Response to the Ofcom consultation document "Recognised Spectrum Access for receive only earth stations" published 8 July 2010

16 September 2010

Introduction

For the past four years I have been working with the former holder of a national licence for two 84MHz spectrum blocks in the 3600 to 4200MHz band used for broadband wireless access (BWA). During this time I have worked to establish, mainly through the Ofcom coordination process, the impact of fixed links and earth stations on deployment of BWA base stations. This has, I believe, provided me with insight into the radio environment shared by the national licence holder, the operators of fixed links and the earth station operators. I have no connection with the current national licence holder.

This response to the consultation document focuses only on the proposal to introduce recognised spectrum access (RSA) rights for receive only stations in the 3600 to 4200MHz band as I have only limited familiarity with the other bands being considered. Further, within this band, this response only applies to the two 84MHz spectrum blocks which are covered by the particular national licence.

The introduction of RSA for users of this band as set out in the Ofcom consultation document has the potential to hinder optimal use of the spectrum and opens the possibility for a distortion of the commercial environment resulting in a significant reduction in the benefits broadband wireless access could deliver.

The location of base stations for the provision of services such as broadband access to users over a wireless access media is, by the very definition of access, driven by the location of the users. It is simply not possible to place the transmitter for a base station anywhere other than close to or in the area it is intended to cover. By contrast, most, if not all, users of receive only terminals could operate successfully with the terminal at a remote location albeit at the cost of suitable connectivity between locations. The radio propagation characteristics and network economics of BWA systems in the 3600 to 4200MHz band means, as a general rule, that commercially viable services will concentrate on relatively densely populated areas. It is in these areas that fixed and mobile wireless broadband access has the potential to bring considerable benefits to large numbers of users.

Most, though not all, of the existing earth station sites that have been identified as using this spectrum are located a considerable distance from urban areas. Even where there are stations actively receiving in this spectrum close enough to have a material impact on urban BWA deployment, discussions with the operators have shown in most cases that there is the potential for reasonable mitigation measures which would facilitate effective sharing of the spectrum reducing concern for unacceptable levels of interference to the satellite services and

with only limited impact on the extent of potential BWA coverage. During this work no indications were detected of plans for additional earth stations to use this band.

There are very few fixed links operating in the nationally licensed part of the band, even less in urban areas. The nature of the fixed link equipment means that careful selection of base station location, antenna details and frequency planning results in only minimal impact on BWA deployment. Over the past four years replacement of analogue fixed link systems with digital systems reduced the already limited impact, and no indications were detected of new fixed links being planned in this band.

A very small number of receive only stations operating in this band were discovered during this work, though there may be other sites that had not been identified. It would be very helpful for details of these sites to be available to network planners and this would be a definite benefit of the scheme proposed.

The conclusion of the work was a fairly detailed and comprehensive understanding of the radio environment in which BWA is to be deployed, and confidence that the environment was generally stable. Some aspects of the regime proposed would have the welcome effect of improving the understanding of the radio environment, but has the potential to introduce unwelcome effects greatly reducing the opportunity to use the nationally licensed 3600 to 4200MHz spectrum for BWA to bring benefits to users.

Consultation questions

The responses below focuses only on the proposal to introduce recognised spectrum access (RSA) rights for receive only stations in the 3600 to 4200MHz band and the potential to have an impact on use of the two spectrum blocks 3605 to 3689MHz and 3825 to 4009MHz which are covered by the existing national licence.

Question 1: *Do you agree with the list of proposed RSA parameters for assessing interference and for setting fees for receive-only earth stations? Are sufficient parameters defined for a grant of RSA? If you disagree, please give your reasons and suggest alternatives.*

The approach set out does appear to include an assessment of a new RSA site in terms of the potential for significant impact on the deployment plans of licence holders undertaking long term, large investment projects to provide wireless access services such as broadband access with wide area coverage. Paragraph 4.60 of the consultation document sets out the assumption that relatively few stations are expected to seek RSA, yet the barrier to entry in terms of the investment cost of a terminal, the time to establish a station, the application process and the cost of an RSA grant are low in absolute terms, and tiny when compared to the annual licence fee paid for the nationally licensed part of the 3600 to 4200MHz band. A small number of grants of RSA to sites in, or to the north of, urban areas could have a disproportionate impact on the ability to achieve the necessary clearances to deploy 3600 to 4200MHz wireless broadband access services.

