

Programme Making and Special Events (PMSE)

Pro User Group

Consultation Submission

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Executive Summary

- This submission is designed to reinforce and amplify many of the points that the PMSE Pro User Group made in its original submission to the DDR of 16/04/07 and in its subsequent discussions with Ofcom. This submission is designed to develop more clearly these arguments and to put forward to Ofcom what the PMSE Pro User Group considers to be the most essential guarantees that must be secured in order to ensure that the PMSE sector continues to function successfully. The PMSE Pro User Group believes that the proposals outlined in this document will help achieve this aim.
- The PMSE sector remains a disparate and diverse industry which possesses neither the financial resources nor a mechanism for coordinating a bid for its spectrum requirements. It cannot take part in an auction system for spectrum release. Even if it could do so, the PMSE sector would lose to rival bidders with deeper pockets, leading to PMSE market failure.
- The PMSE Pro User Group proposes that the frequencies needed for PMSE activities be gifted to a single band manager independent of, but paying an annual fee to, Ofcom. The single band manager would then license usage for the frequencies used by the PMSE sector.
- Ofcom should continue its efforts to guarantee the future of the PMSE sector by establishing a transitional timetable which affords the PMSE sector secure simultaneous access to both the 'analogue' interleaved spectrum until at least December 2013, and to the 'digital' interleaved spectrum until 2026.
- Channel 69 should not be deregulated and Ofcom should provide the PMSE sector with more information regarding the likely effects and implementation of recent TG4 Group proposals, regarding a European wide sub-band for use by the mobile telecommunications industry.
- **The PMSE Pro User Group welcomes Ofcom's recognition of the size, importance and the country's reliance upon the PMSE sector, as we do Ofcom's acceptance of the need for a single band manager to coordinate spectrum usage. However The PMSE Pro User Group believes that at present there is insufficient understanding by Ofcom of the practical problems facing the PMSE sector as a result of the Digital Switchover. This consultation submission is designed to address these issues in detail.**

Consultation Submission Key Points

1. The PMSE Pro User Group understands why the sector's access to 'analogue' interleaved spectrum will cease region by region as soon as the rolling switchover starts. This process will begin at the end of 2007, with larger geographical regions undergoing 'switchover' from the start of 2009. However the abrupt termination of PMSE access to 'analogue' interleaved spectrum during this rolling switchover will cause profound disruption to PMSE users. This is contrary to one of Ofcom's welcome and clearly stated objectives which is to minimise disruption to the sector. As a result of this inadequate transitional timetable there will be a severe shortage of PMSE equipment existing in the marketplace that will be capable of operating in these regions as the switchover occurs.

Action: The PMSE sector must be given guaranteed transitional access to 'analogue' interleaved spectrum until the end of 2013 as a minimum, in order to avoid severe disruption.

By truncating PMSE access to 'analogue' interleaved spectrum, Ofcom is unintentionally stifling the innovation of PMSE equipment and is working against one of its expressed objectives to encourage the PMSE sector to develop more spectrally efficient equipment. Shorter transitional arrangements will result in manufacturers being able to conduct less research, and as a consequence will be less able to develop more spectrally efficient equipment. Conversely an elongated transitional timetable encourages innovation in the sector. It would also mean that during the peak PMSE spectrum demands of the London 2012 Olympics, there would be a maximum pool of usable PMSE equipment, with technology in circulation that was capable of operating across both the 'analogue' and the 'digital' interleaved spectrum bands.

The PMSE Pro User welcomes Ofcom's repeated recognition of the need to ensure minimal disruption to the existing PMSE sector. The PMSE Pro User Group encourages Ofcom to further recognise that the only way of achieving this is via a transitional phase that allows continued access to existing 'analogue' interleaved spectrum until 2013. **This access must be in conjunction with access to the new 'digital' interleaved spectrum, once Ofcom has clarified its proposals for these bands.** A rolling switchover programme is impractical as the commercial drivers of the industry are for UK-wide, flexible usage of the same PMSE equipment.

The PMSE sector, especially its manufacturers are progressive and forward thinking, and are committed to ensuring greater spectral efficiency and frequency agility in the future. However there are incontrovertible reasons why to date they have not been able to achieve this. The overriding demand from an operational level is the fundamental need to ensure audio quality, reliability and flexibility of equipment. In order to produce new technology the manufacturers must be able to deliver new products that, as well as guaranteeing spectral efficiency and reliability, must also deliver the same high level audio quality that the industry and the public demand. **In order to develop and disseminate new more spectrally agile and efficient technologies, the PMSE Pro User Group suggests that a timetable be established which allows the PMSE sector both access to the 'analogue' interleaved spectrum until 2013 and to the 'digital' interleaved spectrum, as it becomes available, until 2026.**

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The practical problems facing the PMSE sector during this transitional period are clearly severe. In addition the financial limitations of the PMSE sector mean that PMSE business models would also be placed under severe strain. Indeed the Analysys Report outlined in the original DDR supports this conclusion: "There could be concerns that the professional PMSE community may struggle in the short term to reform their business model to the point where they can realise a greater proportion of the value chain in the likely event that the cost of accessing UHF spectrum rises ..." (Analysys Report p. 55).

