



**BBC response to Ofcom consultation on Supporting increased use of shared spectrum**

**2 February 2024**

## Introduction

The BBC is grateful for the opportunity to comment on Ofcom's proposals for the evolution of Ofcom's Shared Access framework. The introduction of Shared Access Licences, particularly in the range 3.8-4.2GHz, has been particularly welcome and has enabled enhanced BBC produced coverage at a number of events, whilst protecting BBC satellite use through Recognised Spectrum Access (RSA) for Receive only Earth Stations (ROES) use. Examples include coverage of the 2022 Commonwealth Games in Birmingham, live coverage of the late Queen's procession through Edinburgh Airport, and most recently at the Coronation of King Charles. Licences have also facilitated a number of BBC related research projects and industry demonstrations.

5G Private Networks in exclusive and co-ordinated spectrum allow robust, high quality, low latency bi-directional links for wireless cameras and their supporting ancillary signals which include production talkback, tally, camera control and teleprompting. They have a particular advantage over use of public networks which to date have only been for best effort contribution and can fail, particularly when heavily congested. News organisations routinely rely on public networks for live news coverage but they are insufficient and unsuitable for such occasions as the Coronation. There are further applications for 5G Private Networks across the content production sector within the UK's leading creative industries, which contributed £126bn in 2022 (12% higher in real terms than in 2019, compared to the UK economy as a whole which grew by 2% between 2019 and 2022).<sup>1</sup> 5G Private Networks are also better able to enable geographic sharing while protecting existing use in geographically limited locations such as satellite downlinks where that use is notified through, for example, RSA for ROES.

Ofcom's proposals to improve the application process with refined technical assumptions and co-ordination processes are therefore very welcome. Improved geographical availability and speed of access to spectrum is crucial to a greater routine reliance on 5G Private Networks supporting high-quality solutions for content production.

Whilst the term '5G broadcasting' appears in the proposal document it is a very different application to wireless Content Production for which Shared Access licences are employed. The distinction is again highlighted to avoid confusion with 5G broadcast distribution of content to consumer devices.

Unless otherwise stated the responses relate to the 3.8-4.2GHz band alone.

***Q1. Do you have any comments on our proposals to gather additional antenna parameters, and would you prefer Ofcom to specify a small number of antenna pattern***

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<sup>1</sup> <https://www.gov.uk/government/statistics/dcms-and-digital-economic-estimates-monthly-gva-to-sept-2023/using-annual-estimates-from-summed-monthly-data-dcms>.

***'envelopes' or for users to provide details of the specific antenna parameters in use for Ofcom to assess? Please provide reasons for your views.***

Consideration of more closely defined antenna patterns is welcomed and has been highlighted by the BBC in responses to previous consultations. Content production within a relatively small area employs lower height directional base stations antennas with substantial 'Front-to-Back' ratios. Multiple Mobile User Equipment (UEs) generally operate within a small local area, use lower radiated powers and non-directional antennas at lower height than base stations, typically around 1.5m agl. These characteristics could be further modelled in Ofcom spectrum compatibility analyses to improve the geographical availability of spectrum.

The addition of a small number of antenna pattern 'envelopes' would be a worthwhile simplification to aid Ofcom's assessments. The BBC would be happy to assist in characterising typical antenna patterns, heights and tilts to represent standard content production applications.

***Q2. Do you have comments on the suggested approach to enable user-led coordination in certain circumstances?***

The dominant requirement for content production, particularly newsgathering and coverage of events, is to obtain swift access to suitable spectrum. Ofcom's proposals for an automated and online application process are therefore very welcome, similar as they are to the Ofcom PMSE tools which have been in place and successfully applied for many years. However, in cases where the Ofcom SAL process alone is unsuccessful, further user-led co-ordination would be very beneficial. For many cases there may not be sufficient additional time to engage before a production but where possible the BBC would be open to user-led co-ordination.

Additional mitigations of typically lower base station antenna height, directional antennas and short duration productions can then be explored in greater detail. There is already a proven record of PMSE licensees responsibly co-ordinating their spectrum requirements with other established spectrum users, facilitated through Ofcom.

***Q3. Do you have any comments on our proposal to increase the power level of our Low Power product by 3 dBm in the 3.8-4.2 GHz band?***

An increase by 3dBm to the Low Power product would be very welcome for Content Production, applicable as it would be to urban areas where medium power options are more limited.

***Q4. Do you have any comments on our proposal to remove the requirement for licensees holding a Low Power 3.8-4.2 GHz licence to keep a record of the address at which mobile terminals connected to an indoor base station will be used?***

Indoor Private Networks typically operate with UEs roaming within a building over short paths. There would therefore be little additional advantage in specifying mobile terminal locations so close to a base station. On completion of the production all deployed base stations and UEs would be taken away or switched off, whether indoors or outdoors.

