ESOA Responses to RSPG's Consultation on "*Strategic Roadmap towards 5G for Europe: Opinion on spectrum related aspects for next generation wireless systems (5G)*"

15 July 2016

Introduction

ESOA welcomes the opportunity to respond to the European Commission's RSPG consultation on "Strategic Roadmap towards 5G for Europe: Opinion on spectrum related aspects for next generation wireless systems (5G)", published on 8 June 2016.

The position of ESOA represents the view of EMEA satellite operators. This consultation is crucial for the satellite industry for two reasons:

- 5G will integrate satellite components, and cross-sectorial standardisation activities are foreseen to consider different networks from cellular to satellite in order to ensure both ubiquity and resilience of the 5G eco-system overall.
- Some spectrum bands allocated at the WRC-15 conference for studies above 24 GHz[1] (Ka / Q / V bands) are already currently used, or on the verge of being used, for FSS satellite services where significant investments were made. On the other hand, ESOA agrees with the RSPG's opinion for prioritising the bands above 24 GHz and to remain within the scope of the ITU Resolution. We believe that 31.8-33.4 GHz is one of the pioneer win-to-win solutions where international harmonisation is possible as proposed by all three ITU Regions for 5G deployment.

About ESOA

ESOA (EMEA Satellite Operators Association) is a non-profit organisation established with the objective of serving and promoting the common interests of satellite operators from Europe, the Middle East, Africa and CIS. The Association today represents the interests of 21 satellite operators who deliver information communication services across the globe.

Together ESOA Members provide invaluable communication services to the whole world including television broadcast and distribution, broadband connectivity, emergency communication, live broadcasting, maritime and aero communication, secure services for governments, 24-7 monitoring of industrial processes such as energy plants and a whole range of other communications capabilities that society has come to rely on.

[1] *The carrier frequencies noted here are for evaluation purpose only, satellites are deployed in wide range of frequency bands including (27.0-31.0 GHz) and Q/V bands (37.5-43.5, 47.2-50.2 GHz and 50.4-51.4 GHz) and more.*

ESOA's Response

Availability of spectrum is a key element for the success of 5G services to be provided to all European citizens in a timely manner. In that respect, RSPG has explored 7 distinct avenues. ESOA comments on each item are provided below.

1- **RSPG Opinion**: The RSPG considers the 3400-3800 MHz band to be primary band suitable for the introduction of 5G use in Europe even before 2020, nothing that this band is already harmonised for mobile networks, and consists of up to 400 MHz of continuous spectrum, enabling wide channel bandwidth. This band has the possibility to put Europe at the forefront of the 5G deployment.

ESOA comment: *ESOA expects that FSS using C-band will continue to respond to connectivity needs especially as regards IoT, M2M, communication on the move, mobile backhaul, broadcasting, and media & entertainment. Opening this band to very-high powered and ubiquitous 5G systems will place existing users including the FSS at high risk of interference.*

The impact of IMT on existing satellite services has been largely documented, including with LTE small cells.[2]

At WRC-15, the band 3600-3700 MHz was not identified for IMT except for a few number of countries in Region 2 (4 countries). Concerning the upper part of this band (3700-3800 MHz), WRC-15 did not identify it for IMT for all 3 Regions.

The whole band 3400-3800 MHz, although not identified for IMT in Region 1 for EU countries, is subject to an EC Decision 2008/411/EC.

Article 1 of this Decision states that the spectrum harmonization occurs 'without prejudice to the protection and continued operation of other existing use in this band'.[3] *Article 2 of the Decision 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] *.*

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[2] *See notably International Telecommunication Union, Radiocommunication Sector, "Sharing studies between International Mobile Telecommunication-Advanced systems and geostationary satellite networks in the fixed-satellite service in the 3 400-4 200 MHz and 4 500-4 800 MHz frequency bands in the WRC study cycle leading to WRC-15," Report ITU-R S.2368-0 (June 2015).*

[3] *Article 1: This Decision aims at harmonizing, 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 introduction of IMT will very likely cause harmful interference for FSS in some EU countries. Consequently, these countries will have to significantly constrain the deployment of IMT systems (e.g. with large exclusion areas) or be forced to cease FSS services in the band 3400-3800 MHz.

2- **RSPG Opinion**: The RSPG is of opinion that 5G will need to be deployed also in bands already harmonised below 1 GHz, including particularly the 700 MHz band, in order to enable nationwide and indoor 5G coverage.

ESOA comment: *ESOA agrees with RSPG's opinion on 700 MHz band (694-790 MHz) that was identified for MBB usage in EMEA under Agenda Item 1.2 at WRC-15 (some conditions in line with the European Regulations). ESOA agrees with RSPG's opinion for 5G deployments in bands below 1 GHz (sometimes referred to as "coverage bands").*

The well-known technical characteristics of this band make it very attractive for 5G coverage and the development of IoT. In addition, since this spectrum is partially harmonised with the APT700 band plan, it brings significant advantage in terms of reduction of development cost as well as improvements in economics of scale.

3- **RSPG Opinion**: The RSPG considers that there will be a need to ensure that technical and regulatory conditions for all bands already harmonised for mobile networks are fit for 5G use.

ESOA comment: *ESOA agrees that this is needed in all bands under consideration for 5G deployment. ESOA also agrees with the need for clarification of both technical and regulatory conditions and also proposes to take necessary measures, either to facilitate 5G deployments, or to ensure protection of incumbent users (e.g. FSS in the 3400-3800 MHz band).*

4- **RSPG Opinion**: The RSPG stresses that there are many bands above 24 GHz which are of potential interest for 5G in Europe.

