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, turnaround times, and event coordination. Do you think the current approach works well? How could we improve it?	We consider Ofcom's PMSE process broadly effective, especially where the online portal can issue straightforward bookings quickly and where named event co-ordination is used for major events. For routine work the system is workable; for complex broadcast and major live events the quality of outcome still depends heavily on early dialogue with experienced co-ordinators. We have found the DTV data base to be inaccurate in some areas compared to our onsite data and we have also been able to double book frequencies in the same area due to NGR data overlap. Improvements would be: clearer indication of likely spectrum availability before payment; an easier way to amend multi-location and late-running bookings; better visibility of processing status; published planning assumptions for major events; and a faster escalation route where touring, broadcast or state-event requirements change at short notice. A structured post-event review for the largest congested sites would also help industry and Ofcom learn from each season. We also suggest on site spectrum management by PMSE on large events should include unlicensed spectrum including DECT and Ch38 so that a whole spectrum picture is built for the event . Confidential? – N

Question	Your response
Section 4 – PMSE historic trends **Question 2**: 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?	The analysis is directionally right and reflects what we see in the UK market: demand is increasingly concentrated in a small number of very large events and venues, with the heaviest pressure on coordinated wireless microphones and IEMs. The distinction between total assignments, peak day demand and simultaneous local peak demand is particularly useful. It has been suggested that the WMAS solution will increase channel count per TV channel. This is only true if the technology is used in its high density modes which, in some systems, can increase latency and reduce audio quality .Low latency and high audio bandwidth can only be achieved by using small numbers of channels per TV channel thus being less efficient that narrow band analogue transmission. We suggest adding three further views: (i) unique simultaneous frequencies required within the critical re-use zone, not only daily assignments; (ii) separation of microphones and IEMs, because their latency, power and adjacent-channel constraints differ materially; and (iii) a practical view of equipment tuning range and intermodulation limits, because theoretical channel counts can overstate real deployable capacity. It would also help to distinguish indoor broadcast/theatre demand from outdoor festival demand. Confidential? – N
Question 3: 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?	We are primarily an audio company so not qualified to comment on video wireless demand.

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?	The increase in coordinated wireless microphones and IEMs has been driven by larger and more technically ambitious productions, more stages and presentation areas, more guest performers and contributors, greater expectation of uninterrupted roaming coverage, and the growth of broadcast-style production values at live events. IEM counts have also risen as productions move away from wedges and toward cleaner stages and more individualised monitor mixes. The decline in national Channel 38 and VHF licences does not necessarily mean reduced use of those bands. It more likely reflects a shift toward coordinated licensing at congested venues, a post-700 MHz preference for wider-tuning professional equipment, and increased rental rather than ownership in some parts of the market. Use remains important for education, worship, small venues and backup paths. In general , our co-ordinations would not include CH38 as we would leave them clear for ENG / PSC use . We feel the decline in CH38 use has plateaued and unlikely to decline further. The reductions in talkback, fixed audio links and ADS licences are consistent with migration to other tools: DECT and digital intercom, IP workflows, fibre and managed networks in venues, and more efficient integrated production systems. Some legacy categories may therefore be declining because the function remains but is now delivered differently. Confidential? – N
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)? c) talkback, fixed audio links and ADS licences?	Future demand for coordinated microphones and IEMs is likely to continue rising at the largest UK events, though not necessarily in a straight line every year. Growth will come from more complex stagecraft, more contributors, more object-based and multilingual productions, tighter production values, and greater use of personalised monitoring. Peak simultaneous demand, rather than annual totals, is the key pressure point. National Channel 38 and VHF licences are likely to remain important for lower-cost and lower-complexity users, but their share may gradually reduce if more licence-exempt options become usable and if professional users continue moving toward coordinated, wider-tuning digital systems. Talkback, fixed audio links and ADS may continue to decline in their current licensed form where IP, fibre, DECT and private-network solutions are practical. However, they will not disappear entirely, because resilient independent communications and simple one-way assistive/listener services still matter at many venues. Confidential? – N