For content production applications we agree with the proposal to remove the requirement for licensees to keep a record of the addresses for indoor locations of UEs but also raise the possibility to remove the requirement for outdoor deployments too, due to their temporary nature and short signal paths confined within small areas.

***Q5. Do you agree with our proposals to assume synchronisation between users, and coordinate base station to terminal instead of base station to base station in the 3.8-4.2GHz band? If no, please explain how other measures could increase sharing of the band.***

Synchronisation has benefit when the frame structures of adjacent networks align and this is the case for adjacent downlink heavy services such as Fixed Wireless Access. The base station to terminal path is therefore the dominant requirement so co-ordination of the relevant base station interference to the terminal of adjacent networks is clearly the most suitable.

In contrast, content production networks operate uplink-heavy frame structures and the benefit of synchronisation with differently configured adjacent networks is lost. Not mandating synchronisation but assuming it for co-ordination is therefore reasonable and supported by the BBC. As set out in the document the increased risk of interference through not employing synchronisation can be mitigated in a number of other ways. The temporary nature of content production deployments facilitate optimal antenna placement, often at relatively low heights given short paths. Frequency separation can also be employed for greater mutual protection between adjacent networks, regardless of differing frame structures.

***Q6. Please indicate whether you support our preferred option of coordination at -88 dBm/20 MHz (based on I/N of + 3dB, at 1.5m) or a more conservative alternative of -91 dBm/20 MHz (based on I/N of 0dB at 3m), with reasons for your view.***

Given the illustrations of reductions in potential sterilisation areas the BBC supports the preferred option for a threshold at 1.5m height of -88dBm/20MHz (I/N +3dB, 10dB noise figure) to be chosen for base station to terminal co-ordination. It also matches the content production application where UEs are generally attached to the back of handheld cameras close to 1.5m agl.

**Q7. Do you agree with our proposals for an increase in BEL in 3.8-4.2GHz? If no, are there alternatives which you consider could better achieve similar results?**

Based on the Rec. ITU-R P.2109-2 figures for traditional building construction the BBC supports the use a figure of 14dB for BEL in the frequency range 3.8-4.2GHz. It does though remain conservative compared to over 30dB predicted for thermally efficient buildings.

