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From: Graham MacDonald
Senior Radio Executive
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Subject: "Review of Radio Spectrum Management" FEI
Response

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Dear Laurence,

FEI welcomes the opportunity to respond to Professor Martin Cave's report "Review of Radio Spectrum Management" dated March 2002.

FEI's response is as follows -

Opening Remarks

FEI believes economic value of the spectrum and maximum benefit to the UK economy will come from its use and not its assignment alone. FEI supports any future spectrum management that encourages use through a less restrictive, a more flexible, responsive and fair regulatory regime.

FEI believes placing more information in the hands of all users about the value of the spectrum they occupy will lead to a re-alignment of the amount of spectrum devoted to services over time. This should lead to a more productive use of the spectrum for both marketed and non-marketed services. The balancing of the competing requirements of civil, military, public and private sectors is crucial.

Furthermore, a careful review of the effects of spectrum pricing policy should be undertaken, and opportunity costs re-assessed, before any changes to the pricing mechanisms are proposed.

FEI note the report Recommendations concentrate on "economically efficient spectrum assignment" and contain no recognition of the fact that successful and spectrally efficient deployment of wireless networks requires engineering and planning of the spectrum resources made available within a licence as well as just access to frequencies. Activity in spectrum blocks interacts with neighbouring frequencies and assignments and as such blocks or channels may not be mutually independent. Therefore FEI recommends safeguards be implemented so that the financial and economic factors driving spectrum access do not lead to decisions resulting in assignments that constrain proper and efficient network planning.

FEI believes –

- the Government should not take decisions as a result of the report in isolation and must consider the impact of any decisions from a European perspective.
- greater information on the civil radiocommunications bands and the users is central to identifying opportunities for greater utilization.
- an over riding body looking at spectrum issues but this should not be linked to any Government Cabinet committee. FEI are not fundamentally opposed to “incentive pricing” and reasonable valuation of the spectrum, but the process by which the amount is assessed needs to be open and transparent.
- that if spectrum pricing is used to the extreme it could drive Operators to non-radio means of delivery.
- the Government should produce a clear spectrum strategy on when various frequency bands will become commercially available.

FEI is concerned the diversity of spectrum use and its relationship to the national economy and community needs, receives less attention than the economic objective of using cost as a driver.

FEI suggests that a much closer study and continued assessment be made of the rather progressive and innovative spectrum management policies adopted by other Administrations.

Implementation of Report Recommendations (Chapter 15)

FEI believes the report would have been more helpful if the feasibility of implementing the recommendation was detailed. There are two important questions the Report has avoided -

- (i) Can a spectrum market actually be successfully introduced?
- (ii) What would be the cost to the UK of achieving this market?

FEI believes that although the report sets out some relevant points in Chapter 15, there does not appear to be any clear strategy that would get the UK from where we are today to where the report would have us be in a few years time. The report rather assumes it can be done in the UK without introducing too many disadvantages, but the report does not go into the practical details on which these presumptions are based.

FEI believes that process details and timescales are required.

Secondary Trading (All Chapters)

FEI supports “secondary trading” if improved spectrum utilisation and access results. However, some degree of stability should be maintained regarding the intended application for specific tranches of spectrum to allow industry and users some certainty regarding the market opportunity and allow appropriate developments to take place. Any trading should include not just access to frequencies but also the original technical conditions associated with good inter-system coexistence and the overall “purpose” for the spectrum set by governmental objectives and the European harmonisation framework if not there is a risk that the benefits of harmonisation to the Users and Industry in the UK could be lost over time. A licence traded must only be used for networks or equipment that can be demonstrated to meet the appropriate interference criteria.

Furthermore, the FEI considers that although Spectrum trading can be beneficial, the timing of its introduction needs to be carefully considered. In particular for the mobile sector, there is the danger that regulatory and market uncertainty could result in inappropriate values being paid for spectrum, destabilising the industry and users. Spectrum Trading should only be introduced after some stabilisation in the market is achieved.

Harmonisation (Chapter 4 and Chapters 3, 8)

FEI believes it is very important to retain and encourage further International harmonisation but is concerned that the authors of the Report do not appear to have a similar opinion. Where harmonization is not pursued care should be taken when introducing any proposed technology into a band since technical performance in one system may seriously disrupt another system, leading to poor spectrum utilization.

FEI believes that whilst unnecessary national licensing constraints (other than those necessary for spectrum engineering purposes and coexistence) need to be removed this should not be at the expense of wider harmonisation that leads to a much improved uptake of services by the end user.