There are a relatively small number of existing earth stations and fixed links that use the nationally licensed part of the 3600 to 4200MHz band. The locations of most, if not all, of these sites have been established through work carried out for the former licence holder, and discussions have been held with most of the relevant site operators. Over a four year period the environment has been stable. Once actual, rather than implied, spectrum usage, actual site screening, and the potential for mitigation approaches are considered together with careful selection of transmitter site, antenna design and frequency plan for the base stations only a very small number of these existing stations have been found to have a material impact on

likely wireless broadband access roll out plans. The arrival of even a handful of new sites in this part of the spectrum with RSA protection in or near urban areas will have a disproportionate, negative impact on likely roll out plans for wireless broadband, making, in my view, optimal use of the spectrum unachievable.

A significant and very welcome benefit of the proposed RSA scheme would be to make the locations of receive only users of this band known to Ofcom and available to the planners of BWA wireless networks. Under the current arrangements an unintended consequence of the 2003 Communications Act has prevented Ofcom providing information on earth station location, technical details and spectrum usage, even where this is known to Ofcom. Knowledge of the environment is clearly important for network planning if near optimal spectrum use is to be achieved. The introduction of an arrangement making this information available to other band users, perhaps with appropriate restrictions, would be a considerable improvement. This would bring a level of confidence to the understanding of the radio environment for all parties.

In examining the current environment the practice for satellite receivers to have very wide band "front ends" has been noticed. In cases where a station is using only a very small part of the spectrum the antenna and receiver characteristics has meant that a material part of the available licensed 3600 to 4200MHz band is "sterilised" within a significant geographic area around the station location. From the consultation document it is not clear how the technical parameters of the proposed RSA protection will be defined. An approach which sets an interference protection level mask relative to the frequencies being granted protection is likely to reduce the impact on other licensed users compared to an approach which simply assures a maximum interference level in the intended band but which is silent on other technical parameters for the receiver and which could, as a consequence of the particular receiver and antenna design, practically prevent use by others of spectrum many MHz away from the intended, and protected, frequencies. This simple approach may even prevent any use of this spectrum within several tens of Km from a site enjoying RSA protection. With the exception of the reduction in RSA fees for shielded sites there does not appear to be an obligation on or any encouragement for an RSA seeker to take measures such as filters, careful positioning and screening to ensure the minimum spectrum impact on users of the band planning to deploy nearby. Details of the protection to be afforded need to be specified such that impact on other users of this spectrum is minimised, and the expectations on RSA applicants in terms of equipment and sites characteristics are clear.

While the first come first served principle is being suggested, the realities of planning and deploying a wireless network designed to provide services to users across a wide area are significantly different from deploying a single site receive only terminal and applying for RSA. Planning and installing a single small earth station could take only a matter of weeks, but gathering necessary detailed topographic and building clutter data, initial radio planning, site identification, site acquisition and implementation for a wide area network for an urban environment takes years, and the levels of investment are very large. For a wide area service being able to provide reliable coverage within a defined zone, particularly for low power terminals is key. At any time in the planning process a new RSA site within or close to the intended coverage zone could make any deployment plan redundant, and could sterilise enough of the spectrum in that area to prevent deployment. A BWA operator planning to cover an area is not able to secure clearance for sites until site details, including location is known, which is relatively late in the planning process and until some sites in an area have been cleared there would be no protection under the current regime against new sites in the area applying for RSA.