Ofcom should also be aware that even equipment, for which full depreciation has taken place, continues to hold value within the industry due to the longevity of the equipment itself and the rental nature of part of the PMSE sector. This means that equipment filters down through the industry. The proposed changes would have the unintentional result of abruptly ending the life cycle of this equipment, making it entirely redundant.

Ofcom needs to provide a timetable for spectrum release that is long enough to allow the manufacturing industry to produce, in sufficient quantity, equipment capable of utilising newly available frequencies in such a way that does not disrupt their production. This would take between 10 and 15 years for a user organisation such as a rental company or broadcaster to build up an inventory of stock capable of accessing 'digital' interleaved spectrum to match current levels. Therefore for PMSE users 2026 is a more appropriate date for guaranteed PMSE access to 'digital' interleaved spectrum.

Whilst manufacturers have invested, and continue to invest, heavily in developing new technologies the earliest conceivable date to complete this transition would almost certainly adhere to the following timetable. It is the PMSE Pro User Group's considered opinion that there would be a further development lead in time for new equipment of at least 3 years from now, followed by a further 7 years for market penetration, and then in addition a further period for the equipment's life span. This would constitute a minimum period of 10 years for professional usage, and for all that total 20 year period (3+7+10 years), there would have to be the certainty of defined spectrum availability.

2. As part of the transition to digital television broadcasting, it is inevitable that the PMSE sector must migrate from most of the spectrum it currently uses. This is unavoidable if 'analogue' spectrum is to be cleared for sale. As a result the PMSE sector will be forced to operate in a dramatically reduced quantity of spectrum. Ofcom has made clear its intention to offer some protection to existing spectrum users like the PMSE sector. Indeed Ofcom has made further assurances that the PMSE sector can be accommodated in the new 'digital' interleaved spectrum. However there is considerable uncertainty regarding the quality and quantity of the 'digital' interleaved spectrum that potentially will be available to PMSE users. While the PMSE Pro User Group fully appreciate that Ofcom's current approach to managing this PMSE migration, is to focus on the method for future spectrum access, rather than establishing the details of the spectrum that will be available; the industry cannot adequately plan for its future in the new spectrum landscape without knowing the exact quality and quantity of the 'digital' interleaved spectrum that will be available to it, and for how long this access will be secure.

As there is at present an inadequate stock of PMSE equipment for use in the 'digital' interleaved spectrum it is essential that the industry begins to build up stocks of this equipment. However Ofcom has been unable to give the industry any guarantees as to the quantity and quality of the 'digital' interleaved spectrum that PMSE users will be able to access post-switchover.

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Therefore without greater clarity there are few incentives for PMSE manufacturers to produce innovative equipment capable of accessing 'digital' interleaved spectrum. (See Key Point 1)

Action: Ofcom must provide the PMSE sector with the "white space map" in an agreed form that is of practical use to the sector. Ofcom must also demonstrate how both current and future PMSE usage will be accommodated in its proposals.

3. It is unanimously agreed by the PMSE Pro User Group that it is impossible for the PMSE sector to enter a spectrum auction for spectrum release.

Action: Ofcom must continue to acknowledge the inability of the PMSE sector to compete at auction.

As Ofcom has begun to recognise, the PMSE sector is a disparate, diverse and diffuse community of content producers, manufacturers and rental organisations. Many of its members are extremely small and there is no way they could compete at auction. They possess neither the financial resources nor is there a mechanism to coordinate bidding for the collective needs of this community. The PMSE sector encompasses many different spectrum users. Last year spectrum managers JFMG recorded applications from over 600 organisations and individuals for spectrum usage, which resulted in 32,000 individual spectrum assignments (excluding Channel 69). These may range from large high end spectrum users such as TV broadcasters, London theatres or live events to much smaller local community users.

Understandably the PMSE sector feels that for them, an auction mechanism for the release of spectrum is deeply flawed. By engaging in an auction, the PMSE sector would be initiating a process that would lead to market failure. It is the PMSE Pro User Group's genuine belief that the PMSE sector could not be successful in securing spectrum at auction. Therefore the industry would be without access to a critical component of content production. **Without access to spectrum, the industry could not operate at current levels, leading to severe damage to the functioning of the British Entertainment Industry.**

The likelihood of the PMSE sector losing in an auction process is only made more certain by any increase in the value of the likely bid. Ofcom's original supposition that this spectrum is likely to be of only limited value has been undermined by both a letter from Dell Ltd regarding spectrum's value and by the Vodafone RSPG Public Consultation document on the implications of the Digital Dividend. Additionally, at the Westminster eForum held at The Brit Oval on 28th February 2007 a consultant contracted to Microsoft publicly stated that Microsoft saw "huge potential in the 'white spaces'" i.e. interleaved spectrum. Particular geographic areas in the U.K. (such as Greater London) are especially spectrum-constrained. It is in precisely these metropolitan areas where "unlicensed devices" are likely to appear in the highest density. On July 31, 2007 the Technical Research Branch, Laboratory Division, of the Office of Engineering and Technology of the Federal Communications Commission released a detailed report on two prototypes of personal/portable white space devices that two industry parties provided: http://fjallfoss.fcc.gov/edocs_public/attachmatch/DA-07-3457A1.pdf.