FEI notes the Report appears to make a case for a more "stand alone" UK environment, but it is not clear how this will be reconciled with the new EU regulatory framework.

FEI is concerned there is a danger this approach could also lead to fragmentation of the spectrum. Coupled with this is the apparent lack of appreciation of the benefits of spectrum sharing between services.

Interference Management (Chapter 5 and Chapters 7 and 15)

Spectrum planning is essentially a process of interference management, both within allocated bands, and between services in different bands. Spectrum congestion and spectrum efficiency are the two drivers for a more technically efficient use of technology and spectrum, but the price is paid in many cases with an increased risk of interference. The skills required to create the conditions to minimize its occurrence, and to track down and eliminate occurrences, are both highly skilled, and costly. In most cases coordinated action is necessary both nationally and internationally, as is also the capability to apply sanctions. The idea that the burden could, or should, be shifted to operators requires great care and framing of the exact responsibilities and limits of action.

The application of the skills outlined at Paragraph 5.6 appears only applicable to large-scale operators with significant resources. In-band (i.e. intra service co-ordination) planning and interference responsibility only should be the limit of their responsibility. Inter service co-ordination must remain with a central agency provided with resources and powers. It is believed that access to frequency use is only a small part of the overall interference management task and is one probably best achieved through one single open access source of frequency use data.

The close relationship between interference management and equipment standards has to be recognized and conformance with agreed standards is the first step in planning systems in bands where a variant from the ITU Regulations allocation is adopted as a national frequency efficiency measure. In fact, the use of a flexible allocation policy leads to a greater workload for interference management than in harmonized equipment in agreed bands.

This particular emphasis is applicable to the radio services dealing with radio navigation and safety communications, and especially since this is the area where safety of life is

involved. In the case of satellite navigation where high signal levels are difficult to achieve, interference from other services, both licensed and non licensed, presents an ever-present threat. FEI believes the services of an effective and efficient interference organization is vital for all of these services, such as now operated by Radiocommunications Agency.

Spectrum Pricing (Chapter 7)

The Report proposes the greater use of market mechanisms, particularly spectrum pricing, to all services where users have the opportunity to change their spectrum use. FEI welcomes this development, subject to the specific comments given below.

It should be noted that, in order to avoid distortions, all users should face incentives for efficient spectrum use. FEI recommends that the initial focus of new market mechanisms should be on those users and spectrum bands that have not been subject to market mechanisms to date.

The Report recommends that spectrum prices should be set on the basis of the opportunity cost of the spectrum, i.e. on the value of spectrum in the next best alternative use (or user). The spectrum prices developed and applied by the RA since 1998 have been determined on this basis.

Spectrum pricing has now been in place for four years, and prices have been increasing so that from July 2002 prices will have reached the maximum levels determined for fixed and mobile services in 1997. The Draft Spectrum Strategy suggests that the Report would assess the impact of spectrum pricing, however, this has not been the case. Changing the regulatory system before the previous policy has been fully implemented and its effects measured is not fair or reasonable.

Technology developments and market changes could mean that the costs of alternatives and hence opportunity cost may have fallen. The impact of prices on spectrum use and congestion levels should be measured and the effect carefully considered before deciding the appropriate level of future prices.

Auctions (Chapter 7 and Chapter 3, 4, 5, 6, 8, 11, 15)

FEI believes any future mechanisms for licensing spectrum through the use of auctions needs to be open, fair, affordable to Industry and should not be adversely influenced by any previously inappropriate auction in the UK.

FEI believes that until the mismatch of the amount of spectrum is corrected it is difficult to construct an auction that yields a fair price. This is because the Regulators have effectively arranged an artificial scarcity for a key service. Therefore auctions should not be used as the default means of assignment until this re-alignment is effective. FEI suggests Government should produce a clear spectrum strategy informing bidders when the various frequency bands will become available.

FEI believes that unless there is perfect competition 'downstream' an auction doesn't maximise benefits (as claimed in 7.64) since consumer benefits are not a factor in the market balance. Consumer benefits need to be taken into account when spectrum is being licensed through spectrum pricing / auctions. Auctions do not always maximise the benefit to UK PLC.

FEI does not support auctions being used as a means to raise revenue for the Government. FEI believes the Radiocommunications Agency should have taken a "business plan approach" with respect to 3G, looking at the negative impact to the

Industry 3, 5 and 10 years ahead assuming an artificially high price for the spectrum. FEI prefers a “single round sealed bid auction”.