One way of dealing with this issue would be to allow the national licence holder to define, in confidence, target roll out areas in advance of seeking clearance for individual sites, or for Ofcom to define expected coverage areas. Within and around these defined areas any

applications for new RSA sites could be examined in greater detail resulting in the application of technical limits on the extent of the RSA protection designed to contain impact on the future BWA roll out, or, potentially, refusal. Care is needed when defining any such areas using general terms to ensure that the definitions are well understood, and achieve the desired aim. During the 28GHz spectrum auction process reference was made to allowing a number of 28GHz earth stations to be built in "rural" areas, but, on examination, there are areas of London that are defined as "rural" under the DEFRA categorisation scheme. It is the extent of the geographic area where the receiver has an impact on other spectrum users that matters, not simply the location of the terminal seeking RSA protection. A terminal which may be located in a notionally "rural" area may have an impact zone stretching many kilometres into a densely populated urban area.

Question 2: *Do you agree with the proposals for introducing fees for RSA for receive-only earth stations in the bands concerned on the basis of parity with existing PES fees (with a minimum fee of £500) and that the full fees be implemented from the date of grant of RSA? If you disagree, please give your reasons and suggest alternatives.*

Certainly a fee is needed to cover Ofcom's costs and to deter purely frivolous RSA applications. A fee mechanism would, of course, not compensate an existing national licence holder for the economic impact on its ability to roll out services, and hence on the value of its licence. The proposed scheme does not balance the fees for RSA with the fees being paid for the national licence. A scheme which relates the population within the area denied to a BWA operator by the RSA site to the fee payable would provide signals to more consistent with the aim of optimal spectrum usage.

Question 3: *Do you agree that grants of RSA in the bands should normally be on a rolling annual basis, with a 5-year revocation period?*

The period of the grant should take account of the nature of the station benefiting from the rights, the service being used including its economic or other significance to the general population, and the measures taken to minimise impact on other services through equipment, location, topography etc. Some sites should benefit from the certainty of long term protection, perhaps longer than five years; others a far shorter revocation period where the impact on the pre declared roll out of services by an existing licence holder is significant.

Question 4: *Do you agree that grants of RSA in the bands should be tradable and that grants of RSA and WT licences should be inter-convertible? If so, do you agree with our proposal to model the process for trading and conversion on that for RSA for radio astronomy?*

A fundamental difficulty with allowing the RSA rights to be tradable is that this introduces an opportunity for speculation in future spectrum use. Successful applications for RSA for a few carefully designed and located low cost stations may, for a relatively modest investment, effectively prevent the deployment of fixed wireless broadband services over significant urban areas. Such sites could be set up with the specific aim of trading the RSA rights. No mechanism is apparent in the consultation document to detect or prevent this. The assumption made (para 4.60) is that only a few sites will seek RSA rights, but the introduction of tradable rights creates an opportunity for speculation and this could stimulate rather more applications for RSA than has been anticipated.

Question 5: *Do you agree with our proposed procedure for considering applications for the grant of RSA to receive-only earth stations. If you disagree, please give your reasons and suggest alternatives?*

Details of the proposed process are, understandably at this stage, limited. For the reasons set out elsewhere in this response, attention needs to be given to the impact on the roll out of wireless broadband services in urban areas before a station is granted RSA. Attention needs to be given to site and the proposed equipment to realistically assess the extent of its impact in geographic and frequency use terms on the deployment of wireless broadband access networks. Other than where there are cleared operational transmitters nearby, no circumstances are proposed for refusal or limitation of the grant of RSA rights.

Question 6: *Do you agree that RSA for receive-only earth stations could provide greater security against interference and help promote optimal use of the 1690 - 1710, 3600 - 4200 and 7750 - 7850 MHz bands? If not, please explain why and describe any alternative mechanism that you consider to be necessary.*

The scheme as outlined in the consultation document will inevitably lead to severe restrictions and uncertainties for the deployment of the nationally licensed part of the 3600 to 4200MHz band for wireless broadband access in many densely populated areas of the country. The responses to the earlier questions, particularly Question 1, set out the basis of these concerns, and provide some suggestions for changes.

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