The FCC test report demonstrates that unlicensed portable devices, if permitted to operate in the TV band, cannot consistently and reliably sense or detect wireless microphone signals and will cause direct interference to incumbent wireless microphone operations. Ofcom should be aware of the test results and on present evidence, should not allow the use of any spectrum sensing devices in the 'digital interleaved' spectrum.

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As Ofcom is aware the PMSE Pro User Group believes that auctioning spectrum without restriction to a third party would also severely disadvantage the PMSE sector, and is likely to initiate a process that would lead to market failure. The potential participants in an auction base their bids on completely different business models. Unlike for instance mobile phone companies (and to a lesser extent local TV stations), many professional PMSE users cannot buy spectrum in advance because of the shifting demands of their customers (e.g. concert tours and sporting events). The cost of purchasing PMSE equipment for use in specific areas is therefore written off over many years. The PMSE Pro User Group would continue to remind Ofcom that the sector is already an established and successful user in these spectrum bands. Therefore, the PMSE Pro User Group believes that the burden of proof is on any new users to show that their business plans will work and not lead to instances of market drop-out, as occurred in the wake of the European 3G auctions.

The PMSE Pro User Group disagrees with Ofcom's original position that transaction costs for professional PMSE users would not be significant (DDR Annex 8.111). Unlike the mobile telecommunications industry for instance, professional PMSE users are not able to pay "opportunity costs ... to fund the purchase of spectrum in a market-based environment" (DDR Annex 8.113). This problem is exacerbated by the fact that each PMSE user is interested in the use of the spectrum within an extremely small area such as a theatre, production studio or sports arena as compared to a mobile service company which would be providing a service over the entire licensed area. It is simply impractical for all PMSE users to join together to bid for the same spectrum (with each individual PMSE user having access to the spectrum within its particular location) due to the disparate interests and very large number of PMSE users. For these same reasons the current licensing arrangements through a single band manager have worked well, as they have permitted intensive reuse of the same spectrum by individual PMSE users that are geographically separated by the minimum distances required to avoid interference.

As a result, it is likely that professional PMSE will be forced out of the bands it occupies by more financially powerful players who are better equipped to pass these costs on to their customers. Indeed the Analysys Report (DDR Annex E, p. 33) states clearly: "At the downstream level, PMSE service provision appears to be competitive and characterised by low barriers to entry. This means that service providers are unable to extract much of the private value from PMSE downstream users." For these reasons auctions affecting the PMSE users will inevitably lead to market failure.

The PMSE Pro User Group therefore proposes the concept of the 'gifting' of spectrum to a single band manager, on an annual rental basis. This band manager would be committed to the needs of the PMSE sector and competent to manage both 'analogue' and 'digital' interleaved spectrum (See Key Point 6). It would be independent of Ofcom, meaning Ofcom would not be responsible for the organisation or charging of authorised PMSE spectrum usage. This band manager would be charged with licensing the usage of frequencies used by both Local TV and the PMSE sector.

In addition the PMSE Pro User Group advocates that channels 67 and 68 be held back for PMSE use, and that they are gifted and managed in accordance with proposals set out in Key Point 6 of this document. The PMSE Pro User Group believes that provided there is sufficient co-ordination and management of all spectrum users and that the PMSE sector is afforded primary rights as the established user, there is considerable potential for band sharing between PMSE and other lower powered users such as Local Television. The PMSE Pro User Group believes this would lead to more efficient spectrum use on a lower power basis.

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PMSE and managed coordinated lower power users would enjoy 100% national coverage using these bands, giving this use of the spectrum immense social value.

4. Unfortunately despite Ofcom's genuine attempts to understand the scale and character of the sector, recent estimates as to the value of the equipment currently used by the PMSE sector are inaccurate.

Action: Ofcom must re-evaluate their estimates as to the value and quantity of PMSE equipment that will be affected by its proposals for future spectrum access. Ofcom must incorporate such modifications into its proposals. The suggestion that there is at present around £10 million worth of equipment that would become redundant as part of the DDR, is wrong and the PMSE Pro User Group have made it clear that Ofcom underestimates the figure by at least a factor of five. As the PMSE Pro User Group stated in its submission to the DDR, one single medium sized rental company, Autograph Sound Recording, alone has around £7 million worth of potentially affected equipment.

The PMSE Pro user group's estimate of affected equipment, based on consultations with several manufacturers of wireless equipment, is that the figure is actually in excess of £30 million. Ofcom should also recognise that this particular type of equipment has to be built with rock-solid reliability as it is destined for use in the most hostile professional environments, such as found in theatre, broadcast and high level live touring applications, where lost time due to unreliable equipment can be extremely costly.

As the PMSE Pro User Group made clear in its submission to the DDR, the scale of equipment involved in PMSE activities is considerable. Currently there are around 180,000 wireless units that utilise this spectrum, used at 45,000 different events ranging from those on a small scale using just one single frequency, to much larger live events, which excluding unique events such as the Olympics, might use up to 240 frequencies in a given location. Ofcom should also be aware there is a growing tendency in live entertainment towards much larger live events which require greater frequency capacity. On average most typical professional live events will operate across 16 to 30 TV bands in order to ensure interference free performance. For example the 2007 Brit Awards, held at Earls Court, used Wireless Microphones, Wireless In-Ear Monitor Systems, Wireless Talk Back Systems and Wireless Instrument Systems in 27 different UHF TV channels, as well as other types of systems elsewhere in the radio spectrum.

