

## **Additional comments:**

**Question 1: What are likely to be the key underlying factors influencing changes in demand for this spectrum (in terms of quantity of spectrum or preferred bands) over the next 5 to 10 years? Please provide band specific evidence to support your view.:**

Movement of displaced PMSE services and other similar sectors into some of the bands under review particularly the lower frequency bands

Continued demand for high speed, reliable wire free data communications

Influence from European and Worldwide organisations in harmonising spectrum for new technologies

Lack of investment in fibre infrastructure. With continuing demand on RF spectrum, all efforts must be made to reduce the unnecessary use of RF systems to provide solutions that far more efficient and future proof fibre solutions can provide.

**Question 2: Will the reducing trend in the numbers of fixed links in the spectrum under review to support mobile backhaul continue? If so, in which bands will this reduction be most apparent and how will link capacity/bandwidth requirements change? What factors will have the biggest influence on the outcome? In your view, what will be the impact, on spectrum demand, of deploying next generation mobile networks for example using Long Term Evolution (LTE) standards? :**

**Question 3: How might the changes to current or future public safety networks influence the existing and future requirement of the spectrum under review for fixed link backhaul for public safety applications over the next 5-10 years? In which spectrum bands is demand most likely to arise and how much spectrum would be required? May demand for bands currently used by public safety applications decrease? Is it likely that the public safety services may require access to the spectrum under review for other data networks or for alternative uses?:**

**Question 4: How likely is it that use of CCTV by local authorities will significantly increase overall demand for fixed link infrastructure spectrum over the next 5 to 10 years? If so, in which bands is the additional demand most likely to be required and why? Do you have any information about the relative costs of wired and wireless CCTV links in urban and rural areas?:**

**Question 5a: What are the main factors (technical or regulatory) that determine preferences for one band over another for satellite applications? Do these factors vary between different types of satellite applications (Mobile,**

**Fixed, Broadcasting and Science services)? In which bands will we see the most significant changes in demand in the next 5 to 10 years, and why?:**

**Question 5b: A number of the frequency bands under review are currently used for satellite Permanent Earth Stations (PESs), for example to feed Direct to Home satellite broadcast services. What are the continued and future spectrum requirements for satellite PESs (E-s & s-E) likely to be and in which bands? Please provide evidence to support your views.:**

**Question 5c: During recent years, some commentators have forecast significant demand for spectrum to support satellite consumer terminals. To date this demand has been slow to materialise. Do you have information which would help inform a more accurate assessment of future demand for spectrum in bands currently shared with fixed links?:**

**Question 5d: Are there factors specific to the satellite based communications sector which mean that it faces particular difficulties evidencing and satisfying demand for spectrum? If so, how might these be overcome?:**

**Question 6: What is the likely timetable for rollout of Smart Grids and what impact will these developments have on demand for spectrum in the bands covered by this review?:**

**Question 7: What impact will DAB expansion have on demand for the spectrum under review? Are there any other demand drivers that Ofcom should consider in relation to broadcasting use or services related to broadcasting? :**

**Question 8a: What is the likely demand for broadband wireless access applications in the spectrum under review and which bands is this likely to specifically impact? How should Ofcom consider the demand for backhaul to support such applications and is such backhaul demand likely to arise in the spectrum under review?:**

The demand for broadband wireless access will continue to rise. Lower frequencies will be preferred initially but depending on technology advances higher frequencies could be used for fixed applications. I do believe however that a push for wired broadband access should be focused on with only the "In Home" portion left to low power wireless devices as well as wireless access out of the home so to speak. Using wireless devices to provide fixed access to homes and other locations where a wired connection could be used is simply a waste of spectrum resource in the long term. It also inevitably ends up slow and out dated very quickly.

**Question 8b: Do you consider that the emergence of rural broadband fixed wireless access will influence overall demand for the spectrum under review and to what extent? Which bands is this likely to impact most?:**

**Question 9: Do you consider that there will be a material additional demand from the PMSE community for access to the spectrum under review? Which bands under review is this likely to impact most and to what extent?:**

PMSE use has risen year on year. With advances in technology the use of HD wireless cameras has become common place and a must on all events. It is no longer the reserve of the larger broadcaster and is now common place in the non broadcast industry including concert tours, small awards ceremonies etc. Although advances have made them more efficient in their use of spectrum, changes in program making techniques and video standards are forcing the use of more spectrum. Examples of this are 3D and the move to 1080P and even higher resolution formats. For example each 3D system uses twice the amount of video data and hence twice the amount of RF bandwidth.

