

## **Ofcom Consultation**

### **British Entertainment Industry Radio Group (BEIRG)**

#### ***The future role of spectrum sharing for mobile and wireless data services - Response***

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# The future role of spectrum sharing for mobile and wireless data services

## British Entertainment Industry Radio Group Response

### Executive Summary

- The British Entertainment Industry Radio Group (BEIRG) has grave reservations regarding the possibility of allowing mobile telecoms or wireless data services to share the same spectrum bands as Programme Making and Special Events (PMSE), if there is **any threat of interference** to existing users.
- Were interference to be encountered as a consequence of shared use, PMSE equipment could be prevented from operating, leading to unavoidable damage to performances, the potential cancellation of live shows, and an associated socio-economic loss.
- PMSE has long been a very efficient user of spectrum. Users operate within TV interleaved spectrum (white space) alongside Digital Terrestrial Television (DTT) broadcasters, primarily in 470 to 790 MHz (TV Channels 21 to 60), utilising these gaps to make as effective and efficient a use of this interleaved spectrum as possible.
- In doing so, interference is minimised and the maximum possible benefit to users and consumers is obtained. BEIRG does understand that sharing is one potential method by which increasing demand for spectrum can be met, but it must not impinge on incumbent users.
- BEIRG strongly recommends that additional, licence exempt access to spectrum for wireless broadband communications and/or access to previously assigned spectrum facilitated through licensed usage should not be undertaken in bands where PMSE is operational, such as 500, 600 and 700 MHz, if there is a threat of interference or disruption to licensed PMSE users.
- It is therefore very likely that there will be little opportunity or available spectrum for additional services to have shared access in these specific bands, as the risk and consequences of interference to incumbent PMSE and DTT users are too great.
- Instead, Ofcom must ensure it first obtains a better understanding of what spectrum is currently utilised by mobile network operators, and determine how it could be used more efficiently to meet demand through refarming.
- BEIRG believes that this would prove to be a far more constructive and sustainable solution for long-term spectrum management, and prevent a reduced quality of service amongst both new and existing users, which may develop were they to share spectrum used by PMSE.
- The vast majority of UHF spectrum held at present by mobile operators could be eligible to undergo some degree of refarming to increase the efficiency of their service, as current usage levels are far from optimal. The overall quality of service, and hence benefits to users and consumers, would be far greater for all parties under this scenario.
- Our industry is already threatened by the proposed introduction of unlicensed White Space Devices into spectrum used by PMSE and DTT. As with mobile services, interference from WSDs may have a negative effect on PMSE operations in any spectrum that they are allowed to share in the future.
- BEIRG cannot see how unlicensed devices such as these could be entered into shared access agreements with PMSE as, by their very nature, they could not formally determine their geographic areas of operation, intended time usage or the levels of demand. This could present an unacceptably high risk of interference.
- While we accept that the principle of spectrum sharing could help to meet increasing spectrum demands, BEIRG calls on Ofcom to ensure that spectrum used by PMSE and DTT is protected from having to share with mobile broadband services, WSDs, M2M applications, Wi-Fi or any other potential users making use of shared access, which will subject existing PMSE users to interference and disruption.

## **Economics of PMSE**

The economic and social importance of PMSE, and the creative industries which rely on it, is growing. In the UK the creative industries are currently responsible for 1.5 million jobs, and contribute £36 billion annually to the UK economy. PMSE services contribute significantly to the economic and social wellbeing of the UK. For example, the West End of London, which uses PMSE equipment to produce much of its content, attracts visitors from all over Britain and tourists from across the world. The current annual turnover of the West End is circa £500 million, and it receives around 15 million visitors a year. Including downstream revenue such as merchandise, the estimated economic impact is £2 billion. Theatres outside London have a current turnover of circa £372 million, and attendances of circa 17 million. Across the West End and the Regions the equivalent of 50% of the entire population of the UK attends a theatre each year. Similarly, music festivals and live music concerts also contribute a significant amount to the British economy, and continue to grow in popularity year on year. The economic argument for support of PMSE users is clear. Ofcom must not allow additional users to be granted shared access to the spectrum that our industry relies on, if there is any risk that incumbent users are threatened by interference of any kind.

While BEIRG recognises the potential benefit that spectrum sharing could have in meeting increasing levels of spectrum demand, it must only be allowed if it does not impinge on existing users. Allowing the spectrum currently used by PMSE to be opened up for any form of shared access, whether geographical, tiered, licensed or unlicensed, threatens to only heighten the erosion of this valuable resource for PMSE. Without sufficient access to an adequate quality and quantity of interference free spectrum, our sector's ability to produce content for consumers is severely hindered. It is essential to recognise that any interference to PMSE usage poses a serious risk to the revenue generation of this sector. As interference affects PMSE content production at its live source, industry users will be directly affected and face a huge potential loss of earnings and consumer reputation.

In any production uninterrupted audio is **absolutely critical**. Any interference experienced that causes a wireless audio failure has severe repercussions for both the production and the audience alike. There is therefore a need for new services to recognise, respect and co-exist with PMSE, and Ofcom must ensure that sharing does not adversely impact on current users.