**Rec. ITU-R P.2109-2**

**5**

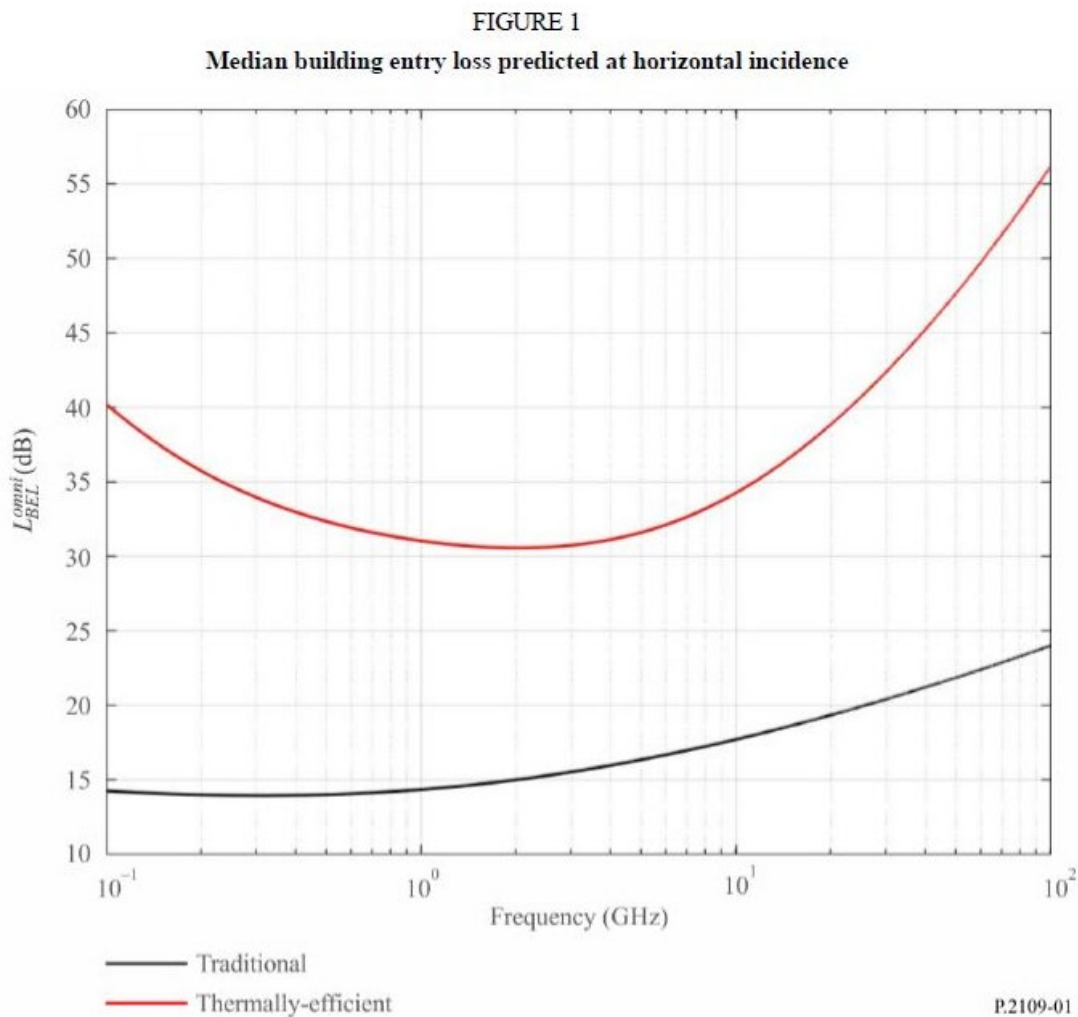


Figure 1: From Rec.ITU-R P.2109-2: Median building entry loss predicted at horizontal incidence

There is therefore scope to consider a greater BEL figure for individual buildings in an exceptions process should it be necessary to further minimise separation distances and improve geographical access to spectrum.

***Q8. Do you agree with our proposal that adjacent band protection for Shared Access users is in future limited to considering only the first 5 MHz above and below UK Broadband assignments?***

The BBC supports the update in the Ofcom approach to protecting Shared Access from UK Broadband assignments which retains co-channel coordination procedures but limits adjacent channel coordination to the 5 MHz above and below UK Broadband. This relaxation in protection for Shared Access can additionally be mitigated for content production given the flexibility to optimise short term temporary deployments as well as long term installations, predominantly indoors.

***Q9. Do you agree with our assessment that, in circumstances where localised shortages of spectrum have occurred, pricing can be used to influence requested spectrum amounts?***

It is welcomed that Ofcom are proposing to retain their approach to promote innovation with Shared Access licences retaining the current level of fees except where there is risk of spectrum scarcity.

Where spectrum scarcity is an issue, for long term outdoor applications such as Fixed Wireless Access (FWA), higher pricing is endorsed to encourage alternatives to Shared Access bands or reduced bandwidth solutions.

For content production however, where long term indoor studio applications will result in less impact on Shared Access spectrum availability, higher prices where there are localised shortages of spectrum would not be supported by the BBC. Comparable PMSE licensing costs for fixed locations do not increase when there are localised shortages of spectrum.

Additionally greater licensing costs for short term, often outdoors content production would also be unreasonable where localised spectrum scarcity exists given the requirement to cover prominent event locations.

The risk would be that, due to cost, less than optimal wired solutions have to be employed, providing coverage to a lesser standard than has become expected.

***Q10. Do you agree that we should take measures to reflect the impact of bandwidth, power levels and urban/rural location in our pricing approach for the 3.8-4.2 GHz band? Do you think there are other factors we should be taking into account?***

Pricing to reflect the impact of bandwidth, power levels and urban/rural locations is reasonable in promoting the use of minimum bandwidths and radiated powers. Content production though is generally a short term deployment, particularly for outdoor events with longer term indoor deployment, for example in studios. For the case of short term use a table below has been derived from the proposals to show typical licence fees based on up to seven days' use.

	10 MHz	20 MHz	30 MHz	40 MHz	50 MHz	60 MHz	80 MHz	100 MHz
Current Price	£32	£32	£32	£32	£32	£32	£32	£32
Rural Low Power	£32	£32	£32	£32	£32	£32	£32	£32
Urban Low Power	£32	£32	£32	£32	£32	£32	£32	£32
Rural Low Power	£32	£32	£32	£32	£32	£32	£32	£32
Urban Medium Power (by exception)	£32	£32	£32	£39	£49	£77	£135	£193

Table 1: Seven day pro rata fees from illustrative annual fees in Table 5.4

For all but the Urban Medium category Programme Makers would appear to be paying £32 for up to a week for a licence which is reasonable and comparable to current PMSE fees. Urban Medium fees are higher but not unreasonable though could become excessive for longer periods and bandwidths. The Coronation deployment required multiple Medium Power licences. If Urban Medium Power was licensed for a longer period for indoor use it would be fair to discount the fee to Urban Low Power rates given that the interference potential is reduced by the BEL and the reference to improved clutter and propagation models. As part of the exceptions process that would be employed for a Medium Power Urban application it could be made a requirement for the applicant to demonstrate a minimum degree of BEL.

Ofcom have set out that they considered this option but rejected it to avoid undue complexity from multiple fee products. We ask that this be reconsidered at least for content production applications.