Recent evidence has shown that inflexible rules and legal concerns associated with an auction process have worked against subsequent adjustments and improvements to the regulatory regime. These adjustments could be useful to reflect changes in the circumstances of the telecommunications market and industry or for spectrum engineering purposes. The auction process can detract from the flexibility and responsiveness of the regulatory framework to changing industry conditions. FEI understands that the design of the auction is extremely complicated and non-trivial and the reserve price, if there is one, is an extremely important issue affecting the outcome of the auction and subsequent flexibility.

Spectrum Speculation (Chapter 7)

FEI believes spectrum speculation resulting in spectrum being passed on and on without being used should not be encouraged or supported. As indicated previously, FEI believes economic value of the spectrum and maximum benefit to the UK economy will come from its use and not its assignment alone.

FEI does not believe that “fallow spectrum” resulting from speculation, meets the 'best use' objectives of the new EU Directives unless this is part of the Governments Spectrum strategy for future use.

“Band Managers” (Chapter 7, 8 and 15)

FEI has reservations regarding “Band Managers” setting spectrum prices, unless there are enough of them to introduce a competitive market. There is a risk that one “Band Manager”, or a small number competing imperfectly, could charge (to maximise profits) higher than that under the Radiocommunications Agency, and this could leave unsold spectrum which might be challenged under the Authorisation Directive.

FEI believes the introduction of measures allowing users to gain access to spectrum needs to be substantially improved. However, introducing “Band Managers” will create additional costs, an extra layer of bureaucracy, a requirement for “education” on the technical aspects of licensing and reduce spectrum assignment efficiency. “Band Managers” must be sufficiently qualified to be able to balance “economically efficient spectrum assignment” with the requirements for “technically efficient spectrum assignment”.

Roll-out Obligations (Chapter 7)

FEI believes in an efficient market, relaxations on rollout obligations will often not be necessary, but they should be retained as a safeguard to ensure that spectrum is used efficiently.

Such obligations are a useful tool in ensuring that the spectrum value to the consumer is taken into account. That said FEI suggests rollout obligations should not be too onerous to Operators genuinely trying to establish a service.

Rollout obligations can also be used to control hoarding and spectrum speculation if trading is permitted. Otherwise there will be a danger that spectrum will always be traded to the licensee whose business case relies on next years technology!

RTTE Directive (Chapter 7)

FEI believes that two misconceptions relating to the RTTE Directive need to be clarified.

- 1) The RTTE Directive does not regulate the use of spectrum: Regulators are still allowed to specify standards in particular bands, if they can justify it. The same applies to the WTO (provided it is not done anti-competitively).
- 2) The RTTE Directive also applies to receivers. If regulators wanted they could use it e.g. to specify the selectivity on car-locks so that Tetra doesn't set them off.

OFCOM (Chapter 6, 7 and Chapters 8, 9, 10, 11, and 15)

FEI believes that removing regulatory boundaries leaves technical constraints that have to be resolved and therefore a forum with the technical expertise similar to that already in the Radiocommunications Agency needs to be retained within OFCOM (once established) to address these technical issues.

Defence and Public Service (Chapter 10 and 13)

FEI believes that Defence and Public Safety users should have a guarantee of appropriate spectrum to support their demonstrated needs subject to the provisions in the report that encourage the use of improved terminal equipment and networks to minimise the amount of spectrum required to meet those needs. FEI expects after these needs have been identified that a considerable amount of spectrum would remain open for potential commercial use under the management of OFCOM.

FEI recommends that there should be a regular review of spectrum requirements for Defence.

FEI support the need for additional resources within Defence to perform these spectrum requirement investigations.

R & D (Chapter 3)

FEI believes that if spectrum pricing is used to optimise economically efficient spectrum assignment then revenue from this should be used to assist R & D on new equipment within the UK.

R & D is needed to provide the necessary basis to assess the economic opportunity for spectrum exploitation and that the licensing of spectrum for development or pioneering purposes should be retained.

Digital TV - Flexibility in Data Capacity (Chapter 11)

FEI notes Recommendation 11.6 stating restrictions on non-programme-related data should be relaxed and then eliminated. This is an important Recommendation as it will make more attractive applications available which will enable the migration from MHEG-5 to MHP as the common API for DVB applications. However, Recommendation 11.2 (allowing broadcasters to lease "spare" capacity) will have a converse and detrimental effect. The commercial pressure to lease capacity for totally unrelated datacasting applications in order to provide a revenue stream is likely to disadvantage further the perceived sluggishness of interactive applications, especially when compared to higher bandwidth platforms such as satellite and cable.