Based on research that did not fully appreciate the scale and character of the PMSE sector, Ofcom has drawn together an unrealistic account of the ability of and time needed for the PMSE sector to adapt to proposed changes. **In place of current proposals, the PMSE sector must be granted sufficient time that would fairly allow them to amortize the value of current equipment that will become redundant under current plans** (See Key Point 1). In addition due consideration must be given to the fact that a considerable amount of this equipment will be unsuitable for upgrading due to the restrictions imposed by the RoHS Directive.

5. Ofcom has revealed that broadcasters will receive guaranteed and protected access to the new 'digital' interleaved spectrum until 2026.

Action: Ofcom must grant the PMSE sector the same protection as the broadcasters. This issue affects the whole industry be they end user, rental company or broadcaster. Therefore the PMSE sector should also receive protected and guaranteed access to the 'digital' interleaved spectrum until 2026.

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The PMSE Pro User Group encourages Ofcom to recognise that the PMSE sector both serves and is critical to broadcasters and broadcast content production and should be afforded the same degree of protection.

6. There must be further discussion with Ofcom to achieve greater clarity with regard to the criteria that Ofcom will use to select a single band manager of spectrum. Ofcom has elucidated a number of potential criteria, which the PMSE Pro User Group welcomes in principal. However Ofcom has not suggested any mechanism for ensuring that the single band manager will be truly sympathetic to the PMSE sector's interests.

Action: Ofcom has stated its belief that engendering PMSE 'trust' would be a central tenet in selecting a new single band manager. The PMSE Pro User Group wholeheartedly agrees with this principle and is clear that the most effective way this trust could be maintained would be for the PMSE sector to be represented in this band manager's organisation and management. In addition the PMSE Pro User Group strongly encourages Ofcom to adopt the following proposals:

- i) **That a commercial band manager will be appointed by Ofcom for the period of 2009 to end in 2026. (See Key Point 3)**
- ii) **The commercial band manager will pay Ofcom an annual fee which would rise by no more than the rate of inflation**
- iii) **The commercial band manager would be responsible for coordinating and licensing all spectrum access from 470 – 854 MHz, until at least December 2013. Post 2013, the commercial band manager would be solely responsible for the retained or 'digital' interleaved spectrum – blocks 470 – 550 MHz (TV bands 21 to 30) and 630 – 806 MHz (TV bands 41 to 62). In addition the PMSE Pro User Group advocates that channels 67 and 68 be held back for PMSE use (See Key Point 3). Channel 69 will continue to be run on a licensed basis and users will be required to pay a reasonable fee to operate in this band.**
- iv) **The commercial band manager must have knowledge of the market, an understanding of the needs and be responsive to the demands of the PMSE sector and other established sectors. It will seek to provide access for other users, but will hold established usage as a priority. The band manager will be required to show financial backing and that it is innovative in how it manages these demands.**
- v) **It is essential that the commercial band manager be resistant to the predatory activities of non-PMSE organisations. It must be granted sufficient legislative protection to enable it to make robust decisions between competing demands if these demands fail to recognise the legitimate needs of the PMSE sector. The commercial band manager that is appointed must be capable of exercising its judgment to ensure that the priority of PMSE access is not compromised by the potential demands of other 'deep pocketed' service providers.**
- vi) **The commercial band manager will use a pricing mechanism as a method of encouraging industry innovation and to stimulate the transition to less congested areas of spectrum. The pricing mechanism will ultimately reduce spectrum usage by encouraging the development and deployment of more spectrally efficient equipment. It must ensure that the cost of licence assignments allows for duration,**

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time of day, location and demand for frequency so as to keep costs low for community use and to encourage commercial use in less congested areas of spectrum. The fee will also be determined by how much in advance it is paid for.

- vii) **The commercial band manager will grant licences that do not exceed 1 year. This timescale is sufficient to guarantee a degree of certainty of access and not so long that it stifles investment and innovation.**
 - viii) **The commercial band manager will establish and maintain a transparent on-line pre-paid booking and payment system, thus reducing transaction costs. Pre-paid bookings that are no longer required are to be sold back to the commercial band manager at a discount. This will ensure the orderly assignment of frequencies by encouraging an early purchase of spectrum access, but will not unfairly penalise such purchases.**
 - ix) **Once the commercial band manager is established and running efficiently, it will be in a position to acquire the rights to additional bands on a competitive basis.**
7. The PMSE Pro User Group understands Ofcom's focus in this consultation is to establish a viable method for future spectrum access, but would like to encourage Ofcom to clarify its views on recent TG4 Group proposals regarding the establishment of a European wide sub-band of spectrum for use by the mobile telecommunications industry. This proposal, if implemented, would have drastic implications for the PMSE sector's access to Channel 69, the only coordinated nationwide spectrum band for PMSE use. In addressing this issue, and providing the PMSE sector with more certainties regarding future spectrum access, Ofcom would eradicate one of a number of important issues which currently hampers the industry's ability to plan for its future.

The PMSE Pro User Group believes there are three fundamental points Ofcom must recognise about Channel 69.

