



JRC Response to A review of the management of spectrum currently used for point to point fixed links and other services that share this spectrum.

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Key Points

- ❑ JRC welcomes the opportunity to respond to this consultation and the Aegis Report which presents an excellent analysis of the current situation and potential scenarios for the future.
- ❑ The fixed links market is a relatively stable part of the radio landscape, with changes being evolutionary rather than revolutionary.
- ❑ Microwave fixed links provide diversity and resilience in a communications infrastructure, a feature which should not be undervalued as our economy becomes more dependent on electronic communications in every aspect of life.

Response to Questions

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?

One might expect to see a number of countervailing influences on the growth and decline in demand for radio fixed links:

- A. The geographic spread of fibre-optic cables is likely to reduce demand for radio fixed links as more communications migrate to cable.
- B. The ubiquity of IP networks and 'cloud computing' makes it almost impossible to assess resilience and ensure redundancy in communications provision unless one route is fibre and the alternative route is radio, leading in growth in demand for radio fixed links for resilience purposes.
- C. The general increase in need for responsiveness in a globally competitive market places a premium on being able to introduce or reconfigure services very rapidly in response to changing demand, an inherent characteristic of radio based networks, generating increased demand.

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?

No view.

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?

No view at present.

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?

No view at present.

Question 5:

(a) 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?

(b) 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.

(c) 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?

(d) 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?

Utilities use a limited amount of satellite services, predominantly fixed satellite services. The most important differentiating characteristic for frequency bands from a utility perspective is weather related performance. Utility infrastructure is most highly stressed during severe weather events, and it is therefore important that any non-availability of utility telecommunications does not correlate to severe weather, eg rain fading on the communications links.

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?

Smart Grids and intelligent utility networks are likely to generate growth in the demand for radio fixed links. The most important element of this network growth is likely to be at the lower end of the frequency spectrum, where the longer hops and slightly obstructed paths are achievable. This facilitates resilience as resources can be concentrated on fewer nodes in the networks. The lower frequencies are also generally less prone to weather related outages which correlate with the times when utilities need to rely on communications most.

The lower data rates available at these frequencies are not always an impediment for utility applications as growth is likely to be in terms of geographic reach and number of nodes, not substantial increases in data rates from individual nodes.

Growth in this area is also driven by a need for diversity and resilience. Utilities have requirements for power independence in the communications networks and guaranteed redundancy.

In March 2004, a fire broke out in a cable tunnel in Manchester and put 130,000 land lines out of action, affecting internet services and disrupting several parts of the emergency services communications network including Derbyshire and Cheshire police forces and the Greater Manchester ambulance service. Many bank cash machines in the area were closed since they make security checks over phone lines and local shops could not use credit and debit card machines.

The incident highlights the vulnerability of parts of our communications infrastructure, and demonstrates how a single failure can cascade across multiple areas and services. At the same time, some organisations which had thought they had back-up communication routes in place should the BT services go down, found that these alternative routes used duct space in the same cable tunnel, and so were lost as well.

As commercial telecommunications migrate towards IP networks and cloud computing, it may be virtually impossible to guarantee diverse routing and power independence from fixed 'wired' networks. Fixed radio links enable resilience to designed and – most importantly – tested regularly to demonstrate resilience.

In terms of timescale, growth in smart networks is driven primarily by other government policy goals. Most critically the “20-20-20” targets:

- At least 20% reduction in EU greenhouse gas emissions below 1990 levels.
- 20% of EU energy consumption to come from renewable resources.
- 20% reduction in primary energy use compared with projected levels, to be achieved by improving energy efficiency.

In order to achieve these goals whilst maintaining energy security and affordability, much more intelligence will have to be incorporated into utility networks; this intelligence depends telecommunications; and increases in telecommunications capabilities on these timescales will necessitate more use of radio systems.

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?

No view.

Question 8:

a) 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?

b) 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?

No view.

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?

No view.

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).