***Q11. How do you consider the illustrative prices would impact your spectrum requirements and future deployment plans in the 3.8-4.2 GHz band? Please provide evidence in support of your view.***

With the proposed Shared Access fees appearing comparable to existing PMSE licence fees and swift access to spectrum through the online application portal described there is a high probability that demand for 3.8-4.2GHz spectrum will continue to grow for content production utilising Private Networks. The particular characteristics of content production, long term usually indoors and for short periods outdoors with low antenna deployments and fleeting impact on spectrum availability for other networks. These proposals indicate clear decisions and policy on spectrum access for the future and will encourage investment from the programme making industry and its suppliers to develop and source suitable innovative products. The range 3.8-4.2GHz is particularly attractive for content production given the availability of equipment within this 3GPP NR band and its international possibilities. Until now the international availability of the same PMSE spectrum for content production has been poor, limiting the market for suitable products and solutions.

***Q12: Do you have any comments on our proposals to clarify the circumstances in which exceptions are available, the tests we will apply, and how this supports user flexibility outside our overarching rules?***

To date the exceptions process as employed for the Coronation applications has been unclear and difficult to navigate, particularly when time is short. We welcome more clarity from the proposals set out though the range of exceptional parameters being considered remains cautious and limited.

Whilst the exceptional use of higher antenna heights is considered there is advantage of also taking account of lower antenna heights deployed for content production to further maximise spectrum availability. Other mitigations such as directional antennas are mentioned for routine applications but it isn't clear how they may be considered in the exceptions process. The short term nature of content production applications is also a factor worth considering for compatibility purposes.

The BBC would be happy to talk further to Ofcom about exceptions and how they can be more fully considered with respect to content production applications.

***Q13: Do you agree with our overall approach based around refining our existing coordination framework for Shared Access, whilst monitoring future opportunities for more user led and outcomes led coordination where evidence suggests it would be of benefit?***

The proposals well reflect the issues raised in prior consultations and stakeholder events and address many of them with practical solutions. Continuing to facilitate Shared Access spectrum for innovative uses is vital and Ofcom are remaining cautious to ensure that remains the case as their approaches evolve. The possibilities for users to override the Ofcom co-ordination process and also for applicants to co-ordinate between themselves are very attractive. They do though need to be carefully managed to avoid individual operators and applications dominating spectrum use to the detriment of smaller more niche uses such as content production. Access to the Shared Access bands needs to remain open to all including those without significant spectrum planning knowledge and tools.

***Q14: Do you agree with our assessment of the potential impact on specific groups of persons?***

No comment

***Q15: Do you agree with our assessment of the potential impact of our proposal on the Welsh language? Do you think our proposal could be formulated or revised to ensure, or increase, positive effects, or reduce/eliminate any negative effects, on opportunities to use the Welsh language and treating the Welsh language no less favourably than English?***

No comment



**Q16: Do you have any other comments on the proposals set out in this document?**

The consultation also mentions the 2302-2350MHz band and opportunities for Shared Access which may arise from Ofcom’s work on Shared Access with MoD. The BBC supports this work and is very interested in pursuing further access for PMSE in this band.

The consultation highlights that the “3.8-4.2 GHz band in particular forms part of a developing global market seeking to maximise the potential for 5G to support private networks and industrial verticals” (2.8). The BBC welcomes the opportunities this would bring but emphasises the need for regulators to protect existing use globally. In the UK, shared access in this band and co-existence with ROES is enabled by RSA.<sup>2</sup> This allows Ofcom and the BBC, as an end user in the UK, to maximise the benefits of 3.8-4.2GHz for both programme making, distribution and monitoring. As very few countries have a mechanism to allow the registration or licencing of ROES worldwide, these satellite links remain very vulnerable to interference and would not be protected.

The BBC is conducting work to best characterise the mutual compatibility of ROES and 5G Private Networks and will be happy to share the outcomes of the work with Ofcom.

The BBC’s use of satellite in the band 3.8-4.2GHz in the UK and internationally is detailed in numerous BBC responses to Ofcom’s consultations, mostly recently:

[https://www.ofcom.org.uk/\\_data/assets/pdf\\_file/0026/78308/bbc.pdf.pdf](https://www.ofcom.org.uk/_data/assets/pdf_file/0026/78308/bbc.pdf.pdf)

BBC requests that Ofcom fully recognises that the requirement for regulatory recognition of ROES and reciprocal downlink operation must underpin successful shared access in 3.8 - 4.2GHz in the global context.

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<sup>2</sup> RSA was established by Ofcom between 3.6 – 4.2GHz in 2011 in response to requests for formal recognition from ROES operators in the spectrum management and planning process, to limit the possibility of interference from sharing with terrestrial services.

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