If Ofcom intends to carry out any R&D, or plans to introduce new services in the future, which currently have no band allocation, BEIRG would strongly recommend that they are careful in introducing additional uses to spectrum, in order not to affect any current users. With regard to the introduction of shared services, BEIRG also calls on Ofcom to consider making use of frequency bands that are not utilised by PMSE, and that have a proximity far enough away from channels used by PMSE, so as not to threaten any interference to our already vulnerable industry. The threat of interference from unlicensed White Space Devices (which would compete with cognitive systems for PMSE) and the potential clearance of the 700MHz band, are already providing further concern for PMSE professionals and undermining investor confidence. At the same time, consumer demand for PMSE produced content is rising. BEIRG believes there will soon be insufficient spectrum available to operate necessary quantities of PMSE equipment for large-scale musical productions to be staged at certain prime venues across the UK. The introduction of additional shared services in PMSE bands will only serve to hasten this.

## **PMSE Spectrum Requirements**

Unlike other technologies, wireless microphones do not have the capability to move to platforms other than radio spectrum. Whereas television broadcasts may potentially be able to be broadcast online in the longer-term, PMSE equipment cannot function on any platform other than clean, interference-free spectrum. Currently there is only a limited pool of PMSE equipment that operates outside the UHF spectrum; the UHF

bands offer the largest quantity of contiguous, good quality spectrum required for large professional events, and this must be protected.

Interference from TV in the UHF bands is predictable and can be accounted for as part of PMSEs sharing of interleaved spectrum with DTT. The two users can operate efficiently side by side, with PMSE making use of TV white spaces. The PMSE industry has operated successfully under this model for many years. With such a satisfactory system already in place, BEIRG believes that it would be unwise to change it by allowing further services such as Wi-Fi, white space devices (WSDs) and mobile broadband shared access in these bands, which could introduce damaging interference.

In other parts of spectrum where radio mics can operate, PMSE users must share spectrum with license exempt devices and find that access can be much more unreliable and of a poorer quality. This type, and quantity, of interference will only rise if licensed or unlicensed shared access is allowed for mobile services or WSDs in these particular parts of spectrum. While BEIRG recognises that mobile broadband may bring benefits to consumers in the future, and that shared access is one potential way of meeting spectrum demand, it should not be introduced at cost to other industries reliant on spectrum such as PMSE. The impact on these industries will outweigh those benefits to citizens and consumers. There is a risk that the increased deployment of Wi-Fi access points outdoors, as well as the introduction of any additional mobile broadband services, M2M applications and WSDs, could threaten incumbent PMSE users with a reduced quality of spectrum, and subject them to interference. Certain geographical areas with high usage rates of PMSE, including most urban areas, are especially threatened by interference. Use of these bands should therefore continue for incumbent, licensed users only, in order to minimise the risk of disruption.

PMSE drives content production, and produces the content that mobile broadband is designed to supply. If PMSE does not have sufficient access to spectrum its capability to produce content will be severely hindered – even to the point where the industry will not be able to supply enough content for consumers to watch, in some cases via broadband access. Such a scenario would render in increase in mobile broadband levels unnecessary and impact on the service quality received. Content creation comes before content delivery. Without it, audio-visual mobile content will decline in quantity and quality, no matter how much spectrum is allocated to mobile broadband. This fact should not be underestimated, or ignored.

Demand for spectrum in the UK is extremely high, and growing. Upwards of 90,000 requests for PMSE spectrum access are made to the licensing band manager in the UK each year. Any changes to spectrum allocation which will affect the ability of these industries to operate, including shared access, risk diminishing their contribution to society and reducing their capability to provide a range of benefits to consumers. BEIRG believes that Ofcom has a responsibility to the PMSE industry to ensure that it does not suffer interference or clearance as a consequence of any new shared services. Introduction of widespread shared access for WSDs, Wi-Fi access points and similar users can only decrease confidence in our sector as production values are put at risk, if spectrum used by PMSE is allowed to be shared with interference-generating services.

## **PMSE Equipment**

Due to the relatively limited tuning ranges of PMSE equipment access to contiguous bands of spectrum is very important for flexibility as well as quality of PMSE. Regional variation in spectrum use causes changing requirements for PMSE which must adapt to local availability. Putting more pressure on PMSE through an ever-decreasing amount of spectrum as a consequence of allowing further users shared access could be highly damaging for the long-term benefits that could be gained through good management.

The development of PMSE equipment designed to deal with increasing spectrum congestion would, as a result, be far more expensive, as it needs to be able to exploit more efficiently what spectrum remains in the UHF bands and attempt to mitigate as much as possible the potentially heightened levels of interference

shared access could bring. This will be detrimental to the industry if new services are introduced with any risk of disruption to existing users.

Licensed shared access should not, in the long term, be allowed to limit potential innovation by incumbent services or risk introducing harmful interference to these users. While allowing shared access for these services may be appropriate for certain bands, it should not be considered for any channels in which PMSE operates if there is any risk of interfering with the operations of pre-existing, licensed users.