We would anticipate more ubiquitous provision of fibre-based broadband providing the capacity to accommodate the massive predicted growth in broadband data traffic, removing the requirement for radio-based backbone trunks, unless such services are provided for resilience.

It should be noted that fibre-based communications are not totally immune to weather related incidents. Storms can damage overhead lines, and underground cables can be disturbed as trees frequently break underground cables when uprooted by severe storms.

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?

See answer to Question 12.

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.

It must be noted that microwave fixed bands are not necessarily substitutable, especially at the lower end of the frequency band. The 1.4GHz band is especially important to utilities because its unique properties are not replicable at higher frequencies. Relatively long hops enable protected landscapes to be traversed without intervening radio towers, and terrestrial radio provides low latencies not available via satellite. The 1.4 GHz band is also relatively unaffected by weather-related incidents, making it ideal for utility teleprotection services which cannot be operated over the new generation of fixed IP-based commercial telecommunications networks.

That is why, when the concept of market based mechanisms for spectrum allocation was first debated in Parliament in October 1997, the Government spokesperson gave assurances that "I entirely agree that the utilities, emergency services and the Environment Agency all perform vital safety of life services on which quality of life, and even safety of life, may depend. I also fully understand their dependence on radio for efficient communications, and that that is essential to the prompt and effective execution of their duties." ... "I therefore agree that it is right – indeed essential – that those services should continue to have access to the frequencies that they need to carry out their functions; I say that clearly and plainly. I am happy to repeat the assurance that the introduction of spectrum pricing should not affect the access of essential services to the radio spectrum they require." [Hansard, 29 October 1997]

JRC therefore considers it vital that, in whatever mechanisms are considered, utilities can continue to access spectrum at the lower end of the fixed link range for essential radio links.

Question 13

(a) Do you consider that any changes should be made to the Ofcom licence fixed link product set?

(b) 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?

(c) 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?

In any consideration of changes in the fixed link licensing regime, it must be remembered that planning consent to erect radio masts suitable for fixed links is not a trivial issue. There is a general disposition against the erection of new radio infrastructure, which puts a premium at being able to access spectrum at existing radio hub sites. Establishing new radio towers to exploit currently under-utilised fixed link spectrum may not be practicable.

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?

We do not see a significant role for geographic fee modifiers in fixed link bands, particularly in the lower frequency bands which provide their main value outside main centres of population where there are less alternatives than in heavily populated areas.

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?

We understand that Ofcom may be considering offering a consultancy service to allow greater interaction between applicants for radio licences and Ofcom's licensing section. This service may be useful for fixed links where a user wishes to plan a network as a totality, not a series of disconnected links. A level of interaction will provide a more efficient and effective service for customers, and save Ofcom's licensing section unnecessary assignment work.

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?

Yes

Background

- A. JRC Ltd is a wholly owned joint venture between the UK electricity and gas industries specifically created to manage the radio spectrum allocations for these industries used to support operational, safety and emergency communications. JRC also represents gas and electricity interests to government on radio issues.
- B. JRC manages blocks of VHF and UHF spectrum for Private Business Radio applications, telemetry & telecontrol services and network operations. JRC created and manages a national cellular plan for co-ordinating frequency assignments for a number of large radio networks in the UK.
- C. The VHF and UHF frequency allocations managed by JRC support telecommunications networks to keep the electricity and gas industries in touch with their field engineers throughout the country. The networks provide comprehensive geographical coverage to support the installation, maintenance and repair of plant in all weather conditions on a 24 hour/365 days per year basis.
- D. JRC's Scanning Telemetry Service is used by radio based System Control And Data Acquisition (SCADA) networks which control and monitor safety critical gas and electricity industry plant and equipment throughout the country. These networks provide resilient and reliable communications at all times to unmanned sites and plant in remote locations to maintain the integrity of the UK's energy generation, transmission and distribution.
- E. JRC works with the Energy Networks Association's Future Energy Networks Groups assessing the ICT implications of Smart Networks, Smart Grids and Smart Meters.

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