- To give sufficient guidance to industry, the RSPG will aim to identify at the earliest opportunity, a suitable band to be made available in Europe. In order to do this, RSPG members will prioritize the necessary work to assess what would be involved in enabling access to each candidate band in their country.

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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.

- In this regard, the RSPG believes that global harmonisation will be essential for developing 5G.
- The RSPG will define the timeline for availability of other bands taking into account sharing and transition challenges, for example for mobile access and fixed services (including backhauling).

ESOA comment: *ESOA agrees that early availability of 5G spectrum will facilitate 5G deployment (e.g. in the US, the FCC via its rule making process intends to make available spectrum nationally to be used for 5G). However, as Europe has demonstrated it is a leader in 5G in its own right (with trials including major verticals such as automotive industry, media & entertainment and health care applications), already being developed. Therefore, an early availability of a globally harmonised spectrum is a key issue for the transition of 5G deployment.*

ESOA agrees with this RSPG proposal provided that consideration is given to the potential for sharing with other existing and planned services. ESOA strongly supports the desire for global harmonisation of spectrum for 5G and hence work of the ITU-R in connections with WRC-19 agenda item 1.13 will be a key driver for the potential identification of bands for 5G above 24 GHz.

In line with the above view, ESOA agrees with the initiatives of the ECC/PT1 questionnaire[5] on current usage of the bands above 24 GHz, the purpose of which is to gather the views of CEPT administrations and industry on the frequency bands under study for WRC-19 agenda item 1.13 on IMT.

ESOA will also reply to this questionnaire taking into account the existing usage in some of those bands. ESOA will furthermore highlight during its response the importance of a sustainable and continued access due to the increasing use of Ka-band for broadband applications alongside existing and future Q/V band applications.

Taking all these considerations into account, ESOA agrees with RSPG that a timeline should be defined for the availability of other bands (taking into account sharing and transition challenges, for example for mobile access and fixed services including backhauling).

5- **RSPG Opinion**: The RSPG believes that considerations of bands above 6 GHz for 5G shall be limited to the bands listed by WRC-15, in order to strengthen the global harmonisation opportunities. This work should focus on the frequency bands proposed by Europe, in particular the bands 24.5-27.5 GHz, 31.8-33.4 GHz and 40.5-43.5 GHz. The RSPG intends to identify which one of these could be harmonised in Europe for early implementation.

ESOA comment: *ESOA agrees with this opinion expressed by RSPG. All the bands identified at WRC-15 for studies should be respected for international harmonisation. Prior to conference CEPT identified various bands and most of the bands were retained at WRC-15 for future studies. The band 31.8-33.4 GHz, was proposed by all the ITU Regions to the conference and showed the strongest support.*

[5] *http://www.cept.org/cept/start-page/questionnaire/?sqid=p63a6yg6hnt6edk3ftpr*

Furthermore, the 31.8-33.4 GHz band offers the widest bandwidth on a globally harmonised level, suitable for offering attractive 5G services while having the least impact on other services. A focus on frequencies above 31GHz will thus aid and accelerate the collaborative and interoperability efforts between different technologies, capabilities and industries, and significantly reduce the risk of protracted spectrum discussions.

The interest shown to the 31.8 – 33.4 GHz band is due to a number of advantages as an initial trial band, including:

- *It received support from all regions at WRC-15;*
- *It is lightly used globally and therefore it has a higher chance than any other band to become a global harmonised band for mm-Wave;*
- *There is potential for early availability of this frequency band;*
- *With little use by incumbent services, the in-band co-existence studies are likely to be relatively straight forward and deployment of 5G systems would not be significantly constrained by sharing requirements.;*
- *Up to 1.6 GHz of spectrum is available.*

Therefore, ESOA is of the opinion that the band 31.8-33.4 GHz should be treated as priority band with respect to others on the list of studies that facilitate global harmonisation.

6- **RSPG Opinion**: The RSPG will keep under review whether there is any requirement for European harmonisation measures in bands above 24 GHz before WRC-19.

ESOA comment: *ESOA agrees with this approach and RSPG should keep under review any requirement needed for European harmonisation measures in bands above 24 GHz before WRC-19. See answers given above.*

7- **RSPG Opinion**: The RSPG will prepare a supplementary opinion elaborating on the implementation of this opinion taking also into account the wider RSPG work programme, in particular the working groups on IoT and ITS.

ESOA comment: *ESOA welcomes the RSPG view for the preparation of a supplementary opinion on those highly important topics since both IoT and ITS (one of the important vertical sectors) has been receiving a lot of attention for 5G deployment. In addition, the ongoing EU 5G Action plan considered 4 important vertical sectors (one of them is ITS).*

It should be noted that the IoT is likely to be a significant driver of growth in satellite spectrum use. The IoT is a very wide field with many facets - in certain cases, satellites are the ideal mode of communication, in particular in locations not easily served by terrestrial networks. One clear example is the connected car where providing software updates to millions of cars around the globe can only be efficiently achieved via satellite. It may be noted that that satellite systems already provide the IoT with M2M services notably for SCADA applications e.g. oil & gas; electricity generation & distribution; or petrol stations and ATMs outside urban areas. As technology develops further, ESOA sees the IoT as a key driver to increased spectrum use by satellites, also in the areas of military, transportation (e.g. dispatch, fuel, emergency, geo-positioning) & cargo (freight by all transport means).