- a) It is the only UK wide TV band available for PMSE use
- b) Its users constitute a large proportion of smaller professional PMSE spectrum users
- c) If it were deregulated the possibility exists that manufacturers could choose to stretch the definition of what constitutes a radio microphone, and as a consequence the bands used for professional PMSE use would become dominated by non-PMSE equipment with attendant interference problems.

Action: Ofcom must provide the PMSE sector with more information regarding PMSE access to Channel 69 following the Digital Switchover at the first available opportunity. Given the focus of this consultation (20/06/07) it is understandable that there is no mention of Channel 69. However Ofcom must be fully aware of Channel 69's importance to the PMSE sector. Ofcom should also provide more information on the likely timing and potential implications of the TG4 proposals and the extent to which they are likely to be implemented in the UK.

The PMSE Pro User Group would also encourage Ofcom to engage more widely with the issue of future spectrum access in Channel 69. The PMSE Pro User Group is opposed to the deregulation of Channel 69 because existing PMSE needs, as well as those of amateur users require interference-free use of spectrum.

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If the PMSE sector uses a deregulated Channel 69 for professional use it is certain that sound production will suffer from interference. Consequently it is a fundamental that the spectrum used by the PMSE community is licensed and coordinated by a single band manager. As Analysys states in their report included in the DDR, there will be a “be a uniquely strong demand from a PMSE band manager for this specific channel [69], owing to the high level of existing PMSE use in this channel [69]. Aggregating this channel with other channels would therefore unduly discriminate against PMSE bidders.” (Analysys Report p. 76)

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The PMSE Pro User Group

Who are we?

The Programme Making and Special Events (PMSE) sector is a disparate, diverse and diffuse community of content producers, manufacturers, rental organisations and freelance engineers. The PMSE sector is responsible for both content production and content delivery for live and recorded entertainment. It plays a critical role in the ongoing success of the £15 billion pa British Entertainment Industry. The PMSE Pro User Group represents over 150,000 industry professionals working within the PMSE sector.

The PMSE Pro User Group includes individuals and associate members from the PMSE sector such as:

ABTT - Association of British Theatre Technicians
AMPS - Association of Motion Picture Sound
APRS - Association of Professional Recording Services
BACS - British Academy of Composers & Songwriters
BECTU - Broadcasting Entertainment Cinematograph and Theatre Union
BEIRG - British Entertainment Industry Radio Group
CPA - Concert Promoters Association
EQUITY - The British Actors Union
IBS - Institute of Broadcast Sound
MU - Musicians Union
MIA - Music Industries Association
NODA - National Operatic and Drama Association
PACT - Producers Alliance for Cinema and Television
PLASA - Professional Lighting and Sound Association
PSA - Production Services Association
SOLT - Society of London Theatres
TMA - Theatrical Management Association

What do we do?

The PMSE sector is critical to the production of content for live entertainment of all genres. This sector extensively utilises wireless equipment such as Wireless Microphones, Wireless In-Ear Monitor Systems, Wireless Talk Back Systems and Wireless Instrument Systems.

For over fifty years wireless products have been used in the entertainment industry. In the past thirty years there have been vast improvements in production value and safety levels as a result of advances in wireless technology.

How do we do it?

The PMSE sector currently relies on the spectrum interleaved between existing TV Broadcast channels to enable the use of Radio Microphones, In-Ear Devices and other short-range wireless devices. This equipment is an essential component of the British Entertainment Industry.

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Who benefits from our activities?

On a daily basis this sector is responsible for the production of content that has received world-wide acclaim and continues to attract a global audience. A vast array of organisations are reliant on radio spectrum for the production of content for **Performing Arts, Broadcasting, News Gathering, Independent Film and TV Production, Corporate Events, Concerts, Night Venues and Sports Events**. In addition, other sectors that utilise the current UHF spectrum include the Health Service, Education, Local Government, Political Programming and Conferencing.

In addition these technologies play a vital role in helping to improve security and safety levels within the Entertainment Industry and other sectors. Their benefits include improving the management of electrical safety, the reduction of noise levels, the development of safety in communications and the reduction of trip hazards. In addition the sector continues to provide essential tools for the security orientated services.

Wireless equipment and the spectrum it operates on are now crucial to the British Entertainment Industry. **All parts of this important industry have a major impact on the daily lives of the entire UK population.**

Just one example of this contribution would be the UK's theatre industry. However this is only one facet of the much broader contribution that the PMSE sector makes every year to the unusually diverse British Entertainment Industry. A study by Dominic Shellard, of the University of Sheffield, published as recently as April 2004 (Theatre Impact on UK Economy - Economic Impact Study of UK Theatre), highlighted the considerable social and economic value of the theatre market alone:

***Theatre has a huge economic impact: £2.6bn annually.** This is a conservative figure. It does not include, for instance, the impact of touring theatre companies or non building-based theatre activity.*

Theatre makes a considerable contribution to local economies, both in terms of direct spending on goods and services and in terms of visitor spending.

***Theatre activity outside London has an economic impact of £1.1bn annually.** By attracting audience members who undertake spending on food, transport and childcare, theatres make a significant contribution to their local economies. Audience members spend an average of £7.77 per person on food, transport and childcare when they visit a UK theatre outside the West End.*

***The economic importance of West End theatre to the UK is clear – it contributes £1.5bn pa.** Audience members spend an average of £53.77 per person on food, transport and childcare when they visit a West End theatre.*

Employment

A sample of 259 UK based theatres showed that they employ 6,274 people on a full-time basis and offer 5,700 part-time contracts.