## **Reforming Spectrum**

BEIRG believes that consumers' interest must be preserved in the implementation of any spectrum sharing for mobile and wireless data services. However, the best way for this to be achieved is for Ofcom to plan for the long term across all industry sectors, ensuring that sufficient levels of spectrum are available for all users without oversaturating usage of the UHF bands.

As mentioned above, although BEIRG understands that sharing is one way by which increasing demand for spectrum can be tackled, ultimately we are in favour of encouraging telecommunications companies to farm their already held spectrum more effectively, allowing better use of UHF bands and relieving the pressure on other spectrum users such as PMSE, who fear further selloffs and rising levels of interference. The past actions of extending mobile broadband spectrum access, over supporting the reuse of existing resources, did not encourage sufficient efficiency amongst the mobile telephone industry.

BEIRG is concerned that the mobile companies have so far not best utilised their current spectrum allocation and that much more efficient use could therefore be made of this limited resource. Ofcom should encourage this option as strongly as possible. Refarming could be complimented with additional base stations for the bands already held by mobile operators, to remove the need for further spectrum allocation or the introduction of shared access in bands used by PMSE, improve spectral efficiency and help reduce spectrum pollution (including out of band energy) for mobile and other spectrum. The introduction of shared access for mobile and wireless services alone may not work well enough to ensure a sufficiently greater efficiency of spectrum use overall, and could impact on the technical quality of service received by consumers and produced by incumbent users.

We would therefore support future refarming efforts from Ofcom and the telecommunications industry. 800MHz and 2.6GHz, now auctioned off in the UK to mobile operators, must be made the best use of in the most efficient way possible, to ensure fair use of spectrum among all industries. BEIRG feels that no decision should be made on spectrum sharing for new wireless services until it is clear how much demand can be met first by refarming the licenses in question, and ensuring the efficiency of new services. If future demand can be met in this way, then BEIRG cannot see why shared access should be allowed for mobile and wireless data services at the expense of other industries. It is imperative that mobile telephone companies look at their existing spectrum holdings and be encouraged to get the most appropriate value out of it, as applicable to its propagation characteristics.

## **White Space Devices**

BEIRG believes that the deployment of WSDs into UHF spectrum has the potential to severely compromise PMSE's operating environment. Interference free spectrum is crucial to the successful operation of PMSE equipment. By allowing the deployment of White Space Devices into UHF spectrum, through shared access, an environment could be allowed to develop that permits increasing levels of interference to affect existing users of UHF spectrum far more frequently. Allowing more RF energy to radiate in the band will, inevitably, impact negatively on existing spectrum users. BEIRG therefore urges an extremely cautious approach to the deployment of WSDs, Wi-Fi access points, and the introduction of related shared users.

As far as the PMSE industry is concerned, **all interference is potentially harmful** and able to cause serious problems within our sector. PMSE equipment is used at the very front of the production chain; therefore any interference experienced by this equipment destroys not only the performance or event, but also any downstream revenue generation. For many PMSE users such as theatres, live TV broadcasts, live music and large political and industrial events, the presence of interference from unlicensed users can be disastrous, even if for only a short period of time. BEIRG urges Ofcom to work to mitigate all interference from WSDs, take careful note of the results of on-going white space trials, and look to prevent allowing any shared access that might endanger existing PMSE use. Until it can be clearly shown that existing PMSE and broadcast users of spectrum and consumers will be entirely protected from harmful interference or disruption brought about by shared spectrum access with WSDs and similar users, and unless a safe balance can be struck, further WSDs should not be introduced to spectrum shared with PMSE.

BEIRG is concerned that PMSE is still considered a consequential user that only receives intermittent access to white space within spectrum primarily reserved for DTT. It must be considered a fully-fledged incumbent user, which cannot be asked to cope with the impact of additional users sharing their spectrum. If demand for PMSE or DTT exists, it must always take precedence and be served before WSD or other proposed shared user requirements, in a similar fashion to the management necessitated by the London 2012 Olympics. It must be protected from additional spectrum demands brought about through having to share with mobile broadband and wireless data services, WSDs, M2M applications, Wi-Fi or any other users who require shared access, where any threat of interference exists.

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### ***British Entertainment Industry Radio Group***

The British Entertainment Industry Radio Group (BEIRG) is an independent, not-for-profit organisation that works for the benefit of all those who produce, distribute and ultimately consume content made using radio spectrum in the UK. Venues and productions that depend on radio spectrum include TV, film, sport, theatre, churches, schools, live music, newsgathering, political and corporate events, and many others. BEIRG campaigns for the maintenance of 'Programme Making and Special Events' (PMSE) access to sufficient quantity of interference-free spectrum for use by wireless production tools such as wireless microphones and wireless in-ear monitor (IEM) systems.

As well as being vital in producing live content, wireless PMSE technologies play a key 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 reducing trip hazards as well as providing an essential tool for the security orientated services. Wireless equipment and the spectrum it operates in are now crucial to the British entertainment industry.

BEIRG is a member of the Association of Professional Wireless Production Technologies (APWPT)<sup>1</sup>, which promotes on an international level the efficient and demand-driven provision and use of production frequencies for professional event productions, as well as safeguarding such production frequencies for the users on the long run.

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<sup>1</sup><http://www.apwpt.org/>