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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.:

Generally speaking, over the years the trend in telecommunications has shifted to broadband communications. The satellite industry has geared up to cater for this demand, and in addition to offering other services such as DTH (SD), HDTV, 3D television, the satellite industry has deployed very high capacity satellites like ViaSat-1 to offer broadband services. In many cases satellites offer services to consumers not served or under served by terrestrial systems (i.e. impractical or uneconomical to be served by terrestrial means), or complement the terrestrial services with other applications, such as mobile broadband. This demand for broadband is primarily addressed with the use of the Ka band. The other available frequency bands (i.e. the L band, C band and the Ku band) are extensively used and it's not possible to seek any further new assignment from the GSO. Moreover, the lower frequencies are generally unsuited for broadband communications because of the limited bandwidth available.
Therefore, the Ka band, including the spectrum shared with the Fixed Service, will be extensively utilised in the next 5 - 10 years. Within this time frame it is unlikely that technology will mature to put higher frequency bands into commercial utilisation. We would like to urge Ofcom carefully examine the feasibility of making available the bands (i) that are exclusively allocated to the FSS under the Radio Regulations without any constraints (ii) that are shared on a primary basis with the Fixed Service under conditions that are not detrimental to the ubiquitous deployment (i.e. including mobile) of satellite services.

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?:

Generally, propagation is more favourable for satellite use at lower frequencies. Hence there is extensive use of L band and C-band, and even the Ku-band. However, as mentioned above increased demand for satellite broadband for ubiquitous applications, including mobile and aircraft use, means that these bands cannot cater for the requirements. Hence, the available Ka-band utilised. The Ka band is being brought into use following the development of new techniques over the many years, amongst other things, to overcome the less favourable propagation characteristics. We will expect there to be a growing demand for the full utilisation of the Ka band, including those currently shared with the Fixed Service.
With regard to other regulatory aspects, with the expected demand for mobile applications at Ka band we would expect a regime of license exemption, similar to that applied to other mobile satellite applications, would become necessary. In parallel with that we will see a need for the exclusive use of the Ka bands.
Regulatory certainty is essential for the satellite industry to provide long term stability, at least over 15 - 20 years or more. The investment in the satellite industry is on the expectation of development of a service over a longer period, needed for the design and launch a satellite, and then to develop the market.

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.:

PESs are an integral feature of almost all commercial satellite services. It is difficult to assess the exact spectrum requirement for PES, but it is expected that increasing PES deployment is anticipated in Ka-band with its expanded deployment..

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?:

Ku band saturation and increasing demand for broadband will drive deployment of Ka band consumer terminals in the coming years. These terminals will enable broadband access at locations where terrestrial solutions are not practical, or underserved by terrestrial services (mainly in rural areas). We have seen certain Ka band broadband services being oversubscribed by the consumers.

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?:

It is very difficult or almost impossible to secure spectrum in C and Ku-bands because of full deployment of satellite services within the limited spectrum, and constraints imposed due to sharing with terrestrial allocations within these bands. Additionally, some bands are reserved for government use. In this respect, activities are underway within CEPT FM44 to secure frequencies in Ka-band for satellite use free from such burdens, and the consideration of the views of the satellite industry in this respect would be welcomed.

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?:

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?:

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).:

Fibre is like to be deployed in the developed world, and its widespread use will ease the need for satellite spectrum in some limited applications. Its significant impact is expected to be for the fixed service. However, in the developing world such fibre deployment is not anticipated for a long period to come, and satellite services will be mainstay of broadband service (amongst others). Also general speaking, fibre deployment will not provide solutions for applications for mobile, that includes deployments for ships and aircraft.

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?:

We believe Ofcom should review the requirement for more satellite spectrum in Ka-band. In so doing consideration would be given to possible migration of some FS to higher bands, noting that some of these bands are currently under-used (or hardly used at all). It should take into account the benefits of providing broadband access in mobile applications, and the ability to close the digital divide in respect of remote areas and in developing countries. Additionally, Ofcom should review the ongoing work in FM44 in relation to FS and FSS in Ka-band.
In regard to the use of commercial decisions when determining allocations of spectrum in the bands, we have some concerns that this could lead to parts of the bands becoming unusable by satellite despite the existence of a satellite allocation in the ITU and UK allocation tables. Due to the global nature of satellite, unilateral decisions at a UK level can be damaging to satellite operators. We are particularly concerned by the auctioning of parts of Ka-band on a regional basis, since this could render parts of the satellite allocation unusable. There are also a number of instances where allocations made in C-band have caused issues for satellite operators in respect to interference into earth stations.

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? :

We note that, although Ofcom has made a significant amount of spectrum available to FS, the operators have been very slow in using this spectrum, despite the wide availability of the necessary equipment from several manufacturers. We would suggest that Ofcom might consult with the FS community to identify the reasons for underuse of the Ka band and the reluctance to migrate to higher bands.
We believe that the application of a managed approach combined with competitive fees would be one approach to promoting migration to higher bands. Regarding "light licensing", there is a question as to whether it provides enough assurance to operators regarding potential interference. This may be particularly relevant when they have contractual obligations to provide a given availability figure.
We would stress that the higher bands are currently not suitable for reliable satellite use, and that if FS operators were to migrate to higher frequencies it would free up spectrum in Ka-band which is viable for satellite use.

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?:

We note that the 28 GHz band is not included in the consultation. This band is paired with the 18 GHz (downlink) band such that actions taken with respect to 28GHz will impact on the 18GHz band. Moreover, ECC Decision (05)01 partitions the 27.7 - 29.5 GHz band between FS and FSS. However, the band 28.8365-28.9485GHz which is designated by ECC Dec (05)01 to HDFSS has been auctioned in the UK, which effectively prevents UK adoption of

Dec(05)01.
We also note that this auctioned spectrum remains largely unused. Since this spectrum is in demand for satellite applications we would respectfully urge Ofcom to re-consider the allocation of 28.8365-28.9485GHz with a view to enabling it to be used for FSS as soon as possible.