The UK is one of the leading forces in RF equipment manufacture and RF camera supply in the world. Disruption to available spectrum is already having an impact on all aspect of the TV production industry. With the loss of the 2.6GHz band and massive uncertainty of other available bands the future of large and even average size events being able to take place in the UK is not promising. PMSE use is important. A large percentage of the news coverage in the field uses wireless camera systems as cable use is simply not an option now especially with health and safety rules.

Long term access to bands suitable for PMSE use must be established ASAP to allow the continued high quality, varied and innovative use of television technology to continue. Its use may not provide the financial income that large scale mobile phone and data networks can but the importance of the PMSE industry should not and cannot be measured in financial reward alone.

Although PMSE does use a large amount of fixed link systems where the use of higher frequencies (7GHz and above) is suitable, to obtain reliable coverage from mobile platforms such as bikes, athletes, golf cameras, aircraft etc a move away from the lower frequency (2.5GHz and 3.5GHz) will result in decreased performance. 7GHz has proved to be of use for simpler wireless camera operations such as stadium based cameras and some news operations.

Anything up to 13GHz is of interest to PMSE with particular focus on 4 GHz to 7GHz but it is long term access that must also be improved rather than the continued uncertainty in some areas that exists at present.

**Question 10: How might the economics of new fibre provision (with or without reliance on regulatory remedies ? whether active or passive), as compared with wireless provision of both terrestrial and satellite based services, impact on the requirements for wireless backhaul? We are interested in the possible impact, in terms of the extent of possible substitution for wireless links and in terms of the nature of wireless links affected (urban v. rural, lower / higher frequency bands):**

Access to super fast fibre based data should be priority. Fibre provides reliable, high speed, future proof service. The use of RF based solutions should only be considered where no other solution is available and for truly mobile applications.

**Question 11: What issues relating to spectrum access for different services do you think Ofcom should review? How might Ofcom start to rely more on commercial decisions when determining allocations of spectrum in the bands covered by this review?:**

I think OFCOM should review its focus on commercial based decision completely. A large variety of services require access to spectrum for different purposes. Not all of these services have the financial weight that large mobile phone operators have.

The focus should be on fair efficient access in the bands that are best suited to the purpose. I agree that access to fast reliable data is essential to society but so is access to quality coverage of thousands of events that the PMSE sector provides as well as all the valuable services that other users offer.

**Question 12: We would welcome views on the potential for more widespread use of market based approaches to the spectrum under review such as third party band management, and the regulatory steps which would need to be taken to facilitate this. :**

**Question 13a: do you consider that any changes should be made to the Ofcom licence fixed link product set?:**

**Question 13b: Might a more flexible approach to licensing, in bands where demand is unlikely to exceed supply for the foreseeable future, enable more intensive use of these bands? If so, what form might the licensing take and in which bands would this be appropriate? :**

**Question 13c: Are there other actions which Ofcom could take to improve spectrum efficiency by encouraging migration to or use of higher, less heavily used, bands, with a view to freeing up spectrum in popular lower frequency bands? :**

Longer term and clear decisions will benefit everyone. Migration into different, higher frequency bands means investment in new equipment and support infrastructure as well as development of new working practises. This investment can only be justified if a return is to be made on it. Short term access to new frequency bands helps no one unless it is in the existing tuning range of their equipment.

**Question 14: What is your view on the impact of geographically uniform fees for spectrum bands included in this review? If you consider that a geographic fee modifier would promote more efficient use of spectrum, how might that modifier be constructed?:**

**Question 15: Are there other aspects of the review on which you have evidence that would help inform our consideration of these issues and formulate proposals for consultation?:**

**Question 16: Is the proposed list of bands to be included within the review (as set out in Figure A.5.1 in Annex 5 appropriate?:**

All bands should be reviewed periodically to assure that the most suitable use for that band is being applied. In PMSE the problem faced is one of peak demand verses average demand. In this scenario peak demand must be catered for in bands that are consistantly available otherwise large events will simply not be able to be covered from a TV and News perspective. This lack of coverage or poor quality coverage can effect organisers plans to bring these events to the UK. From my experience the UK is one of the best organised countries in the world when it comes to frequency oragnisation and because of this it has a large sucessful industry built around this concept. PMSE is happy to share suitable bands with other users especially in peak demand times but can only do so with long term commitment to these bands,