

14 June 2016

**ESOA comments on  
ANACOM's  
Public consultation on the  
Strategic Spectrum Plan (Plano Estratégico do Espectro)**

**INTRODUCTION**

EMEA Satellite Operators Association<sup>1</sup> (“ESOA”) would like to thank the the Autoridade Nacional de Comunicações (“ANACOM”) for the opportunity to comment on their proposed “Strategic Spectrum Plan (Plano Estratégico do Espectro)” (the “Consultation”). In particular, ESOA congratulates ANACOM on its strategic vision in recognizing the essential role of satellite communications to Portugal and the world.

ESOA is a non-profit organisation established with the objective of serving and promoting the common interests of EMEA satellite operators. The Association is the reference point for the European, Middle Eastern, and African satellite industry and today represents the interests of 34 members, including satellite operators who deliver information communication services across the globe as well as EMEA space industry stakeholders and insurance brokers.

ESOA is generally very pleased that the satellite sector is treated in ANACOM's consultation document with much consideration. We understand that this is a wide-ranging consultation which aims to establish the overall strategic vision of ANACOM related to radio spectrum, and in particular the availability of frequencies for various services. Each section ends with “Strategic Actions” to be recommended, rather than specific questions on which we can comment. Thus, ESOA provides these comments on the various sections of this Consultation.

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<sup>1</sup> The activities and other details about ESOA can be found at [www.esoa.net](http://www.esoa.net)

### **In response to Section 3(1) Mobile Services:**

Regarding 5G, ESOA welcomes the consideration of other technologies (such as satellite) within the 5G ecosystem and the importance of properly evaluating the IMT 5G spectrum needs. Regarding future requirements for IMT-2020 or 5G, it may be expected that high bandwidth terrestrial applications will drive increased demand for high bandwidth satellite communications; for example, for provision of backhaul to areas beyond the coverage of terrestrial networks such as remote areas and mobile platforms (cars, trains, ships, and aircrafts.)

ESOA would like to highlight its concern with the potential use of the frequency range of 27.5 - 29.5 GHz for high density IMT services (e.g. 5G). First, we note that this band is not included in the list of 11 frequency bands identified by the WRC-15 to be studied for 5G systems. All industry sectors, including satellite, expect that 5G systems will operate based on specifications that are global rather than piecemeal. ESOA is only aware of two or three non-European countries exploring options in the 28 GHz band, one of which (the United States) is for purely domestic reasons.

This ITU decision, fully supported by the CEPT, has resulted from the analysis that services such as 5G would not fit into any existing frequency sharing models and thus are not compatible with the existing intensive use of spectrum between 6 GHz and 31 GHz by satellite services and probably by most other services. ESOA is not aware of a prior case where high density mobile service (2G, 3G, 4G) involving ubiquitous deployment of mobile terminals and base stations has ever successfully shared spectrum in the medium-to-long term on a sustainable basis with satellite services where satellite earth stations have been ubiquitously deployed.<sup>2</sup>

If 5G mobile services are successful, it is inevitable that they will be widely deployed geographically, either to meet commercial demands, or to meet government led requirements for near-universal coverage. It can thus be seen that IMT systems (and hence 5G), which are by nature high-density, cannot share with other services. This explains why mobile operators generally require exclusive licenses for the national deployment of their IMT services in order to protect their long-term investments and the services of their customers. This is fundamentally different from the “Fixed Service” case, where case-by-case coordination between Fixed Service (“FS”) and Fixed Satellite Service (“FSS”) allows efficient sharing using well-established procedures.<sup>3</sup>

Furthermore, the Mobile/IMT/5G community is generally seeking access to a contiguous block of user bandwidth between high hundreds of MHz up to multiple GHz in order to provide a fundamentally new and innovative user experience, and the ability to accommodate multiple network and service providers to provide enhanced mobile broadband services. A preliminary band assessment performed by the EU funded METIS study<sup>4</sup> identified no real opportunities for accommodation of IMT/5G below 31 GHz. This EU funded study did, however, identify various frequency bands above 31 GHz as ‘high priority’ candidates for the future accommodation of 5G

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<sup>2</sup> See the draft new Report ITU-R [FSS-IMT C-BAND DOWNLINK] - *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.*

<sup>3</sup> See ECC/DEC(05)01.

<sup>4</sup> METIS\_D5.3\_v1, Section 2.5 (Document Number: ICT-317669-METIS/D5.3, dated 29 August 2014).

terrestrial service which are envisaged by their proponents to require wide contiguous segment of frequencies (typically between >500 MHz to 1 GHz).