***Theatre is a popular area for volunteering.** There are at least 16,000 volunteers working in UK theatres.*

Consultation Questions (20/06/07)

Question 1. Do you agree with our identification and analysis of the options for how the PMSE sector could make use of the 'digital' interleaved spectrum? Which options if any, do you favour?

The PMSE Pro User Group welcomes Ofcom's obvious desire to engage with the concerns of the PMSE sector. However The PMSE Pro User Group does not believe that the realities of PMSE future spectrum access conform to any one of Ofcom's proposed models. Instead the PMSE Pro User Group would refer Ofcom to their consultation Key Points which outline the essential needs of the industry as well as the steps that Ofcom must take in order to secure the sector's future.

Question 2. Do you agree that we should offer one package of 'digital' interleaved spectrum?

The PMSE Pro User Group believes that Ofcom should gift one package of 'digital' interleaved spectrum to a single commercial band manager.

Question 3. Do you believe that greater licence exempt use could be made of Channel 70 by the PMSE? Are there any obstacles that would need to be overcome first?

The PMSE Pro User Group's understanding of Channel 70 is that it constitutes just 2 MHz of spectrum. It is not a full 8 MHz band and spectrum above the 863 MHz band has already been allocated for other uses. The PMSE Pro User Group views licence exempt use of this 2 MHz of spectrum as inappropriate for professional purposes.

Question 4. Do you have any comments on the scope for applying the options discussed above to bands other than the 'digital' interleaved spectrum?

The PMSE Pro User Group would refer Ofcom to *Key Point 3*

Annex A' – PMSE Pro User Group Answers to Original DDR Questions (19/12/06)

**Listed below are the answers given by the PMSE Pro User Group to questions outlined in the Digital Dividend Review (19/12/2006). The Key Point references in the answers to these questions have been amended from those in the original submission to reflect the Key Points as issued in this document. In addition the dates proposed by the PMSE Pro User Group for the termination of transitional arrangements have been changed to reflect discussions held with Ofcom subsequent to publication of Ofcom's second consultation 20/06/07 .*

The PMSE Pro User Group recognises the significance of the difference between cleared and 'digital' interleaved spectrum, and as such our response has two elements. Answers to questions are dependent on which part of the spectrum is under discussion.

1. This executive summary sets out Ofcom's proposals for the release of the digital dividend. Do you agree with these proposals?

The PMSE Pro User Group recognises the principles on which the DDR proposals have been made, but for the PMSE sector, it fundamentally disagrees with the proposed methods of implementation in so far as it affects them.

2. Do you have any comments on our analysis of the essential constraints that will apply to the available UHF spectrum?

The PMSE Pro User Group can only answer the question for the PMSE sector. The PMSE Pro User Group believes the quality of the research undertaken is deficient and hence the conclusions drawn are questionable. For instance analysis of the value of equipment that would become redundant is incorrect. (See Key Point 4) The PMSE Pro User Group also disputes Ofcom's suggestion that at auction this spectrum is unlikely to be of interest to many bidders. We suggest that letters from Dell Ltd and Vodafone together with public statements from consultants contracted to Microsoft contradict this. (See Key Point 3). Moreover, Ofcom's distinction between PMSE "professional use" vis-à-vis "community use" leads to further uncertainties in the market because it is unclear which PMSE users fall into which category.

3. Do you agree with the more detailed analysis and proposals regarding these technical constraints as set out in Annex 10?

The PMSE Pro User Group believes there are a number of additional points that need to be made with regard to the analysis in *Annex 10* in relation to PMSE use of the UHF spectrum.

The PMSE Pro User Group does not believe that the problem of interference to PMSE services in the UHF spectrum from other services has been adequately considered.

The issue of Adjacent Channel Interference to DTT reception from other services is discussed in *Annex 10.11*. However the issue of Adjacent Channel Interference to PMSE receivers and the impact on the PMSE sector's future use of the interleaved spectrum is not studied. Clearly any future use of any part of the UHF spectrum will have an impact on PMSE equipment in neighbouring channels whether in the interleaved or cleared spectrum.

The issue of Image Channel Interference to DTT reception from other services is discussed in *Annex 10.13*. However the issue of Image Channel Interference to PMSE receivers and the impact on the PMSE sector's future use of the interleaved spectrum was not studied. Whilst we appreciate that it is difficult to plan comprehensively for Image Channel Interference to

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PMSE equipment because of the many different IF frequencies in use by different types of PMSE equipment, and consequently the many different image frequencies, we do believe that this is an area that requires further study.

Similarly the adjacent channel rejection of different brands and models of PMSE equipment varies quite widely. In many respects the technical reports do not differentiate between the many different quality levels of PMSE equipment available.

With reference to *Annex10.14*, it is impractical for PMSE users to share frequencies with any type of portable device that uses an in-band uplink. Such devices would present a serious risk of interference to PMSE receiving equipment. Due to their low power operations and exacting standard for sound transmission quality, PMSE equipment is extremely susceptible to interference from other sources. For example, wireless microphones typically operate at 10 mW. To achieve the audio quality required for television and sound production as well as for theatre, a minimum 100 dB signal-to-noise ratio is required throughout the duration of the programme. The high standards expected by consumers and audiences must be considered when developing rules to protect the PMSE user community from interference. We do not believe that there is any practical way to manage this risk. Such interference would be very costly to the PMSE sector and would dangerously undermine the high level of confidence that exists internationally in the UK PMSE industry's technical capabilities.

