbent user. This example serves to illustrate one of the two key issues we would like to raise in response to this consultation - the importance of sequencing in sharing planning. The timing of when protection (e.g. through the issuing of RSAs)[3] is offered to receive-only users is a key factor and should be built into any sharing framework as the *first* order of business.

7. The second concern we wish to raise is the importance of recognising complexity of the way the Fixed Satellite Service uses this band as well as the incremental benefits receive only uses bring. We welcome Ofcom's statement that this will be a central concern should sharing proceed in this band (paragraph 3.12). We would expect Ofcom to involve a call for input or consultation prior to progressing sharing initiatives to ensure existing users (including receive only users) can be considered. As we emphasised in response to Ofcom's consultation on Space Spectrum Strategy, in order to support existing benefits it will be important that Ofcom can protect existing operations which may use unknown or unlicensed receiving locations. The existing provision of RSAs in the UK between 3.8 to 4.2 GHz may assist Ofcom applying the Sharing Framework to this band. The BBC believes that sharing should be avoided unless it is possible to first recognise the presumed rights and value generated by existing users - including receive only or licence exempt users. For bands where RSA is not currently offered, or where RSA would not be suitable, this may require additional steps in implementing the sharing framework. For example, outreach and information gathering with a view to ensuring Ofcom has captured and can consider uses where licences are not required.

8. We set out more detailed comments below in response to the most relevant specific questions raised in the consultation.

---

[3] By 'protection' we mean the consideration Ofcom would give a licence or RSA holder when planning additional spectrum use.

The BBC's response to Ofcom's call for input:
'Ofcom's '3.8 GHz to 4.2 GHz band: Opportunities for Innovation'

Answers to questions in Ofcom's call for input

> *Question 2: Based on information provided in this Section, can you identify any barriers to enhanced sharing in the 3.8 GHz to 4.2 GHz band? Please use the Spectrum Sharing Framework, which identifies four types of barriers to spectrum sharing: lack of information; market barriers; technology barriers; and authorisation barriers.*

9. Ofcom's 'Spectrum Sharing Statement' correctly identifies that availability of information on spectrum use and spectrum demand could be a potential barrier. This is illustrated by the observation that "detailed usage information would be required for receive-only terminals" in order to enable opportunistic spectrum access (paragraph 3.5.2). At a minimum prior to sharing spectrum in new ways Ofcom will need to undertake a wide-ranging outreach effort to give receive only users the opportunity to declare their spectrum use so it can be fully considered. Overcoming this barrier will be a key challenge in many bands used by satellite, but perhaps less so in 3.8 to 4.2 GHz given RSA has been available enabling users to apply for protection if desired.

10. In addition, Ofcom should ensure that potential new sharers are aware that not all existing uses are featured in the interactive data Ofcom has published. For example, confidential or sensitive uses will not be included.

11. Authorisation barriers may also be a particular problem for receive-only users, even where RSA is in place. This is because RSA does not necessarily fully reflect existing use cases. For example, the BBC's response to Ofcom's consultation on RSA indicated that due to the sensitive reception equipment and larger dishes used by BBC Monitoring, a baseline figure for the noise temperature of 60 Kelvin was more appropriate than the 93 Kelvin proposed. This is different to the problem Ofcom raises in respect of authorisation barriers to new sharers in 3.8 to 4.2 GHz, it might still reduce sharing by making the band unsuitable for incumbents, potentially forcing incumbent users to move elsewhere. We expect Ofcom would share our view that if a lack of protection from interference through existing authorisation measures reduced sharing by moving incumbents out of the band, or to new geographic locations (potentially outside the UK) this would not represent a successful *sharing* implementation. It is therefore important that existing uses can be fully accounted for in coexistence planning.

12. Due to the receive only nature of BBC Monitoring operations and the requirement for our facilities to have access to a large range of frequencies across satellite spectrum used by the world's broadcasters, technology barriers are relevant. Due to the large dishes required, which are also highly susceptible to adjacent (in frequency and geography) signals, past experience of operating in this band with other terrestrial users has shown that the desired signals are often impossible to hear or see due to interference. Spectrum and particular dish elevations are effectively rendered unusable. Without careful coexistence planning, this could mean the band is less suitable for incumbent users and for the BBC's purposes if the band is shared. Filters are only suitable as a mitigation to allow sharing where a fixed frequency is used at a fixed location. Filters are not a suitable mitigation for frequency-agile applications such those of BBC Monitoring or the reception of Occasional-Use feeds where a wide range of frequencies will need to be accessed on a dynamic basis across this band. These frequencies are often not

allocated or able to be influenced by the receiving station but are chosen by others operating the transmission which may originate from outside the UK.

Question 3: Do you agree with our initial assessment of a potential application of a tiered authorisation approach in this band?

- If yes, please provide as much detailed information as possible of how you consider any tiered authorisation approach may enable greater spectrum sharing and how it could be implemented in practice.

- If no, please describe the spectrum access method that you consider may best meet any requirements you have to access spectrum in the 3.8 GHz to 4.2 GHz band. Please give specific details of how you would envisage this working in practice, where appropriate with reference to the tools and enablers identified in the Spectrum Sharing Framework.

13. The BBC considers that the proposal for tiered access is broadly sensible. In any deployment of any sharing model we would expect our existing use in this band to be fully considered in co-existence planning. Such consideration might include a review of existing RSA parameters. RSA is useful for spectrum management planning to allow consideration of ROES use which would not otherwise be considered in spectrum planning (and essentially afforded some degree of protection.)

Question 4: Should a potential future tiered authorisation approach to spectrum access in the 3.8 GHz to 4.2 GHz band accommodate changes from incumbent services of the spectrum? I.e. should new licences or variations to existing fixed link and satellite earth station licences be allowed to continue on a first-come-first-served co-ordinated basis?

The BBC believes any sharing framework should be able to accommodate changes from incumbent users, which would be in line with Ofcom's first-come-first-served spectrum licensing principle. Given the importance to our operations of fixed satellite services which use spectrum between 3.8 to 4.2 GHz in the UK, the BBC supports the multi-tiered authorisation approach which continues to allow Tier 1 licensees to grow their businesses in this band. For example, the BBC is planning to increase our C-band capacity on Intelsat 10-02 to accommodate additional African TV services. These new services will require additional monitoring in the UK, either at a new or existing site.

ENDS.