Question	Your response
Question 6: Do you agree that, given the trends, we are right to focus on wireless microphones/IEMs?	Yes. We agree that Ofcom is right to focus primarily on wireless microphones and IEMs. They represent the largest coordinated audio demand, the most acute peak-spectrum challenge, and the most direct exposure to any future change in UHF availability. They are also the applications where poor spectrum outcomes are immediately audible and commercially damaging. That said, the review should still keep talkback, fixed audio links and ADS in view, because these functions often migrate into other bands or technologies rather than disappearing. Policy that relieves pressure on microphones and IEMs by moving suitable comms and ancillary audio elsewhere would be valuable. Confidential? – N
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?	Take-up has been driven mainly by propagation, interference risk, equipment ecosystem, cost, and the amount of coordination support available. UHF remains the preferred professional band because it offers the best compromise of range, body-loss performance, indoor/outdoor usability and proven workflows. Channel 38 has remained attractive because it is simple and nationally portable. Newer options gain traction only when equipment is available, affordable and trusted in real productions. The barriers to greater DME use are well known: a smaller installed equipment base, limited rental inventory compared with UHF, higher equipment cost, concern about planning complexity around aeronautical sharing, and weaker familiarity among technicians. Some users also prefer to keep premium channels in UHF because artists, monitor engineers and RF teams trust the propagation characteristics and established workflows. Confidential? – N
Question 8: What actions could enable greater take-up of the DME, DECT and licence exempt bands in the future?	Greater DME take-up would be helped by predictable national rules, better planning tools, clearer operational guidance, and confidence that equipment investments will remain usable for a reasonable period. Ofcom could publish more worked examples for representative event types and expand practical guidance for coordinators and end users. Industry can help by increasing rental stock, training engineers, and normalising DME use for overflow and high-density deployments. DECT is largely saturated already with very little room for increased use, especially at larger events. The unmanaged nature of it means it is difficult to know if system will be stable Generally, for DECT and licence-exempt bands, growth will depend on realistic positioning. They are useful for comms, lower-risk productions and ancillary audio, but not a universal substitute for protected coordinated UHF.

Question	Your response
	Ofcom can help by keeping the rules simple and by publishing good-practice guidance on coexistence. Manufacturers can help by producing robust, better-filtered products with clear UK tuning support and monitoring tools. Confidential? – 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?	For additional wireless-audio capacity, the most credible approach is targeted shared access rather than assuming one direct replacement for UHF. Options worth exploring are further localised access to spectrum above 1 GHz where sharing can be engineered, including more practical use of DME, selective sharing opportunities in public-sector bands where incumbents permit it, and carefully designed temporary access arrangements for exceptional peaks. In our view, any candidate band must be judged against real PMSE needs: handheld/body worn operation, human-body losses, indoor penetration, antenna practicality, low latency and reliable operation in dense multi-user deployments. On that basis, alternative bands can supplement UHF, but they do not replicate it. UHF remains the anchor resource for the largest events and venues. Confidential? – N
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?	Application characteristics are fundamental. Wireless microphones need robust low-latency links, high channel density, resistance to intermodulation and body-shadowing, and dependable operation around metalwork, LED screens and crowds. IEMs are even more latency-sensitive; manufacturer guidance indicates that around 5 ms and below is the practical target for many performer uses. High power and adjacent-channel behaviour also matter because IEM transmitters can dominate local RF environments. By contrast, talkback, comms and some ancillary audio can tolerate different compromises and can often move to DECT, IP or other bands. This is why Ofcom should avoid treating “audio PMSE” as one homogeneous demand class. Different applications place materially different requirements on latency, resilience, duplexing, range and spectral efficiency. Confidential? – N

