



Department for Culture, Media and Sport Consultation

British Entertainment Industry Radio Group (BEIRG)

Digital Communications Infrastructure Strategy

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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. Entities 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. 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)¹, 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.

BEIRG Response

Executive Summary

- BEIRG recognises the need to prepare for future spectrum consumption, but urges DCMS to prioritise the protection of incumbent users of spectrum, such as PMSE, over new technologies. It is crucial that the economic, cultural and social contribution of the creative industries is safeguarded.
- A study in 2008 found that PMSE users require a minimum of 96 MHz of spectrum to operate on a daily basis. Following nearly a decade of uncertainty and upheaval, BEIRG asks that DCMS prioritise finding a sufficient quantity and quality of spectrum as a permanent home for PMSE users.
- BEIRG urges caution regarding the projected increase in mobile data demand described in the consultation. Studies which suggest such a demand are unreliable and potentially inaccurate. BEIRG asks that an independent review is conducted into such projections and, in addition, DCMS analyse the efficiency with which MNOs make use of the spectrum that they currently hold.
- BEIRG thinks that the importance of Wi-Fi as a conduit for wireless information is not adequately recognised in the demand scenarios put forward in this consultation. A 2014 report by Goldman Sachs indicates that it is extremely likely that Wi-Fi will become the primary connection method for the Internet of Things.
- BEIRG acknowledges the important potential of the Internet of Things, but the problems which could arise from the mass introduction of White Space Devices are not discussed, which is surprising, given the volume of work produced by Ofcom on the subject. We ask that the government both recognises these issues and agrees to conduct further tests to understand the consequences of this technology.
- BEIRG urges DCMS to act to prevent large commercial interests dominating the finite resource of radio spectrum. Failure to do so could result in vital sectors, such as PMSE, being jeopardised.

Protecting the PMSE sector

¹ <http://www.apwpt.org/>

BEIRG recognises that DCMS must take steps to prepare for the future technological and communication requirements of the UK. By its very nature this process demands a degree of speculation and lack of certainty, especially when it concerns future demand for radio spectrum. However, faced by this challenge, the Government should be prioritising the requirements of incumbent users of spectrum, not potential technologies and developments far in the future. If DCMS continues to place these possibilities ahead of the requirements of the industries which currently rely on spectrum, the consequences could be severe for sectors such as 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 nearly £72 billion annually to the UK economy. PMSE services contribute significantly to the economic, cultural and social wellbeing of the UK. For example, London theatres, which use PMSE equipment to produce much of their content, attract visitors from all over Britain and tourists from across the world. The current annual turnover of London theatres alone is £618.5 million, which represents just over 22 million attendances annually². Including downstream revenue such as merchandise, the estimated economic impact is £1.5 billion. Similar figures apply to theatres outside London. Similarly, music festivals and live music concerts also contribute a significant amount to the British economy.

Without sufficient access to spectrum, the PMSE sector's ability to produce content for consumers will be severely hindered. It is essential to recognise that any impingement on PMSE usage poses a serious threat to the revenue generation of this sector. 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. Consequently, any interference experienced that causes a wireless audio failure has severe repercussions for both the production and the audience alike. Therefore new services need to recognise, respect and co-exist with PMSE users, as well as to make the most of the spectrum that they have, to ensure fair usage for all.

Unlike other technologies, wireless microphones do not have the capability to move to platforms other than UHF radio spectrum. Whereas currently terrestrial television services 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. This is not the case for other "usable" blocks of spectrum like 1.8GHz, 2.4GHz, or even 5GHz for which some manufacturers make a small amount of equipment. Furthermore, interference from TV in the UHF bands is predictable and can be accounted for, while in other parts of spectrum where some 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.

In May 2014, Ofcom published a consultation on the future of the 700 MHz band; across Europe, the band is being considered for allocation to Mobile Network Operators. This potential clearance, and Ofcom's apparent readiness to accept it, is a stark reminder of the threats facing the PMSE sector. If DCMS does not take account of such contemporary pressures, the results for the industry could be catastrophic: quite simply, there will not be enough spectrum to satisfy current and future PMSE use.

² SOLT, *London Theatre Report*, pg.8,
<http://www.solt.co.uk/downloads/pdfs/pressroom/London%20Theatre%20Report%202014.pdf> (accessed on 15th August 2014)

A study by the German Federal Network Agency in October 2008 found that 96 MHz of spectrum was the minimum requirement for PMSE audio equipment to operate production on a daily basis³. This study was carried out in an urban area, and took into consideration the operation of PMSE systems in close proximity to each other. Both practical application and the report show that a minimum of 96 MHz is required to operate PMSE services without interference and the UK situation is no different. In the West End there are approximately 1,000 pieces of wireless PMSE equipment in use daily across all the venues. At the same time news crews and other content producers are also operating in this area, requiring further spectrum access. Furthermore, the German study did not include special events, such as national and international sports events (such as the Olympic Games), VIP visits, Jubilee celebrations, Royal Weddings, elections, large open air events or live news events, which involve large scale use of PMSE that cannot be easily planned for, and yet have to coexist with PMSE 'business as usual'.

