

## Your response

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<p><b>Section 3 –Spectrum use by the PMSE sector in the UK</b></p> <p><b>Question 1:</b> What are your views on how our processes work - for example our online booking system, turn-around times, and event coordination. Do you think the current approach works well? How could we improve it?</p>	<p>Confidential? – N</p> <p>Online booking system is good. Response time to changes or inquiries is too long for the industry, also need to be able to get in touch with regards to frequency changes over the weekend.</p>
<p><b>Section 4 – PMSE historic trends</b></p> <p><b>Question 2:</b> Do you have any comments on how we have analysed and characterised wireless microphone and IEM demand, or suggestions for alternative ways of characterising this demand?</p>	<p>Confidential? – N</p> <p>No</p>
<p><b>Question 3:</b> Do you have any comments on how we have analysed and characterised wireless video demand, or suggestions for alternative ways of characterising wireless video demand?</p>	<p>Confidential? – Y / N</p>

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<p><b>Section 5 – Future trends and opportunities</b></p> <p><b>Wireless audio</b></p> <p><b>Drivers of demand</b></p> <p><b>Question 4:</b> What factors have driven changes in the demand for audio PMSE applications, specifically for:</p> <ul style="list-style-type: none"> <li>a) the increased use of coordinated wireless microphones and IEMs, particularly the peak number of simultaneous assignments used at the largest events?</li> <li>b) the slight decline in the number of national wireless microphone licences (UHF channel 38 and VHF)? Has the extent of use of these licences changed, and if so why?</li> <li>c) the declines in talkback, fixed audio links and ADS licences?</li> </ul>	<p>Confidential? – N</p> <ul style="list-style-type: none"> <li>a) Scaling up production values and the ever increasing expectation that wireless will work everywhere as phones mostly do. TV production companies are always looking to be bigger and better year on year, so the requirements tend to increase each time round.</li> <li>b) Channel 38 is not a reliable part of the spectrum.</li> <li>c) This is probably down to the likes of Riedel Bolero comms and others like it which have made wireless intercom easier. That being said, at Glastonbury the DECT spectrum these devices use was getting very congested, in a way I have not seen before. This is not likely to get any better in the future and may lead to this part of the unlicensed spectrum needing co ordinating.</li> </ul>
<p><b>Question 5:</b> What factors could drive further changes in the demand for audio PMSE applications in the future, and what will this mean for future demand, specifically for:</p> <ul style="list-style-type: none"> <li>a) coordinated wireless microphones and IEMs, particularly the peak number of simultaneous assignments used at the largest events?</li> <li>b) national wireless microphone licences (UHF channel 38 and VHF)?</li> </ul>	<p>Confidential? – N</p> <p>All of these refer to previous answer.</p>

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c) talkback, fixed audio links and ADS licences?	
<b>Question 6:</b> Do you agree that, given the trends, we are right to focus on wireless microphones/IEMs?	Confidential? – N Yes
<p data-bbox="204 618 600 685"><b>Changes in the take-up of bands already available</b></p> <p data-bbox="204 712 660 860"><b>Question 7:</b> What factors have driven the take-up of different bands for wireless audio? What are the barriers to greater use of the DME band?</p>	Confidential? – N Equipment availability. In terms of DME it is a restricted band which is obviously not the preference.
<b>Question 8:</b> What actions could enable greater take-up of the DME, DECT and licence exempt bands in the future?	Confidential? – N You can't, it will end up too congested at big events. It is unreliable and not suitable for critical applications.
<p data-bbox="204 1108 528 1176"><b>Changes in spectrum availability</b></p> <p data-bbox="204 1202 639 1386"><b>Question 9:</b> Which potential additional bands might be suitable for wireless audio applications, particularly microphones and IEMs at the largest events and venues?</p>	Confidential? –N Higher bands will only cause more issues with coverage and where will the equipment in those bands go?
<b>Question 10:</b> To what extent do the characteristics of different audio applications drive their requirements for spectrum – for example particular requirements for latency, resilience or capacity?	Confidential? –N This depends on the event. Very low latency is a big requirement, as is good quality audio. No RF dropouts is essential on high profile broadcasts.

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<p><b>Changes in efficiency of spectrum use</b></p> <p><b>Question 11:</b> What changes in spectrum use (technology, working practices, different bands, etc) have enabled audio wireless growth to be accommodated to date, particularly the increased use of wireless microphones and IEMs at the largest events and venues in the context of reduced UHF spectrum availability?</p>	<p>Confidential? –N</p> <p>The move to digital modulation has been a big factor. The likes of Shure Axient equipment allowing more carriers in a small space. There is only so far that can go without degrading quality though.</p>
<p><b>Question 12:</b> What technologies are currently available or are being developed which can improve audio spectrum efficiency in the future, particularly in the use of wireless microphones and IEMs at the largest events and venues?</p>	<p>Confidential? – N</p> <p>Increase spectral efficiency, forward error correction etc.</p>
<p><b>Question 13:</b> Are there any barriers to adopting more efficient technologies for audio applications, particularly for wireless microphones and IEMs at the largest events and venues? What could industry do and what could Ofcom do to facilitate greater use of those technologies?</p>	<p>Confidential? – N</p> <p>Cost and limited availability of spectrum</p>
<p><b>Question 14:</b> What changes to working practices and spectrum planning could improve audio spectrum efficiency in the future, particularly in the use of wireless microphones and IEMs at the largest events and venues?</p>	<p>Confidential? –N</p> <p>Greater co ordination between different vendors and RF service providers. This is far easier said than done with large events, it is practically impossible.</p>
<p><b>Question 15:</b> Are there any barriers to adopting working practices that could enable more efficient use of spectrum by audio applications, particularly for wireless microphones and IEMs at the largest events and venues? What could industry do and what could</p>	<p>Confidential? – N</p> <p>Operational complexity</p>