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?	Growth has been accommodated by a combination of tighter coordination, migration out of the cleared 700 MHz range into lower UHF and, to a limited extent, DME, improved digital equipment, wider tuning ranges, better software planning, and more disciplined event RF management. Large UK events are now generally designed around more active RF coordination than in the past. Industry has also become better at time-sharing and geographic reuse across large sites, reducing unnecessary transmitter power, and grouping requirements by priority. In parallel, some non-critical functions have moved to DECT, IP, fibre or other licence-exempt/alternative platforms, which helps preserve the most protected PMSE spectrum for the applications that truly need it. Confidential? – N
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?	Available and emerging technologies include narrowband digital and analogue wireless with tighter channel spacing than legacy analogue, digital systems with high-density modes, improved filtering and front-end selectivity, wider-band tuners, remote spectrum monitoring, and WMAS platforms. These can materially improve how many audio links can be supported in a given amount of spectrum. Shure and Sennheiser have both highlighted WMAS as a route to much higher channel density and more flexible resource management, there is however some trade off with latency and audio quality for high channel count is some systems Wisycom equipment demonstrates the value of wide tuning ranges, DME-capable front ends and narrowband modes for practical spectrum efficiency. Confidential? – N
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?	The main barriers are cost, interoperability, confidence, and regulation. Many users still hold significant investments in analogue or earlier digital fleets and cannot replace them quickly. Mixed estates are common, especially in rental and touring. Newer efficient systems also require training, updated planning methods and, in some cases, confidence that the relevant bands will remain available long enough to justify capital spend. Industry can help by demonstrating proven deployment models, improving cross-vendor coexistence information, and expanding technician training. Ofcom can help by giving greater regulatory certainty where possible, keeping coordination rules aligned with modern equipment performance, and engaging early with manufacturers and coordinators on practical trial activity. The more that policy, planning tools and equipment roadmaps line up, the faster adoption will be. Confidential? – N

Question	Your response
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?	Better working practice would include earlier submission of requirements for major events, clearer classification of critical versus optional channels, stronger use of on-site RF managers, tighter control of ad hoc additions, lower transmitter powers where feasible, and more systematic reuse planning by zone and time of day. It would also help to separate microphone and IEM planning more explicitly so that high-power monitor carriers do not unnecessarily sterilise spectrum. There could be a Super User ability within the online tools to allow better spectrum visibility and booking access to approved partners / companies . This could help reduce workload on Ofcom staff when the event is not managed by them but has large channel count requirements. On the planning side, Ofcom could review conservative legacy assumptions where modern digital performance justifies it, publish updated best-practice templates for high-density events, and encourage pre-event data exchange in standard formats. The practical goal should be to move from “requested assignments” toward “justified simultaneous need”, while preserving sufficient contingency for live broadcast and major show risk. Confidential? – N
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?	The main barriers are commercial and cultural as much as technical. Artists, productions and suppliers often prefer generous contingency, broad tuning flexibility and familiar legacy workflows. Final channel lists can change very late. Smaller productions may also lack the engineering resource to apply best practice consistently Industry should improve training, better understanding of technology will improve channel density, we regularly fit 30 transmits channels into 1 x 8 MHz TV channel space Use of common coordination data templates, and normalise earlier RF sign-off for major events. Ofcom can support this through guidance, coordinator forums, published lessons learned from representative events, and planning rules that reward good practice without creating undue administrative burden. Any efficiency drive must remain realistic: live broadcast and premium events still need resilience margins, backups and the ability to respond rapidly when show conditions change. Confidential? – N

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?	N/A
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?	N/A

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?	N/A
Question 19: Which potential additional bands might be suitable for video PMSE applications, particularly at the largest events and venues?	N/A
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?	N/A
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?	N/A
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?	N/A
Question 23: What types of video demand could realistically be supported by private (for example 5G) networks?	N/A
Question 24: What changes to working practices and spectrum planning could improve video spectrum efficiency in the future?	N/A
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?	N/A

Question	Your response
Other comments **Question 26:** Do you have any other comments or views on the issues raised in this document?	Ofcom's review is timely and important. The central UK policy point is that alternative bands and new technologies can help, but they do not yet remove the need for access to high-quality, interference-managed UHF for the most demanding wireless audio applications. Historic PMSE responses have consistently stressed that the sector should not be left materially worse off by wider spectrum policy decisions, and that principle remains valid. Every event we undertake will use some type of UHF RF device, be it Radio Microphone, IEM or comms system. Daily small show channel counts can be 30 or more. Larger shows 100 to 400 channels in the same space. This is only possible with the UHF spectrum currently available and to reduce this would mean lower production values, less rental opportunities for companies and less requirement for RF engineers and crews across all disciplines possibly leading to job losses. We believe the loss of more UHF spectrum could prove catastrophic for an already embattled industry. We therefore encourage Ofcom to focus on three outcomes: preserve core UHF access for PMSE while wider DTT policy develops; accelerate practical adoption of more efficient technologies through trials, guidance and regulatory certainty; and develop targeted sharing solutions for exceptional peaks rather than assuming a single substitute band will solve every problem. Confidential? – n

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