



ESOA response to Ofcom consultation document:

“The future role of spectrum sharing for mobile and wireless data services”

9 November 2013

1 Introduction

ESOA is pleased to provide comments to Ofcom related to the consultation document: “The future role of spectrum sharing for mobile and wireless data services”.

ESOA is a non-profit European organisation established with the objective of serving and promoting the common interests of European satellite operators. The Association is the reference point for the European satellite industry, and today represents the interests of 25 satellite operators, manufacturers, and related sectors that deliver information communication services across the globe. See www.esoa.net.

ESOA is not seeking access to additional bands for terrestrial mobile or wireless data applications. Hence, many of issues and questions raised by Ofcom in the consultation document are not directly relevant to ESOA. However there are some bands mentioned in the consultation document as potential new mobile bands, which are allocated to and are used by the fixed satellite service (FSS) – specifically the bands 5725-5850 MHz and 5850-5925MHz. There are also bands not specifically mentioned in the consultation document which are being considered in other fora for potential use by terrestrial mobile systems, in particular all or parts of the band 3400-3800 MHz. ESOA is concerned about the possible use of these bands for licensed or license-exempt terrestrial mobile or wireless systems, and the potential impact on current and future FSS operations in the UK and elsewhere. These comments do not fit neatly into the questions posed by Ofcom, but might be considered under question 14: *“Question 14: Do you have any other views on any of the issues discussed in this consultation?”*

2 Potential use of the band 3400-3800 MHz by mobile services

The band 3400-3800 MHz is allocated to the FSS (space-to-Earth) on a primary basis in the ITU Radio Regulations. In the UK Frequency Allocation Table, the band 3400-3600 MHz is not allocated to the FSS but is allocated to the mobile service on a primary basis; and the band 3600-3800 MHz is allocated to the FSS on a primary basis and the mobile service on a secondary basis.

Since, within the UK, the band 3400-3600 MHz is not allocated to the FSS, use of this band by receiving FSS earth stations is not protected from interference from mobile systems. However, it is important to consider two interference issues before authorising mobile systems in this band.

Firstly, interference can occur to FSS earth stations operating in the adjacent band, above 3600 MHz. There have been numerous incidents in other countries of interference caused to C-band FSS earth stations by mobile systems operating in the adjacent band. Interference may be caused by blockage or overdrive of the earth station's low noise amplifier, or by the reception by the earth station of the out-of-band emissions for mobile base stations and user terminals. The EU Radio Spectrum Committee is currently reviewing proposals to relax the in-block and out-of-block emission limits for "Broadband Wireless Access (BWA)" systems in the band 3400-3800 MHz, which will increase the risk of interference to FSS earth stations. Mobile systems using the band 3400-3600 MHz will require geographic separation with respect to FSS earth stations operating in the band 3600-4200 MHz. This will probably require a coordination procedure between the two services.

Secondly, interference can occur to FSS earth stations operating in the band 3400-3600 MHz in other countries. Depending on the characteristics of the mobile base stations, interference can occur to FSS earth stations in Ireland, France, Belgium and The Netherlands¹. In accordance with the Radio Regulations, if the coordination area of an earth station located in any of these countries overlaps with the UK, the use of this band by terrestrial services within the coordination area must be coordinated with neighbouring administration.

With regard to the band 3600-3800 MHz, this band is allocated in the Radio Regulations and in the UK to the FSS (space-to-Earth) on a primary basis and to the mobile service on a secondary basis. Hence FSS earth stations in the UK, receiving in the band 3600-3800 MHz must be protected from interference from mobile systems. Furthermore, as the allocation to the mobile service is secondary, existing mobile systems must also not cause harmful interference to new FSS earth stations. The adjacent band interference issues described above for mobile systems in the band 3400-3600 MHz also apply to any mobile systems that might be deployed in the band 3600-3800 MHz, i.e. mobile systems in the band 3600-3800 MHz could also cause interference to FSS earth stations operating in the UK in the adjacent band 3800-4200 MHz and to foreign earth stations operating in the band 3600-3800 MHz.

ESOA is sceptical about the need for this band for mobile systems, given that attempts to deploy mobile system in the band 3400-3600 MHz in Europe have mostly been unsuccessful. If however

¹ see example coordination areas in ECC Report 100.