We note that sections *Annex10.83 – Annex10.85*, which refer specifically to the PMSE sector only take account of the potential for interference from PMSE to DTT. No attempt appears to have been made to quantify the potential for interference to PMSE from adjacent channel DTT. We do however welcome Ofcom's conclusion that PMSE services are compatible with the planned DTT services subject to suitable co-ordination (*Annex10.136*).

The PMSE Pro User Group suggests that any additional interleaved broadcast services (*Annex10.137*) will adversely affect the capacity of the interleaved spectrum to support PMSE activities. The conclusions drawn elsewhere in the DDR regarding the ability of the interleaved spectrum to supply the PMSE sector's needs do not, we believe, take this into account.

With reference to *Annex10.141 & 142*, we agree that there is a need for continuing co-ordination of PMSE activities in the UHF spectrum as currently carried out by a single band manager. The need for co-ordination will be even greater during both this transitional period and then following the DSO than it is at present. Ongoing co-ordination is essential if the PMSE sector is to continue to thrive in the UK.

Regarding future uses of the cleared spectrum we note that in *Annex 10.143* there is no mention of the PMSE sector's continuing extensive usage of TV channels 36 and 38 on a secondary basis, although this is mentioned elsewhere (e.g. *Annex 11.40*). We are aware of the need to protect the primary users of these channels from harmful co-channel and adjacent channel interference. We believe a continuation of the current practice of co-ordinated use of channels 36, 37, 38 and 39 by PMSE users, will offer the necessary protection from other potential high-powered services to Radio Astronomy and Radar.

4. Do you have any comments on Ofcom's assessment of the potential uses of this spectrum? Are there any potential uses which should be considered that are not mentioned in this document?

The PMSE Pro User Group believes Ofcom has covered many important potential uses of spectrum in the consultation. However the PMSE Pro User Group believes Ofcom has significantly underestimated the likely interest in some of those uses in the interleaved spectrum. For the interleaved spectrum the PMSE Pro User Group would suggest the potential uses of this spectrum are considerable. The PMSE Pro User Group would cite a letter from Dell Ltd, recent statements by officials contracted to Microsoft, as well as the Vodafone RSPG Public Consultation document on the implications of the Digital Dividend as evidence of the likely of interest in this spectrum, interests that are not included in the Ofcom document. The PMSE Pro User Group suggests that the number of potential users is underestimated by the Ofcom document and that in the event that an auction system is established to award the release of spectrum utilised by the PMSE sector, that there would be considerable interest in acquiring this spectrum. (See *Key Point 3*). The PMSE sector is also concerned that some of this interest would be for the speculative use of this spectrum. In contrast the PMSE's requirements are well established. They have accrued grandfather rights over a thirty year period, and now form a critical component of the British Entertainment Industry.

The PMSE Pro User Group also suggests that whilst Ofcom has covered many spectrum uses it has inadequately recognised that rather than remaining constant or decreasing, the spectrum use of the PMSE sector is likely to increase in the foreseeable future (beyond 2012). This increase will occur despite potential gains in spectral efficiency. The Tour de France, the Commonwealth Games and even more so the 2012 London Olympics are all examples of prestigious international events whose success is dependent on reliable PMSE applications. Companies will not invest in new PMSE equipment for these events if they do not know whether they can use their equipment in determined frequency bands beyond 2012.

5. Do you have any comments on our analysis of the choice between a market-led and an interventionist approach to the release of this spectrum? Do you agree with the analysis of different mechanisms for intervening to remedy potential market failures?

The PMSE Pro User Group would suggest that market-led and interventionist approaches are not mutually exclusive. We feel that a solution lies between the two, and that this question seeks to polarise positions. There is a median position. This will permit some spectrum to be auctioned for other uses. For the PMSE sector a value could be placed on the interleaved spectrum. (See *Key Point 3*) We believe the 'one size fits all' auction proposals in the Ofcom document will precipitate market failure; consequently we have suggested an extension of transitional arrangements from 2013 until 2026. The PMSE Pro User Group also suggest that a system of 'gifting' of spectrum on an annual rental be established, and have evidenced the likely market failure that would result from the auction process for PMSE spectrum usage.

In addition to the suggestions in *Key Point 1, 2 and 3* in relation to 'digital' interleaved spectrum, the PMSE Pro User Group advocates that channels 67 and 68 should be reserved for PMSE use on a similar basis as outlined in *Key Point 6*. This would provide several advantages as it would allow three TV bands of contiguous spectrum that could be used nationwide. This proposal would therefore address the lack of spectrum that is available on a national basis. (See *Key Point 3*).

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It would also address a significant part of the problem of the legacy of redundant equipment. Furthermore it would also act as a buffer to the Channel 69, community usage as well as recognising the potential shortage of spectrum available in the 'digital' interleaved spectrum.

6. Do you agree with our proposals to continue making available channel 69 for use by low power PMSE devices? Do you agree with our proposal to make some or the entire spectrum available for use on a license-exempt basis?

