

25 March 2011

**SES Response to
Consultation published by the RTR
on future spectrum allocations and the liberalization of
the 900 MHz 1800 MHz and 3600-3800 MHz bands
(RTR Konsultation zu künftigen Frequenzvergaben und zur Liberalisierung
der Frequenzbereiche 900 MHz und 1800 MHz)**

INTRODUCTION

SES appreciates the opportunity to comment on the RTR consultation on the changes required following the new European legislation relating in particular to the regulator plans to make the 3600-3800 MHz band available for mobile services in the future.

SES wholly owns the market-leading satellite operators SES ASTRA and SES WORLD SKIES, and participations in Ciel in Canada, QuetzSat in Mexico as well as a strategic participation in satellite infrastructure start-up O3b Networks. SES provides outstanding satellite communications solutions via a global fleet of 44 satellites.

SES has particular concern over the allocations in the whole C Band 3400 - 3800 MHz band, as it is important that allocation of this band for satellite services remain (co-)primary for fixed satellite services (FSS) in ITU Region 1. Below we provide comments on the general use of the band in relation with the RTR proposals.

USE OF THE C-BAND FOR FSS

For over forty years the 3400 - 4200 MHz frequency bands (C band) have been used by the satellite sector for FSS. Today, there are approximately 160 geostationary satellites operating in this band providing essential services to consumers around the world. In particular, satellite service providers are using the C-band for global communications within Europe and also to interconnect Europe with other regions. (e.g., Africa, Middle East).

In addition, more satellites using the C-band are under construction. New C-band earth stations are being deployed all around the world on a regular basis, not to mention the countless number of ROES antennas used for TV reception that are distributed globally.

Governments, non-governmental organisations (NGOs), intergovernmental organisations (IGOs), businesses as well as individual consumers all depend on and benefit from the crucial services that are provided by FSS in the C-band.

However, the prospects of increased use of this spectrum for fixed and mobile terrestrial services such as WiMAX and the LTE limit the FSS business confidence to be able to use it, as it will likely cause harmful interference into satellite services using this band.

Today, satellite operators are constructing fourteen (14) new satellites that include C-Band payloads and that will serve Europe within the next 2-3 years, all including spectrum down to 3700 MHz or below.¹ Of these, the SES spacecraft include:

Satellite	Launch Date	Number of Transponders	Frequencies
SES-4	2011	52	3625-4200 MHz
SES 5	2011	28	3640-4200 MHz
SES-6	2013	43	<i>Still confidential</i>

The existing and planned use of the 3600-4200 MHz C-Band spectrum as well as the planned Galileo project demonstrate that C-Band will remain an important band for the satellite sector. Nevertheless, the EU has opened the band 3400-3800 MHz to fixed and mobile terrestrial Broadband Wireless Access (BWA) systems. This decision results in the need to protect satellite networks from resulting interference and the need to assure that critical coordination takes place.

INTERPRETATION OF EUROPEAN COMMISSION DECISION 2008/411/EC

The EC Decision on the harmonisation of the 3400 - 3800 MHz frequency band for terrestrial systems capable of providing electronic communications services² requires Member States to protect existing services. It further requires that implementation of the EC Decision not preclude the use of the band by other services. This means that Member States need to protect existing *and* future FSS services on a 'first come, first served basis'.

SES notes that Article 1 of the EC Decision states that the harmonisation will occur, 'without prejudice to the protection and continued operation of other existing use in this band'.³ Article 2 states that Member States shall designate and make available the 3400-3600 MHz and 3600-3800 MHz bands for terrestrial electronic communications networks but 'on a non-exclusive basis'.⁴

Furthermore, the EC Decision makes it clear that it does not seek to override the ITU Radio Regulations (ITU RR) or impede Member States from meeting their international obligations.

¹ These include Inmarsat Alphasat as well as Intelsat satellites which list (incl. those under construction) is available from: www.intelsat.com/network/satellite/

² EC Decision 2008/411/EC.

³ *Article 1:* This Decision aims at harmonising, without prejudice to the protection and continued operation of other existing use in this band, the conditions for the availability and efficient use of the 3 400-3 800 MHz band for terrestrial systems capable of providing electronic communications services.

⁴ *Article 2:* 1. No later than six months after entry into force of this Decision Member States shall designate and make available, on a non-exclusive basis, the 3 400-3 600 MHz band for terrestrial electronic communications networks, in compliance with the parameters set out in the Annex to this Decision. 2. By 1 January 2012 Member States shall designate and subsequently make available, on a non-exclusive basis, the 3 600-3 800 MHz band for terrestrial electronic communications networks, in compliance with the parameters set out in the Annex to this Decision.

The ITU RR are specifically referenced in the EC Decision, with Recital 7 noting the importance of allowing access to the spectrum of services allocated in the ITU RR to the 3400 - 3600 MHz and 3600 - 3800 MHz bands. Recital 7 states that:

“The fact that there are other existing applications within these bands ... does not preclude the future use of these bands by other systems and services to which these bands are allocated in accordance with the ITU Radio Regulations (designation on a non-exclusive basis). Appropriate sharing criteria for coexistence with other systems and services in the same and adjacent bands have been developed in ECC Report 100.

This report confirms, inter alia, that sharing with satellite services is often feasible considering the extent of their deployment in Europe, geographical separation requirements and case-by-case evaluation of actual terrain topography.”

This section requires that, within EU Member States, the 3400 - 3800 MHz band be available for services allocated in accordance with the ITU RR. FSS is allocated to this band in Region 1, and therefore, in all EU Member States.