Ofcom is considering the authorisation of mobile systems in the band 3600-3800 MHz, all of these potential interference issues will need to be addressed, and protection measures put into place. It is particularly important to note that, consistent with the allocation status of the FSS and mobile services, the introduction of new FSS earth stations might require previously operating mobile systems to cease or change their operations, so as to ensure adequate protection to the new earth station.

In principle, sharing is feasible provided sufficient geographic separation is maintained between mobile stations and FSS earth stations. Example separation distances are contained in ECC Report 100 and ITU-R Report M.2109. Typical separation distances are tens or hundreds of km. According to information included in Radio Spectrum Committee document RSCOM10-28, there are 50 earth stations in the UK operating in the band 3400-3800 MHz and 102 earth stations in the UK operating in the band 3800-4200 MHz. There are likely to be many more earth stations in operation, since receive only earth stations, which are sometimes used for reception of satellite TV channels, may operate in the UK without a licence. With so many earth stations in the UK alone, it seems unrealistic that the band 3600-3800 MHz can be used by mobile systems. Furthermore, given that mobile systems might also have to suddenly cease operations in a particular area if a new earth station is introduced, it would not be possible to provide any assurance of service to mobile users in this band.

For these reasons, ESOA is doubtful that the band 3600-3800 MHz could usefully be used by mobile systems in the UK.

While new authorisation schemes, such as a Licensed Shared Access and Dynamic Spectrum Access have been suggested, these authorisation schemes do not change the fundamental requirements for mobile systems to avoid causing interference to FSS earth stations, and do not change the impracticality for mobile systems to exist with exclusion areas around a large number of earth stations and with the possibility of new exclusion areas required with little notice.

3 Potential use of the band 5725-5925 MHz by mobile services

This band is allocated to the FSS (Earth-to-space) in the Radio Regulations and in the UK Frequency Allocation Table. In both the Radio Regulations and the UK Frequency Allocation Table, there is no allocation to the mobile service in the band 5725-5850 MHz but there is a primary allocation to the mobile service in the band 5850-5925 MHz.

The band 5725-5925 MHz is used for geostationary FSS uplinks, and so there is potential for interference from FSS earth stations to mobile systems and for interference from mobile systems to FSS satellites. As is described by Ofcom, this band is being considered as a potential extension band

for 5 GHz WiFi systems. ESOA is sceptical that additional WiFi spectrum is required while the current 5 GHz WiFi bands are largely unused².

Sharing studies for this band are at an early stage and hence it would be too premature to draw absolute conclusions of the feasibility of the use of this band by WiFi systems. If this band is indeed opened to WiFi systems or similar mobile systems, ESOA would be very concerned about potential interference to FSS satellites and potential constraints on FSS earth stations that might arise from the need to protect mobile systems from interference.

Regarding potential interference to FSS satellites, it should be noted that most FSS satellites operating in this band use “global” beams, which cover around one third of the Earth surface within the satellite footprint. Hence satellites would receive an aggregation of interference from potentially millions of mobile devices deployed in hundreds of countries throughout the world. While power and deployment restrictions (such as indoor use only) might be developed, it is not clear how such restrictions could be ensured in all countries. If a country fails to correctly apply and maintain the necessary restrictions on WiFi systems, that could result in a loss of satellite service to many other countries.

Also, if FSS earth stations operating in this band were required to protect ubiquitously deployed WiFi systems, that could lead to constraints on the deployment of earth stations.

4 Summary

ESOA is concerned about the potential impact of the deployment of new mobile systems in bands use by FSS systems. While new authorisation mechanisms such as DSA and LSA are suggested, these do not resolve or overcome fundamentally difficult sharing situations that exist in the bands 3400-3800 MHz and 5725-5925 MHz.

The current consultation document does not address frequency sharing issues in any particular band in detail. If Ofcom does plan to pursue the authorisation of mobile systems in the above mentioned bands, or in other bands used by satellite services, ESOA suggests that further consultation be undertaken.

² See, for example, information comparing 2.4 GHz and 5 GHz WiFi deployment in the UK in the report “Study on Impact of traffic off-loading and related technological trends on the demand for wireless broadband spectrum”; a study prepared for the European Commission DG Communications Networks, Content & Technology, carried out by Wik Consult and Aegis Systems Limited.