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**Laurence Green
Radiocommunications Agency
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Wyndham House
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London
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Dear Laurence,

Hughes Network Systems (HNS), welcome this opportunity to comment on the Independent Review of Spectrum Management for Her Majesty's Treasury by Professor Cave.

Background to Hughes Network Systems

Hughes Network Systems, a unit of Hughes Electronic Corporation, is the world's largest provider of broadband satellite network solutions for businesses and consumers, with over 500,000 systems installed in more than 85 countries. HNS pioneered the development of high-speed satellite Internet access services, which it markets globally under the DirecPC and DIRECWAY™ brands and is a major supplier of mobile satellite networks and user terminals. For terrestrial access, it offers the comprehensive AIReach family of broadband wireless, point-to-multipoint products. In addition, HNS is a leading manufacturer of DIRECTV® satellite television receivers, having shipped its 8 millionth system in 2001. HNS revenues in 2000 reached \$1.4 Billion.

Headquartered near Washington, DC, in Germantown, Maryland, with more than 30 facilities and sales offices around the world, HNS employs over 6000 people in engineering, operations, marketing, sales and support. It operates manufacturing facilities in Maryland, San Diego, Milton Keynes UK and Tijuana, Mexico. Affiliate companies in India include Hughes Software Systems, a publicly traded software development subsidiary; Hughes Escorts Communications Ltd. (HECL), a provider of shared-hub satellite communications services; and Hughes Tele.com, Ltd., a telecommunications operator in Maharashtra (Region of Mumbai). HNS plants are ISO-9001 certified in the US, UK and India, and ISO-9002 certified in Mexico.

Hughes Network Systems Europe (HNSE) is Hughes Network Systems' (HNS) operating and sales organisation for the European market. It is headquartered in

Rome, Italy with facilities in the United Kingdom, Germany, and the Czech Republic. HNSE provides DIRECWAY® broadband satellite services across Europe, utilising its satellite hub earth stations and network operations centres in Griesheim, Germany and Milton Keynes, U.K. HNSE designs, develops, installs and maintains a wide variety of enterprise network service offerings, such as, broadband Internet access for ISPs, business television, broadcast video, micro-advertising, as well as interactive distance learning.

Introduction

Decisions made by Administrations world-wide can impact on the ability of companies like HNS to develop and deploy equipment which then impacts on the manufacturing facilities world wide. We have long had an association with the UK, through our facilities at Milton Keynes and participate in a number of International, European, UK industry and Administration consultative groups such as ITU-R, ETSI, DVB, FEI, DTG etc. It has long been the view of HNS that the role of Administrations should be to facilitate the use of spectrum, rather than to only regulate its use.

HNSE is concerned that including satellite spectrum in the pricing policies recommended by Professor Cave would have a serious negative effect on the development of satellite broadband services in the UK and throughout Europe.

The concern of the Radio Authority is that spectrum, a scarce resource, is used efficiently. HNSE shares that interest but contends that use of a pricing mechanism is inappropriate and unnecessary as an incentive for satellite operators to use spectrum efficiently.

Professor Cave's efficiency argument is based largely upon the logic that providers of telecommunications services should substitute wire-line services for wireless when the wireless operation cannot support the opportunity cost (reflected in the degree of congestion) of the spectrum being utilised. Satellite operators, however, by definition, cannot substitute wire-line networks making that particular aspect of efficient use of spectrum irrelevant. In fact, from a public policy viewpoint, the role of satellites is to provide a network-based source of competition to wire-line facilities in the provision of broadband services. This inter-modal competition will continue to result in the provision of services in an economically efficient manner to the benefit of users.

HNSE has recently introduced two-way satellite broadband services based on DVB-S for business and consumers in the UK (and Europe) and, unlike traditional satellite services, is making available – via small VSATs – service nation-wide and especially in rural or sparsely populated areas where the economics of terrestrial systems make deployment unattractive.

Any imposition of additional fees on this service essentially constitutes an unwelcome tax on this developing source of broadband provisioning. In doing so, such a policy will slow the rollout of these services in general and reduce the availability of competitive services to consumers by severely handicapping satellite operators in competing for subscribers.

Another point of concern with Professor Cave's Report is that it doesn't recognise the new role of satellites as noted above. As many regulators have recognised, small consumer satellite terminals are highly susceptible to terrestrial interference, especially when receiving from the satellite. Accordingly, regulatory authorities have, as has the RA, allocated spectrum use exclusively to satellites and VSATs i.e. unshared with terrestrial users. For satellite broadband services to truly develop as a mass-market product the availability of unshared spectrum is essential. This, even in Professor Cave's analytical model, precludes the imposition of fees on satellite spectrum as there is no 'opportunity cost' for unshared spectrum.