INTERFERENCE ISSUES

Studies leading up to the World Radiocommunication Conference 2007 (WRC-07) provide evidence of the extreme difficulties that would be caused by allowing FSS and BWA services to share the same frequency band, notably when these include both fixed and mobile wireless access.⁵ This evidence led the WRC to reject a global allocation for IMT and to ensure that satellite services remained in the 3400 – 4200 MHz bands to continue critical satellite services.⁶

Under the agreement reached at WRC-07, new BWA entrants can operate in the 3400 - 3800 MHz frequency band if they mitigate any harmful interference they cause to existing services, such as FSS. Coordination criteria need to be strictly observed, ensuring that BWA deployments protect existing C-band installations. The ITU has concluded that in order to provide an FSS receive earth station with protection from interference in both long-term and short-term propagation conditions, a co-frequency IMT base station must maintain a minimum distance separation of at least several tens of kilometres and potentially hundreds of kilometres relative to the FSS receive earth station.

This lack of compatibility between BWA and FSS has been again re-confirmed by the recently published Report ITU-R S.2199 on the “Studies on compatibility of BWA systems and FSS networks in the 3400-4200 MHz band”. This report was approved jointly by ITU-R Study Groups 4 and 5. Any increased sharing in this band would have substantial disadvantages for satellite operations.

⁵ See ITU-R Report M.2109 plus ITU Recommendations ITU-R S.1432 and SF.1006. BWA is defined by the ITU as including Mobile Wireless Access (MWA), Nomadic Wireless Access (NWA), and Fixed Wireless Access (FWA). This seems to match with the Broadband Wireless Access Local Area (BWALA) defined by the UKE.

⁶ More details about the range of critical services which our industry provides, and the problems of satellite and terrestrial compatibility as sustained by ITU studies can be found from: www.fss-toolkit.com

Several cases of interference suffered by FSS have already been reported in various countries of the world due to WiMAX deployed in the 3400 – 3800 MHz band using the *fixed* allocation in the ITU RR. Evidence indicates a clear threat to the quality of service the FSS can provide to end-users in the band. We believe that action must be taken to ensure that where users of BWA (fixed or mobile) and users of FSS share the same frequency band, steps must be taken to mitigate harmful interference to FSS users.

Where and when new FSS earth stations are licensed in the future, protection would absolutely need to be assured vis-à-vis BWA systems or stations that would come afterwards.

OUT-OF-BAND INTERFERENCE

SES insists that BWA services deployed in the band 3400 – 3800 MHz may not just cause harmful interference to other services in the same band but also may affect (and can cause harmful interference to) services operating in the adjacent bands, specifically satellite services above 3800 MHz.

The impact of out-of-band interference into an FSS receive earth station was investigated by the ITU and it was found that the minimum required separation distances here are also up to tens of kilometres (with no guard band) which decrease as the guard band increases.⁷ The studies showed that with a sufficient guard-band, the minimum separation could be reduced. The risk for out-of-band interference can be mitigated using the same techniques as co-frequency interference.

Based on the ECC Report 100, there is a need to ensure adequate protection of FSS earth stations in enforcing appropriate mitigation areas (*i.e.*, protection zones around the stations). In the same vein, and as stated above, when new FSS earth stations are licensed in the future, subsequent BWA stations would also need to protect these facilities.

CONCLUSION

SES remains fundamentally unsatisfied by the opening of such a critical band to satellite communications as 3400-3800 MHz to fixed and mobile terrestrial systems in Europe. We would welcome any confirmation from RTR for careful analysis of how this may be affecting the C-band FSS operations.

In particular, SES would appreciate RTR' recognition that development in this spectrum must be addressed with full consideration to the abovementioned ITU & CEPT reports and studies, both within the band *and* in adjacent bands.

SES remains available to provide further comment or to respond to any questions if required by RTR.

⁷ See ITU-R Report M.2109.

Responses to Specific Questions of the Consultation

Question 4.22.: Do you intend to acquire frequencies in the 3600 – 3800 MHz band? If not, why not? If yes, when would you plan to start using the frequencies?

Our existing customers operating earth stations in Austria do use the 3600-3800 MHz band. ROES are also deployed using this band. SES does operate several satellites with this spectrum band and has invested in future satellite capacity comprising this spectrum.

Question 4.23.: In your view, which services/applications would be especially well supported by the 3600 – 3800 MHz band? What general conditions would be important for the use of this frequency band? What technologies will be deployed / would you deploy? Are there any differences in usage possibilities compared to the 3400 – 3600 MHz frequency band? If yes, how do the bands differ?

C Band is particularly suited to long distance communications by Fixed Satellite Services, whether across Europe or between Europe and the rest of the world. FSS provided in this frequency band do need appropriate protection against interference from mobile terrestrial systems using the same frequencies. The usage possibilities and related constraints are exactly the same as in 3400-3600 MHz.

Question 4.24.: Please give an estimate of your frequency requirements / a network operator's frequency requirements in the 3600 – 3800 MHz band. What minimum block size would be appropriate in your opinion?

FSS typically operate across all carriers of the entire 3400-4200 MHz band.

Question 4.25.: Would you prefer to use the 3600 – 3800 MHz frequency band for TDD or FDD?

N/A

Question 4.26.: How much interest in these frequencies would you expect to see?

Any interest for the usage of these frequencies by mobile terrestrial systems need to take account of existing and future FSS usage.

Question 4.27.: How should the usage areas be defined? In small areas, by federal province, or throughout Austria? Or would you prefer a different usage area (e.g., by base station)? How should different usage areas be delimited?

The most appropriate type of usage areas seems to be by base station, depending whether FSS earth stations are operated in the vicinity of the site chosen for the base station. The usage areas should be delimited based on the exclusion zones defined in the ITU and CEPT appropriate reports and studies.