FEI believes it is therefore important to strengthen the criterion of "once they have met their public service broadcasting (PSB) commitments" to include reference to the responsiveness of interactive applications. If the Broadcaster cannot provide an acceptable service in this respect, then they should not be allowed to lease out capacity for other purposes.

The digital platforms must concentrate primarily on services that make them profitable. Broadcasters should have additional freedom but only **after** analogue switch-off has

happened. FEI believes it is important to have an early resolution to the use of the freed spectrum after analogue switch-off.

Within the context of large-scale allocations FEI are not advocating a total free-for-all; this is a transition management issue. FEI believes a market-based system will happen but only after the transition to digital has occurred. A European perspective has to be considered prior to knowing what frequency bands after analogue switch-off will be available. There is a risk that paying a tax on broadcast spectrum could be counterproductive to encouraging digital take up.

FEI believes Broadcasters need to pay the market rate prior to allowing spectrum trading or the released spectrum should be handed back to the Government for reallocation. It is quite clear that the issue of how the spectrum is to be issued post-switchover still has to be addressed.

Digital TV - Balance Between Terrestrial and Cable / Satellite (Chapter 11)

FEI notes paragraph 119 suggesting terrestrial broadcasting will become progressively less interesting to consumers as the demand for highly interactive programming increases and these consumers then migrate to cable or satellite with higher bandwidth.

However, terrestrial broadcasting will still remain important, especially for secondary sets, and so terrestrial broadcasters must be allowed to maintain a sustainable business model. If advertising revenues continue to fall with the fragmentation of audiences then the commercial Free-To-Air (“FTA”) services must be subsidised by subscription and Pay-Per-View (“PPV”).

FEI notes paragraph 130 proposing the spectrum allocated to PSB should be minimised. This should be in the context of providing both enough FTA channels for DTT to be attractive to the consumer, but also enough pay-TV for the broadcasters to be viable.

FEI believes this raises the following questions:

- Would an existing terrestrial broadcaster be able (or allowed) to migrate a substantial terrestrial subscription / PPV operation to satellite / cable?
- A terrestrial broadcaster might be granted a favourable license fee for terrestrial subscription services in return for also supplying an FTA service. If they were encouraged to migrate the pay services to other platforms, would it be worthwhile for them to continue to support the FTA terrestrial services?

In the current situation, future business models are somewhat unclear. The strategy for Spectrum allocation must be flexible enough to support a sustainable business model with a substantial FTA component.

Analogue to Digital TV Encouragement (Chapter 11)

FEI notes Recommendation 11.5 recommending the use of spectrum pricing to encourage switchover from analogue to digital TV. Although the use of overlay licenses is interesting, its value is currently uncertain until international agreement is obtained on the future use of this spectrum. Given that the licensees might be required to subsidise equipment, they must have a strong business model to be able to have sufficient cash-flow to support analogue switch-off before the greater revenue-generating opportunities of the reused spectrum bear fruit.

Satellite – Spectrum Issues (Chapter 8 and Chapters 4, 5, 6 and 10)

The area of satellite systems and services is one of the more specialized with its own framework, and is essentially global in character. This is given tentative recognition in the paragraph 105, but the statement in paragraph 107 that there is no spectrum scarcity is misleading e.g. there are several items on the agenda for the next World Radio Conference indicating a continue interest over new allocations for a variety of satellite services, including spectrum for High Density Fixed Satellite Services and this could play an important part in the rollout of Broadband Britain.

FEI notes most radio services are expanding and are likely to continue in this way. The prime problem is how to satisfy all demands in a manner that satisfies the needs of the community. The danger is that undue emphasis is placed on the service with the strongest voice, or the largest purse, and solutions are hence narrowly drawn, and tailored too closely towards that objective.

Satellite Navigation Systems Market Forces / Pricing Policies (Chapter 3 and 8)

FEI believes the opportunity cost of the frequencies used by satellite navigation systems is essentially zero. For reasons of international obligations the frequencies cannot be used for other services in the greater part of the UK. Their market (not real) worth cannot be ascertained by an auction process. As with frequencies themselves their worth may be a function of where they exist in the overall spectrum, the location of their use, and the time of day or year, in effect many variables incapable of precise definition.