This aspect of satellite service, however, does not generate a regulatory concern for efficient use of the radio spectrum. Satellites, being power limited, have consistently improved spectrum efficiency by developing ever better means of frequency re-use and utilisation of spot-beams. For example, Hughes is actively addressing next generation DVB-S2 which should increase the bandwidth efficiency of broadcast satellites by using advanced modulation and turbo coding. In addition the Hughes' SPACEWAY system,(which is under construction) is a Ka-band system designed to take into account the broadband marketplace and utilise the latest developments in satellite and small earth station technology. This state of the art system increases spectrum use efficiency by using smaller up-link and down-link beams, high frequency reuse, hopping down-link spot beams and an on-board processing system that eliminates the requirements for gateways. The system uses up-link and down-link power control to improve the spacecraft power utilisation. Up-link and down-link data rates are maximised by the system aggregate capacity and frequency re-use. A dynamic assignment of capacity to down-link areas, along with the spot, multicast, and broadcast capability, increases the efficient use of assigning traffic and thus of spectrum.

The state-of-the-art technology and design of the SPACEWAY system will provide the highest system performance, service quality, overall capacity, and spectrum efficiency of any commercial satellite system ever launched.

Throughout the report, emphasis is placed on the presumed benefits of being able to use tranches of spectrum in restricted geographic areas for purposes other than those for which they were originally designated, but little recognition is given the success of harmonised systems, spectrum and applications in Europe. A detailed understanding of spectrum engineering and propagation is not required in a harmonised environment and the results of bad engineering or planning, such as the interference to television receivers in the southeast suffered every summer, are far less likely in an environment which encourages proper and efficient network planning.

The somewhat simplistic approach taken to spectrum engineering by the report gives rise to concern regarding whether the review had sufficient consultation with spectrum engineers and industry. For instance the comment in paragraph 45 of the summary that "interference is unavoidable and ever present" belittles the work which is done by spectrum engineers and the standards setting bodies, such as the ITU to ensure that any interference in a well planned environment is at a level which is considered "acceptable" by the user. As such there is no "inconvenience".

For the UK to remain competitive, it is important that spectrum policy objectives should aim at the minimum additional regulation beyond that required to meet international obligations and to promote national political objectives. As such, any market mechanisms introduced as a result of the Cave report should meet these criteria and not introduce additional bureaucracy or expense.

For the reasons articulated above, HNSE believes that the portion of Professor Cave's Report that relates to the application of spectrum fees to satellites should be dismissed. The Report's own conclusion is that there is no opportunity cost for unshared spectrum as required for developing VSAT service into a mass market product and therefore no rational fee. Further, as satellite operators have market-based incentives to continually develop more efficient means of utilising spectrum there is no need for external pressures such as fees or taxes to generate such developments.

We welcome many of the more positive aspects of the Cave report, such as those which should lead to a greater availability of spectrum information and the possibility to trade spectrum. In addition we welcome the recommendation that the benefit to the UK as a whole should be taken into consideration during the decision process regarding allocation and assignment.

We hope that, whatever the Government's response may be to the Cave Report, we will continue to see the improvements in the responsiveness and co-operation of the RA/Ofcom with industry, which we have seen over the last few years. We believe that the innovation of the RA that led to the introduction of administrative pricing has produced a regime where the majority of users of spectrum are forced to recognise the opportunity cost of the spectrum they use, but at the same time facilitates its use. The use of Administrative pricing has only just been introduced into several areas and we believe that it would be unwise to precipitously alter, yet again, the way in which spectrum is assigned before there has been an opportunity to fully assess the impact of the recent changes.

Despite the assurances given, we are concerned that some of the recommendations and many of the statements in the report appear to dwell more on the immediate economic benefits to the treasury, rather than the economic benefits to consumers and the overall GDP of the UK. It is also necessary to recognise that should some of the suggestions lead to a large differential between the cost of spectrum in the UK and the rest of the European Community, then UK industry, particularly the service industries, could be considerably disadvantaged compared to competitors abroad.

In conclusion we believe that some of the reports suggestions have merit, but that the Government should proceed with extreme caution before committing to use of the "spectrum access licensing" techniques advocated, as we see these as having the potential to constrain the opportunity to rapidly introduce new services, in particular by small companies, rather than facilitating them.

Our comments on specific areas of the report are attached and we would be happy to discuss these issues with you if clarification is required. We would also suggest that before any action is taken based on the report, that the RA or its replacement hold

public meetings with industry and operators to discuss the issues presented by the review report, as has been done in the past.

Yours sincerely,

Martin Butcher

General Comments

We believe that the most significant paragraph in the whole report is 53 in the summary and as such quote it in full.

“Ofcom will inherit these spectrum management functions and the limited constraints applying to them. To help guide Ofcom further in the delivery of this remit, the review considers that the Communications Bill should place an explicit duty on Ofcom to manage spectrum with the objective of maximising the value of benefits derived by UK society from spectrum use. This would focus Ofcom on enhancing the economic efficiency of spectrum use, where economic efficiency is broadly defined to encompass both public and private sector outputs marketed and non-marketed services to consumers and citizens. This would put the onus on Ofcom to quantify, where feasible, these societal benefits. It would not imply reducing all Ofcom spectrum decisions to monetary cost benefit analyses of competing allocations, as it would also recognise the unquantifiable social benefits derived from spectrum use.”