PMSE spectrum demand can vary hugely, both geographically and temporally. Large single events such as these would require a great deal more spectrum to be available in order for PMSE to operate successfully, which is something that Government must consider. To ensure guaranteed PMSE operation without interference, in line with the German Federal Network Agency study, BEIRG would therefore advise allocating at least 96 MHz to PMSE, free from shared use with WSDs or other services which might interfere with licensed users, as protection from any future clearances. This would also require a minimum of two 8 MHz guard bands to ensure a guaranteed level of quality and protection from interference from adjacent bands.

Demand Scenarios

BEIRG recognises that predicting the future demand for wireless technology is difficult. However, all three of the scenarios presented by the consultation suggest that the UK will see a marked increase in the use of mobile data. By positing a future which is dominated by increased demand for mobile data, DCMS risks jeopardising the future of the PMSE sector.

BEIRG considers the scenarios presented in this consultation for future mobile data usage to be unreliable and inaccurate; the predictions for data use on which DCMS has based this consultation appear to be rooted in speculation. There does not appear to be a consideration of market forces or economic constraints. For example, will consumers actually be prepared to pay for so much data? Before any decision is made regarding the future use of the 700 MHz band, BEIRG urges DCMS to carry out a **clearly independent** analysis of future mobile data demand. BEIRG believe that if MNOs were made to use their current spectrum more efficiently, future demand for spectrum would not pose such a significant problem.

The past actions of extending mobile broadband spectrum access, without supporting or demanding the reuse of existing resources, have not encouraged sufficient efficiency amongst the mobile telephone industry. Whilst PMSE is an efficient user of spectrum, able to utilise interleaved spectrum and to operate alongside other users such as DTT, mobile telephone technology is, at present, not and is unable to coexist with other users.

³ Institut für Hochfrequenztechnik und Funksysteme, Leibniz Universität Hannover, *Report on the frequency resource requirements of Professional Wireless Microphone Systems in urban areas with respect to changing broadcasting allocation concepts*, 29 October 2008. Available at: <http://www.apwpt.org/downloads/reportonthefrequencyresourcerequirementsofpwms.pdf>.

Additional spectrum should only be allocated for use by MNOs once they have shown that they have maximised the efficiency of their current spectrum and their need for additional spectrum has been confirmed by critical, independent analysis. Currently, BEIRG do not believe that MNOs have made a convincing case in this regard. Much more efficient and cost-effective use could be made of this spectrum, and it is therefore imperative that mobile telephone companies make the most of their large spectrum holdings, as meeting any likely future demand will be greatly dependent on this. DCMS should model the outcome of a re-farming effort by the mobile companies and ensure they comply with this to ensure the greatest possible level of spectral efficiency, before projecting figures of demand.

The increasing complexity of handsets has already led to a steady decline in mobile handset radio performance, which in turn leads to an increase in the required number of base stations to maintain network coverage⁴. The addition of further complexity to mobile handsets (and/or other mobile network user equipment such as dongles and tablet computers) will not promote spectral efficiency. BEIRG believes that MNOs should be encouraged to exclude poor performing handsets from their networks.

In addition to the proposed use of the 700 MHz band by MNOs, the exceptionally high levels of out of band energy for both 10MHz channels and even higher for > 10MHz channels will pollute the adjacent spectrum and the duplex gap for PMSE or DTV use. This is not an efficient use of UHF spectrum which is already under high demand.

MNOs should be required to maximise the efficiency with which they utilise spectrum before, **not after**, they are allocated additional 700 MHz spectrum. A mobile telephone industry that in general refuses, for example, to share network infrastructure resources such as masts, clearly has more interest in its market penetration than in the efficient use of spectrum.

Mobile users already offload onto Wi-Fi to make voice calls and to send and receive data in an already overloaded SRD Band. As a more efficient, reliable and better quality means of data transfer, this raises the question of how much more spectrum the mobile community actually needs in future. The future may see most consumers offloading services onto Wi-Fi, as a preference to mobile broadband, especially with increasing amounts of people working from home. Use of Wi-Fi could allow for a much larger capacity and faster throughput of data. This offloading of voice calls and data is not accurately reflected in predictions for future data use.

It should also be noted that mobile broadband is only one mechanism for data delivery; one which cannot deliver the benefits of a wired connection. DCMS should encourage the use of wired Wi-Fi systems to facilitate data delivery wherever possible. While there is a difference in relative costs, the life of a wired network is 30-50 years, compared to 10-15 years for wireless. Spectral efficiency of networks should be Ofcom's primary focus, and a concentration now on Wi-Fi provision to provide data access would help to relieve a great burden on spectrum use, and allow PMSE to continue operating at its current level.