The PMSE Pro User Group agrees with proposals to continue making channel 69 available for PMSE usage in keeping with current practice. The PMSE Pro User Group advocates keeping the majority of channel 69 usage coordinated and licensed (*See Key Point 7*) and to give up the distinction between "professional users" and "community users". There are many unresolved issues with regard to what it means to be a "community user". The Ofcom consultation document offers little in the way of interference protection from unlicensed devices allowed to operate in the UHF bands. Having PMSE for "Professional Use" and PMSE for unlicensed use in the same band (e.g. in Channel 69) will compromise the use of this band by high-demand end users that usually require significant cleared bandwidth.

7. Do you agree that there should be transitional protection for professional PMSE users to ensure that they can continue to access interleaved capacity until at least the end of 2012? Do you have any views on the mechanism for providing future access to this spectrum?

The PMSE Pro User Group supports the idea that there should be transitional protection for professional PMSE users, but does not agree that 2012 is a suitable date to end such protection. The PMSE Pro User Group advocates the extension of transitional arrangements until at least December 2013 for 'analogue' interleaved spectrum and for 2026 for the 'digital' interleaved. The PMSE Pro User Group suggests that a single band manager be established, that is independent of Ofcom, and that becomes responsible for the organisation, charging and coordination of authorised spectrum usage by the PMSE sector (*See Key Point 6*).

8. Do you consider that additional spectrum from the digital dividend should be reserved for low power applications? If so, please provide as much evidence as possible about the nature of the application and its potential value to society.

Uncoordinated usage of Low Power devices, as defined in the Ofcom Digital Dividend Review- *low power applications and innovation* (DDR 6.107, p.80), which includes devices such as home wireless networks, radio frequency identification (RFID) and wireless "last mile" broadband devices are in the opinion of the PMSE Pro User Group incompatible with PMSE operations due to the high interference risk that they present to the PMSE. Due to their low power operations and exacting standards for sound transmission quality, PMSE equipment is extremely susceptible to interference from other sources. For example wireless microphones typically operate at 10 mW. To achieve the audio quality required for television and sound production as well as for theatre, a minimum 100 dB signal-to-noise ratio is required throughout the duration of the programme. These high standards expected by consumers and audiences make it impossible to have uncoordinated usage of Low Power devices in the same bands as PMSE equipment.

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9. Do you consider that it would be desirable to hold back some spectrum from award with a view to its potential use for future innovation? If so, please provide comments on how much spectrum should be held back, and for how long.

The PMSE Pro User Group agrees that it is desirable to hold back some spectrum from award with a view to its potential use in the future. The PMSE Pro User Group suggests that it is important to hold back spectrum from award until the requirements of the Digital Switchover are more fully understood. The PMSE Pro User Group also suggests that in holding some spectrum back from award it would create a 'spectrum buffer' for the future, which has the potential to be used as a reserve for very large live events. However the PMSE Pro User Group is opposed to elevating the interests of a future possibility above those of existing services. As stated above, the "burden of proof" is on the new applications to evidence that they work and actually bring significant benefits to end users.

10. Do you agree with our proposal that we should package the interleaved spectrum in a way that would be suitable for use by local television services, but not reserve spectrum solely for its use?

The PMSE Pro User Group suggests that a single band manager should license the PMSE sector and is therefore not in favour of spectrum specifically reserved for local television.

11. Do you agree with our proposal to package the spectrum in a way which does not preclude mobile broadband use, but to take no further action in relation to this use?

The PMSE Pro User Group believes that provided mobile broadband use is neither in the same nor adjacent television channels as those used by the PMSE sector, that coexistence with mobile broadband services would not be a problem. However, the PMSE Pro User Group is clear that it would object to any mobile broadband use either in the same or adjacent television channels as those used by the PMSE sector. This is due to the inevitable co-channel or adjacent channel interference that would occur as a result.

12. Do you agree with our proposal that we should not intervene in the award of this spectrum to reserve spectrum for DTT? Do you agree that we should package the spectrum in a way which is suitable for the DTT use?

The PMSE Pro User Group understands this question to apply to the cleared spectrum. Within the confines of the DDR the amount of spectrum is finite and in so far as reserving further spectrum for DTT will reduce the availability of all other users, the PMSE Pro User Group is opposed to such proposals.

13. Do you consider that we have included in our analysis the most material risks in relation to market failure?

The PMSE Pro User Group believes that analysis as it stands overlooks a number of important features regarding the most material risks of market failure. The PMSE Pro User Group is able to quote verbatim Ofcom Chief Executive Ed Richards in a letter to Peter Luff MP, Chairman of the Commons Trade and Industry Select Committee where he states that Ofcom's analysis "***has not identified anything intrinsic to the nature of professional PMSE use that would preclude a bid that reflected its value***". The PMSE Pro User Group is clear in its disagreement with this statement and would refer Ofcom to previous points (See *Key Point 3*).

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The PMSE Pro User Group is also clear in its belief that unless the proposed timetable for support granted to the PMSE sector during the DSO is extended to the more realistic date of at least December 2013 for 'analogue' interleaved spectrum and 2026 for guaranteed access to the 'digital' interleaved spectrum, the difficulties facing the PMSE sector will inevitably lead to market failure (*See Key Point 3*).