We are concerned that the report appears to concentrate “on economically efficient spectrum assignment” and that insufficient attention is paid to the “unquantifiable social benefits derived from spectrum use.”

In particular HNS unashamedly points to the economic benefits that Broadband Satellite access is starting to bring to areas where no sustainable business model currently exists for other broadband technologies.

Comments on Specific Recommendations

Recommendation 4.1

We support the need for greater flexibility in the use of spectrum, but care should be taken that this does not lead to an increase in the probability of interference to receivers.

Recommendation 4.3

We concur with the concept of harmonisation of the minimum essential parameters, but are concerned that the “economic efficiency” may refer to “revenue raising” opportunities, rather than economic efficiency of equipment costs and spectrum use.

Recommendation 5.1

Whilst we concur with this, we are doubtful that more than a few major operators have available the tools and skills needed. As such, the RA/Ofcom will need to retain spectrum-engineering skills in support of interference coordination for some considerable time.

Recommendation 5.2

We strongly support this recommendation since we believe that it will provide the opportunity for operators and industry to identify areas of spectrum where greater efficiency and flexibility can be introduced.

Recommendation 6.1

Whilst we are in agreement with the thrust of this paragraph, it is on the understanding that the revenue raised by licensing should be of little or no account when considering the overall value derived by society.

We would strongly argue that the money raised by auctions, such as the 3g auctions, whilst of immediate benefit to the treasury, has had, in the long term, a negative impact on the telecommunications industry as a whole (and the broadband fixed wireless sector in particular) by withdrawing a major segment of available investment capital. This has led to considerable difficulties for manufacturers and operators alike.

Recommendation 6.4

We are concerned about the apparent support for “spectrum access licensing”, especially since no consideration appears to be given to the size of the areas concerned or the introduction of mechanisms to ensure access to the spectrum by other competing users, particularly where services such as Fixed Links and Fixed Satellite share the same frequencies. We advocate that where spectrum access licenses to fixed service applications are awarded over large geographic areas, (such as the 28GHz BFWA), then there should be an obligation on the spectrum owner to allow access on an equitable financial basis by other users of equipment that is of a similar nature and conventionally, can share.

Recommendation 7.6

Secondary trading with change of use of the spectrum should always be conditional that other licensees sharing the band should not be subjected to additional interference.

Recommendation 7.7

We strongly disagree with the concept that auctions should become the default method for assigning spectrum between competing users, particularly for the sharing Fixed and Fixed Satellite services. Auctions can present Administrations with both an opportunity to assess the market value of specific tranches of spectrum and avoid the possibility of litigation associated with some other award processes. However, they can also present difficult post auction problems as seen in the case of BFWA. Prior to the first auction of this spectrum, industry recommended that successful licensees should be allowed to use the spectrum for both BFWA and third party infrastructure in order to provide a sustainable business case. The Government chose to ignore this advice and as a consequence a number of licences still remain without bids, despite a second auction which has now been running for 3 months.

The sands supporting the government’s policy regarding BFWA seem to have shifted, and we note that Recommendation 8.4 and paragraphs 102 and 103 of the report advocate that FWA licensees should be allowed to lease spectrum, or carry third party traffic. This post auction change of policy must lead to litigation, since many operators will claim that they didn’t bid for licences because third party infrastructure was not allowed under the terms published.

Recommendation 7.9

We have some sympathy with the concept of administrative pricing to encourage and reward the use of the most spectrally efficient equipment, but are concerned that once a band becomes congested, operators are then penalised for efficiently planning the use of a band.

Recommendation 8.1

As seen in our comments on 7.7, we are concerned that auctions can create problems for industry when applied to the Public Telecoms Arena. To a certain extent we see it as an abrogation of the responsibility of the regulator to be informed and prepared to make decisions. We strongly advocate that any future auctions should be based on a single closed bid principle, which we believe would more truly establish overall spectrum values.

Recommendations 8.4 and 8.5

We are concerned that these two services have been treated separately since they have successfully shared several frequency bands for many years. There appears to be a general misconception that satellite transmit terminals are currently undercharged compared to Fixed Service Links. A rigorous analysis based on a standard tariff unit of MHz/km² shows that permanent earth stations are charged more than Fixed Link terminals in the same band and that small terminals are paying administrative price fees in exclusive bands where the report suggests that the opportunity cost is zero.

We are also alarmed that the report suggests that spectrum access licensing should be used to clarify the rights and responsibilities of satellite transmissions into the UK. We would comment that if this type of charge is imposed on satellite operators it is likely to seriously impact on the ability of service providers to facilitate “Broadband” services in rural and remote areas of the UK. We advocate that the approach suggested in our comments on Recommendation 6.4 regarding shared bands should be developed to enable those receive only terminals operating in bands shared with Fixed Services and requiring high availability to register and coordinate/receive protection in the normal manner. This would then enable a far more efficient use of spectrum shared between fixed and fixed satellite services as demonstrated in recent UK inputs to the relevant ITU Working Party dealing with sharing issues in these bands.¹

¹ ITU-R 4-9S/273