Your response

Question	Your response
### Section 3 –Spectrum use by the PMSE sector in the UK **Question 1**: What are your views on how our processes work - for example our online booking system, turna-round times, and event coordination. Do you think the current approach works well? How could we improve it?	Confidential? – Y / N In general the online system works as both a good tool to check availability and for booking frequencies in advaance of an event. With regards to larger events at venues such as Excel London the coordination Ofcom sets inplace woeks well. However if additional frequencies are required onsite this can cause delay! However venues of this nature have always required a complete coordination overview due to there being many events in one place that always need controlling for all to have a succesful show.
### Section 4 – PMSE historic trends **Question 2**: Do you have any com-ments on how we have analysed and characterised wireless microphone and IEM demand, or suggestions for alternative ways of characterising this demand?	Confidential? – Y / N Many events within the Corporate sector both in the UK and across Europe require ever growing demands for Radio mics & IEM systems. The use of radio mic systems are needed for production & presentation needs. Added to which many events have multiple breakout areas and Demos that all require multiple Radio systems to be used throughout the event. These can be a full days use and not just the short periods as indicated!
Question 3: Do you have any com-ments on how we have analysed and characterised wireless video demand, or suggestions for alternative ways of characterising wireless video demand?	Confidential? – Y / N Coming from the audio side of RF coordination & installation the video/Camera RF is not always on the radar however in some case the RF cameras do relay Audio within there retuens which is sometimes show critical especially in internal broadcast setups.

Question	Your response
## Section 5 – Future trends and opportunities ## Wireless audio ### Drivers of demand **Question 4:** What factors have driven changes in the demand for audio PMSE applications, specifically for: a) the increased use of coordinated wireless microphones and IEMs, particularly the peak number of simultaneous assignments used at the largest events? 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? c) the declines in talkback, fixed audio links and ADS licences?	Confidential? – Y / N A: With many large events going from Touring Artists & Festivals to Corporate Events & Roadshows; all have traditionally required large amounts of Radio Mics/IEM's & radio comms. This trend has not decreased even after the advent of DTV & TelComs sitting alongside the main frequencies that PSME has and continues to use. Many shows use ever bigger LED screens and Lighting systems that can create various harmonics and intermod products that need to be considered with the coordination for the events RF-Mics & IEM's. This is also part of the considerations to take into account once the local areas DTV and other potential RF interferences have been accounted for. In addition this does not allow for the noise floor increasing that happen can once audiences arrive with various devices that can change this environment! B: In general while coordinating large frequency plots for events; the CH38 area is left out so that any need for spot frequenciea can be put in that range and not affect the rest of the working show frequencies in use! All companies I work with carry the CH38 licence as required. C: The growing demand for fully duplex Radio comms with clear audio is common on most events and theses tend to sit in DECT.
Question 5: 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: a) coordinated wireless microphones and IEMs, particularly the peak number of simultaneous assignments used at the largest events? b) national wireless microphone licences (UHF channel 38 and VHF)?	Confidential? – Y / N All productions have ever growing demands on Audio as a whole (As per most departments!) Radio Mics & IEM's are essentially the whole show; as in if the radio mic of your Lead singer or the CEO of an international corporation is interrupted/stopped or taken out by interference by an unknown external RF source the who event is compromised! Back ups are often in place but this can adversely affect the production/show in many ways. The addition of back ups & spares also needs to be considered as this adds to the number of frequencies required; often in a different range for safety… B: Ch38 is enevitably a busy area and will be!