Regarding the possible opening of new lower frequency bands for terrestrial mobile broadband networks, we wish to remind ANACOM of the need to ensure that satellite services are adequately protected from interference. This issue was already addressed in the ESOA contribution to the ANACOM consultation of last year, *Consulta sobre disponibilização de espectro na faixa de frequências dos 3,4-3,8 GHz*. In this sense, ESOA would like to remind ANACOM that mobile deployment will require licence conditions to ensure that interference is not caused to FSS earth stations operating along Portugal's border in the 3400 - 3800 MHz band, or to earth stations operating in the 3800 - 4200 MHz band in Portugal, since FSS earth stations may be vulnerable to interference from the adjacent band operations of terrestrial mobile broadband networks. If the L-band spectrum at 1492 - 1518 MHz is to be considered for mobile broadband use in Portugal, it is important to ensure that interference will not be caused to Mobile Satellite Services ("MSS") systems operating in the adjacent band 1518-1559 MHz in Portugal. The CEPT and the ITU-R are currently conducting studies to determine the technical conditions to ensure compatibility between IMT below 1518 MHz and MSS above 1518 MHz.

#### **In response to Section 3(4) Satellite Services:**

ESOA commends ANACOM for its recognition of the value of satellite services to Portugal and the significant growth of the sector in Europe in the past years. ESOA also concurs with ANACOM that innovation in the form of new satellite systems and applications will take place over the coming years.

In relation to Broadcasting Satellite Service ("BSS") and MSS services, ESOA respectfully notes that there are, in fact, both BSS and MSS earth stations and infrastructure already operational in Portugal, despite a comment in the Consultation to the contrary.<sup>5</sup> We highlight that L-band (1.5/1.6 GHz) MSS services, such as those provided by Inmarsat, are very heavily used within Portugal and by Portuguese ships and aircraft around the world. Demand for these MSS services is likely to increase to support high growth applications such as IoT/M2M, broadband connectivity, and governmental uses (military and PPDR – "public protection and disaster relief"). Regarding S-band MSS systems (operating around 2 GHz), systems to operate in these bands are currently under construction, including a complementary ground component, and are planned to be operational within Portugal and other European countries in the very near future.

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<sup>5</sup> "Para o MSS, não há até ao momento nenhuma estação terrena nem nenhuma estação CGC instalada em território nacional. A mesma situação ocorre em termos de infraestruturas para o BSS." Consultation at page 29.

## C-band Remains Essential Spectrum to Satellite

For more than 40 years, the satellite sector has used the whole 3400 - 4200 MHz frequency band (C-band) for FSS. Today, there are approximately 170 geostationary satellites operating in the C-band providing essential services to a multitude of consumers around the world.

New C-band earth stations are being deployed on a regular basis, as are a countless number of Receive Only Earth Station (“ROES”) antennas used for TV reception, which are distributed globally. Governments, non-governmental organisations (“NGOs”), intergovernmental organisations (“IGOs”), businesses, and individual consumers everywhere in the world all depend on and benefit from the crucial services that are provided by FSS in the C-band.

The prospects of increased use of part of this spectrum for fixed and mobile terrestrial services such as WiMAX and the LTE depresses FSS business confidence to be able to use the C-band, as it would be likely to cause harmful interference into satellite services using this band and constrain the deployment of new FSS earth stations. However, the existing and planned uses of the 3400 - 4200 MHz band demonstrate that C-band will remain very important spectrum for the satellite sector.

At present, approximately 55 C-band satellites – both traditional wide-beam and high throughput satellites (“HTS”) – have coverage over Europe, and satellite operators are in the process of launching additional satellites to serve Europe within the next 15 to 20 years.

C-band frequencies have started to be used for the Galileo project.<sup>6</sup> And several United Nations emergency communications systems are relying on this same C-band spectrum, such as UNHCR or emergency.lu.<sup>7</sup>

It should also be noted that ROES (e.g. for the direct-to-home reception of TV signals from outside Europe) may also operate in the whole band 3400 - 4200 MHz on an unlicensed basis, in accordance with CEPT Decision ERC/DEC/(99)26 on *Exemption from Individual Licensing of Receive Only Earth Stations (ROES)*.<sup>8</sup> The locations of such earth stations are unknown, so it is not feasible to define coordination contours.

Nevertheless, some countries in Europe have opened the band 3400 - 3800 MHz to fixed and mobile terrestrial Broadband Wireless Access (“BWA”) systems. This has led to the need to protect satellite networks from the resulting interference and to assure that critical coordination takes place.