Satellite navigation systems are only viable by collaboration with other countries or global partners. The principle of charging an opportunity cost based on the alternative, but not necessarily practicable terrestrial use (Paragraph 108) can only penalize UK interests in relation to other countries not applying the same policies. In the case of the Galileo satellite navigation system the UK operator is the UK Government and the mass user is the general public, largely undeterminable. To contrast this with the use of GPS - a US Government provided system - there is no basis for charging since the service is not guaranteed in any way.

FEI believes charging appears inappropriate for satellite navigation provided services.

Aeronautical Maritime and Safety Services (Chapters 12 and 13)

FEI notes the Report rightly identifies the Aeronautical and Maritime Services as special cases working within strict international frameworks, in which allocations are agreed globally and technical standards are harmonized to match their individual operational conditions for global transit. Frequency allocations are not available for national deviation from the international agreements, and have little or no opportunity cost in the UK.

All present aeronautical communications, many maritime communications and all navigation systems have a safety of life dimension requiring immediate actions to provide an interference free radio environment. Satellite navigation services with their low signal levels are a case for special care and treatment in this regard. Exclusive allocation has been the basis in the past as a measure to avoid transmissions on the same frequencies. FEI believes sharing with other services is not recommended unless the sharing is with a disciplined and carefully controlled service and where it has been proved practicable and safe.

The UK maintains and enjoys international recognition and respect for the standard of its aeronautical and maritime operations. FEI believes nothing should be done to damage this reputation.

Public Safety services contain many of the imperatives applying to aeronautical and maritime services although being national there are no international obligations or constraints to observe. They are recognised as essential services and have to be given the frequencies to discharge their duties efficiently and effectively. The amount of spectrum is relatively small, and the report concentrates on organizational structures and management. Interoperability for accidents, public order, etc. scenarios are important, preferably achieved by neutral technology and dedicated frequencies (Recommendation 13.2). FEI believes the conversion from analogue to digital techniques should be accelerated, if necessary by assisted funding

FEI believes merging of Public Safety and Commercial Users should be regarded as a desirable process rather than a policy imperative using appropriate safeguards to guarantee access in emergencies, together with higher protection from interference for the safety users. The spectrum management tasks of the PSSMG ("Public Safety Spectrum Management Group") could be transferred to a specialist body, or private organization to make it independent of the policy and decision making functions.

Fixed Terrestrial Service (Chapter 8)

FEI endorses Recommendation 8.4 and believes that not only should the restrictions in the type of fixed service technology be lifted in spectrum licences but also the restriction in the type of application that can be offered as detailed in Recommendation 7.2. For Fixed Wireless Access this would expand the opportunities for Operators to wholesale capacity to support other operators and networks and develop better end user access to new telecommunications services.

License-Exempt Spectrum / W-LANs (Chapter 8)

FEI believes that the removal of the restriction stopping public services on licence exempt spectrum is important and feels there may be a case for suggesting even more license exempt spectrum is released.

FEI endorses the conclusions reached in the report on the provision of licence-exempt spectrum for public access communications. However, FEI strongly advocates that priority be given to removing the current constraint on the 2.4 GHz band. Its introduction should not be delayed by combining its availability with the 5.0 GHz band.

FEI shares the concerns highlighted in the Radiocommunications Agency's report, "*Spectrum Management Strategies for License-Exempt Spectrum*" November 2001, stating that if the UK does not quickly remove the inhibiting legislation and permit public access communications using this technology, the UK will fall even further behind the rest of Europe and other trading blocs in the adoption of Wireless e-business.

FEI suggests that to expedite take up and availability of services, the Radiocommunications Agency should consider frequency bands where equipment is more readily available. FEI notes that the "Mason report" strongly advocated that the 2.4 GHz band be deregulated as soon as possible. Unfortunately, in filtering this recommendation through to the "Review of Radio Spectrum Management", the case has become generalized and linked to technology for the 5.0 GHz band. The 5.0 GHz frequency is far less widespread and only now becoming available commercially

FEI believes that releasing the 2.4 GHz band sooner rather than later would enable valuable experience to be gained by users, suppliers and the service providers in the UK by affording them much better market knowledge on which to base their investment decisions when the higher bandwidth equipment becomes widely available.

Please refer to FEI response to the RA "License-Exempt Spectrum Consultation" for further information.

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