Question	Your response
c) talkback, fixed audio links and ADS licences?	
Question 6: Do you agree that, given the trends, we are right to focus on wireless microphones/IEMs?	Confidential? – Y / N YES…
Changes in the take-up of bands already available **Question 7:** What factors have driven the take-up of different bands for wireless audio? What are the barriers to greater use of the DME band?	Confidential? – Y / N The use of other Bands has always been a factor especially with large events on both within the Live Music & Corporate sectors. To enable these events to function in a manor demanded by production and clients on all fronts the use of a wide spectrum is essential.
Question 8: What actions could enable greater take-up of the DME, DECT and licence exempt bands in the future?	Confidential? – Y / N
Changes in spectrum availability **Question 9:** Which potential additional bands might be suitable for wireless audio applications, particularly microphones and IEMs at the largest events and venues?	Confidential? – Y / N The current use of 470MHz -690MHz is required to fit the requirements of many large events generally to encompass the equipment ranges owned by many of the suppliers in the UK and across th Globe! Any extra bands available will always help in large event coordination especially where DTV and other local interference can mean the restrictions on the equipment available. Mainly as only certain equipment is available on that event due to specifacations and supply.
Question 10: 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? – Y / N Most RF-Audio equipement is specifically tuned to maximise the efficiency of certain frequencies for technical reasons. Even as the technology develops this is still the case. Factors of Latency, frequency waves, Resistance to externals, reflection and other reasons still apply…

Question	Your response
Changes in efficiency of spectrum use **Question 11:** 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?	Confidential? – Y / N The creation of usuable Digital Radio Mic systems and the progress of the technology makes Large events possible. To deliver the size of some events on an Analog Radio basis is nearly impossible these days due to demand of numbers and available spectrum in both the UK and abroad.
Question 12: 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?	Confidential? – Y / N Digital & Narrow Banding!
Question 13: 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?	Confidential? – Y / N As the manufacturers work to bring the Digital RF systems to the working Professional market the ever growing demands can be met but only to a certain point!
Question 14: 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?	Confidential? – Y / N This is almost predicted by the ability of the production and availabilty of technology and spectrum available to PSME users.
Question 15: 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 Ofcom do to facilitate those efficiencies?	Confidential? – Y / N To enable the large events that cover both the Live Music, Corporate and Many more. It is essential that we maitain the ability to use a wide area of the spectrum. This also takes into accaount that many suppliers have invested heavily to ensure they can safely deliver the needs of their clients at the highest levels. This also includes the jobs and companies reliant on these events with the correct technical knowledge.

Question	Your response
## Wireless video ### Drivers of demand **Question 16:** What factors (such as more complex events and use of higher resolution equipment) have driven the demand for wireless video bandwidth, in particular for: a) the increased bandwidth required for the largest sporting events such as Formula 1 at Silverstone and The Open Championship? b) the bandwidth required for nationally important state events such as The Coronation? c) the slow growth or decline in bandwidth used at horse racing fixtures?	Confidential? – Y / N
Question 17: 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: a) the bandwidth required for the largest sporting events like Formula 1 at Silverstone and The Open Championship? b) the bandwidth required for nationally important state events such as The Coronation? c) the bandwidth used at horse racing fixtures and other major sporting events?	Confidential? – Y / N

Question	Your response
Potential new bands **Question 18:** 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?	Confidential? – Y / N
Question 19: Which potential additional bands might be suitable for video PMSE applications, particularly at the largest events and venues?	Confidential? – Y / N
Question 20: To what extent do the characteristics of different video applications drive their requirements for spectrum – for example particular requirements for resilience or capacity?	Confidential? – Y / N
Changes in efficiency of spectrum use **Question 21:** What technologies are currently available or are being developed which can improve wireless video spectrum efficiency in the future?	Confidential? – Y / N
Question 22: 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?	Confidential? – Y / N
Question 23: What types of video demand could realistically be supported by private (for example 5G) networks?	Confidential? – Y / N
Question 24: What changes to working practices and spectrum planning could improve video spectrum efficiency in the future?	Confidential? – Y / N

Question	Your response
Question 25: 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?	Confidential? – Y / N
Other comments **Question 26:** Do you have any other comments or views on the issues raised in this document?	Confidential? – Y / N The use of the currently availble range of 470-694MHz is essentail for many events in the UK and abroad as the clients demand and equipment availabilty by suppliers is geared towards this. Many shows abroad are supplied by UK companies as part of a supply chain for international clients. These all require many channels of Radio frequencies and are needed to keep the needs of the industry.

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