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Ofcom do to facilitate those efficiencies?	
<p><b>Wireless video</b></p> <p><b>Drivers of demand</b></p> <p><b>Question 16:</b> What factors (such as more complex events and use of higher resolution equipment) have driven the demand for wireless video bandwidth, in particular for:</p> <ul style="list-style-type: none"> <li>a) the increased bandwidth required for the largest sporting events such as Formula 1 at Silverstone and The Open Championship?</li> <li>b) the bandwidth required for nationally important state events such as The Coronation?</li> <li>c) the slow growth or decline in bandwidth used at horse racing fixtures?</li> </ul>	<p>Confidential? – N</p> <ul style="list-style-type: none"> <li>a) As with Audio, it is the increasing production requirements, the industry pressure to be bigger and better with each passing year and the move from HD into UHD HDR.</li> <li>b) As above</li> <li>c) More efficient use of spectrum but also there has been less money available to increase the size of the production due to TV companies advertising revenue losses post covid.</li> </ul>
<p><b>Question 17:</b> What factors could drive further changes in the demand for wireless video bandwidth in the future, and what will this mean for future demand, in particular for:</p> <ul style="list-style-type: none"> <li>a) the bandwidth required for the largest sporting events like Formula 1 at Silverstone and The Open Championship?</li> <li>b) the bandwidth required for nationally important state events such as The Coronation?</li> </ul>	<p>Confidential? – N</p> <p>Increases in scale of production</p>

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c) the bandwidth used at horse racing fixtures and other major sporting events?	
<p><b>Potential new bands</b></p> <p><b>Question 18:</b> What factors have influenced the degree of take-up of existing bands used by wireless video applications, particularly the growth in take-up of the 7 GHz band?</p>	<p>Confidential? –N</p> <p>Ofcom advised broadcast facilities providers to move to the 7 GHz band. This has become a viable alternative to fighting for space in the 2GHz band</p>
<p><b>Question 19:</b> Which potential additional bands might be suitable for video PMSE applications, particularly at the largest events and venues?</p>	<p>Confidential? – N</p> <p>Non currently offer an attractive alternative to 7GHz, perhaps the 1.4GHz band?</p>
<p><b>Question 20:</b> To what extent do the characteristics of different video applications drive their requirements for spectrum – for example particular requirements for resilience or capacity?</p>	<p>Confidential? – N</p> <p>The reliability of the links drive the need for clean spectrum. Not shared or unlicensed bands</p>
<p><b>Changes in efficiency of spectrum use</b></p> <p><b>Question 21:</b> What technologies are currently available or are being developed which can improve wireless video spectrum efficiency in the future?</p>	<p>Confidential? – Y / N</p>
<p><b>Question 22:</b> Are there any barriers to adopting more efficient technologies for wireless video? What could industry do and what could Ofcom do to facilitate greater use of those technologies?</p>	<p>Confidential? – N</p> <p>Cost</p>
<p><b>Question 23:</b> What types of video demand could realistically be supported by private (for example 5G) networks?</p>	<p>Confidential? – N</p> <p>Very low priority links, ones where latency is not an issue. This does not describe many links in use in broadcast.</p>

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<p><b>Question 24:</b> What changes to working practices and spectrum planning could improve video spectrum efficiency in the future?</p>	<p>Confidential? – N</p> <p>Not sure</p>
<p><b>Question 25:</b> Are there any barriers to adopting working practices that could enable more efficient use of spectrum by wireless video? What could industry do and what could Ofcom do to facilitate those efficiencies?</p>	<p>Confidential? – N</p> <p>No visibility of other users use of the spectrum</p>
<p><b>Other comments</b></p> <p><b>Question 26:</b> Do you have any other comments or views on the issues raised in this document?</p>	<p>Confidential? – N</p> <p>The 7GHz spectrum is very important for broadcast and needs to be protected. There are no alternatives currently. 5G is not reliable enough and cannot provide the capacity and low latency at the same time, even with a private 5G network and infrastructure.</p>

**Please tell us how you came across about this consultation.**

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- Read about it in a newspaper or magazine
- Heard about it at an event
- Somebody told me or shared it with me
- Other (please specify)

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