IoT

⁴ Eurexcm Engineering, *Study for the European Commission – Enterprise and Industry Directorate General: Technical support relating to performance of antennas of mobile phones, Final Report*, 28 January 2014

The scenarios presented by DCMS all hold the Internet of Things to be a key component in the coming changes to the digital world; while this may be true, BEIRG feels that the nature of the IoT is misrepresented in this consultation.

Firstly, automatically conflating IoT with mobile data is premature: a report from July of this year released by Goldman Sachs detailed the likelihood of WiFi acting as the major conduit for information transmission. Goldman Sachs cited the low cost of deploying extensive WiFi connections along with a precedent of public attachment to the concept as the reasons why it would be the most efficient way to establish connection. This was supported by a survey conducted by VDC Research, which found that around 70% of respondents expected WiFi to be the enabler of the IoT. This information suggests that DCMS's decision to present three scenarios with similar, albeit fluctuating, results is short sighted.

Secondly, BEIRG feels that the presentation of the IoT in a relentlessly positive manner is misleading; there are potential issues with the technology which should be addressed before widespread adoption is encouraged by the government. Although the Internet of Things is not necessarily dependent on White Space Devices (WSDs), which operate in the small areas of spectrum between licensed users, any facets of the IoT which utilised such technology would pose a severe threat to the PMSE sector. The scale of WSD usage is likely to be significant, as we see a rise in the purchase of wearable technology. However, the effect of such a sudden increase is largely unknown; BEIRG feels it is irresponsible for DCMS to lend its support to a technology which is untested in a real world environment and could cause lasting damage to the performing industry.

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. Allowing more RF energy to radiate in the band will, inevitably, impact negatively on existing spectrum users. Additionally, there is the likelihood that, no matter how careful manufacturers are to ensure that their products minimise any possibility of interference with other users, there will be people who deliberately hack into WSDs to suit their own purposes. It is highly unlikely that these people will put the same safeguards in place to protect incumbent industries. With wearable technology being such a large feature of the IoT, the potential for one of these cracked devices being in close enough proximity to affect a performance or event is strong. Whilst we appreciate that such action would be illegal, the question of whether any potential enforcement action would be timely or adequate must be raised.

BEIRG therefore urges an extremely cautious approach to the deployment of WSDs and, as an extension, call upon DCMS to retain a healthy scepticism regarding the IoT. At the very least, BEIRG believes that a phased introduction should be considered, to ensure that any negative consequences resulting from WSD deployment can be accurately measured and fully assessed in test scenarios.

Role of Public Bodies

BEIRG understands the reluctance of the government to insert itself into a commercial market unnecessarily. However, this case is unique; enterprises which rely on spectrum range from multi-million dollar corporations to SMEs operating in niche areas of industry. Public bodies are needed to protect the interests of companies which form the cultural backbone of the UK, but which are too specialised to be a presence in international dialogue.

As such, intervention is required to make sure that SMEs are not marginalised by those with more capacity to influence political and economic processes. Our market is vulnerable to domination; the nature of global companies such as MNOs increases their ability to engage with political procedure, but unchecked growth in a sector which relies on a finite resource can only occur at the expense of other users.

If MNOs continue to acquire more spectrum, it is not only key industry knowledge which will be lost. PMSE is the foundation for a dynamic, colourful and lucrative sector; the UK's creative industries. Limiting access to spectrum for PMSE users will have significant consequences for critically acclaimed West End shows, globally successful music festivals and international tours. Spectrum is the keystone of the UK's thriving PMSE sector; although PMSE users have limited resources to engage with policy makers, the causal chain of spectrum loss will have very recognisable results.

BEIRG suggests that DCMS asks Ofcom to give more consideration to the problem of how to defend the security of specialised sectors such as PMSE; for example, Ofcom's approach to the proposed reallocation of the 700 MHz band needs to be addressed. BEIRG asks for the development of a robust strategy to limit the damage caused by reallocation, focusing on three key needs. Firstly, PMSE users need to be allocated a sufficient quantity and quality of secure spectrum as soon as possible so that the sector can acquire the stability it so badly needs. Secondly, that spectrum needs to be guaranteed for the future, safe from the threat of clearance for mobile data usage or interference from WSDs; incumbent PMSE users do not want to continue to experience uncertainty which has dogged their sector since the Digital Switch Over and clearance of the 800 MHz (and 600MHz) band of spectrum. Lastly, adequate compensation needs to be provided – moving bands requires new equipment to be researched, made purchased and installed, and additional training to be provided for technicians. BEIRG considers the estimates for compensation in the recent Ofcom consultation on the proposed 700 MHz clearance to be an underestimation of that which is needed.