## Ka-band is Critical Spectrum to Satellite

The demand for spectrum never abates, and over the years satellite systems have innovatively responded to this increasing demand by developing ever-more efficient and powerful space and ground segments. Importantly, satellite operators have substantial investments (which are primed to continue growing) in satellites that will use the bands 17.3 - 20.2 GHz (Space to earth) and 27.5-30 GHz (Earth to space). Some of the biggest trends in satellite investment and system deployments worldwide is the use of Ka-band for HTS systems to support the operation of mass-market Ka-band VSATs / SITs; Ka-band Gateway Earth Stations (“GES”); and remote broadband connectivity such

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<sup>6</sup> <http://www.ses.com/4233325/news/2013/14353300>

<sup>7</sup> <http://www.ses.com/10263167/emergency-lu>

<sup>8</sup> As implemented by 30 countries in the CEPT.

as to ships and aircraft (known as “Earth Stations In Motion” (ESIMs) at the ITU, and “Earth Stations on Mobile Platforms (“ESOMPs”) in Europe).

ESOA members already operate more than 20 existing satellites and have several further planned satellites to cover Europe with Ka-band. Operators such as Hispasat, SES, Eutelsat, Turksat, Avanti, and Inmarsat have existing and planned geostationary orbit (“GSO”) satellites that operate in this spectrum over Europe. Global GEO and non-GSO satellite constellations such as O3b (‘Other 3 billion’) also deliver satellite Internet services and mobile backhaul services to customers worldwide using this Ka-band spectrum. In addition, Ka-band is increasingly being used in Europe to support mobile satellite service feeder links. Today, Iridium operates MSS feeder links in the Ka-band; EchoStar Mobile Limited and Inmarsat will launch their next-generation 2 GHz MSS satellites in 2016, both of which will both utilize Ka-band feeder links. These systems together represent investment of several billion Euros.<sup>9</sup>

As an example of FSS Ka-band usage in Portugal, ESOA kindly calls to the attention of ANACOM that the 27.5-29.5 GHz band is in use by the O3b gateway earth station in Sintra.<sup>10</sup>

ESOA wishes to highlight that Ka-band is used for many of the same applications as Ku-band, with a particular emphasis on broadband end-users services. It is anticipated that, in addition to Ku-band, Ka-band satellite communications will be used as a basis for broadband access technologies extensively used in Europe to provide communications services to governments, businesses and consumers. Ka-band satellites are being used for such services as:

- i. Digital radio and television, in Standard and High Definition (SD & HD), via satellite, through direct or collective reception to millions of households;
- ii. High-speed broadband (*i.e.*, 2-way) internet and triple-play services (*i.e.*, telephone, television and Internet) to all regardless of location or terrestrial infrastructure;
- iii. Feeder links to cable and television (making satellite an essential component to bring audiovisual content to all);
- iv. Ka-band satellite services to backhaul 2G/3G/4G mobile services;
- v. Satellite news gathering and occasional use by broadcasters (*e.g.* live news event and sports coverage) and governments;
- vi. Contribution and distribution links used by broadcasters for integration of news, sports and entertainment of finished programs;
- vii. One-way transfer of data to a large and widely dispersed community of recipients (*i.e.*, point-to-multipoint distribution);
- viii. Two-way IP platforms for reliable, cost-effective capabilities for a wide range of data, audio and video applications, including maritime and aeronautical applications;
- ix. Connection of primary and secondary networks as well as Internet backbone connectivity for businesses and other private networks; and

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<sup>9</sup> Increasingly, VSAT manufacturers (Gilat, Hughes, Viasat, iDirect, for example) have started to manufacture and roll out Modems that operate in the 27.5-29.5 GHz Ka-band frequencies and the uptake of such services will undoubtedly continue growing across Europe and globally.

<sup>10</sup> Footnote 33 of the ANACOM consultation, which states that the frequency band 27.5-29.5 GHz is currently without use, is therefore incorrect.

- x. Telecommunications services to aircraft, ships, trains and other vehicles.

Demand for these services is growing quickly and satellite operators are depending upon the continued availability of the Ka-band to assure that satellite operators are able to effectively meet customer needs in a timely manner. This goal only remains a reality if there is sufficient sustainable spectrum available to support such satellite services now and in the future.

Much of the growing demand for high-speed Internet services, HDTV, and 3-D television will be satisfied using Ka-band satellite services. The same is true for evolved maritime and aeronautical services as well as satellite services in the context of border control and disaster relief. Fortunately, the Ka-band allows for efficient spectrum use through cutting-edge frequency re-use schemes. The Ka-band's higher frequencies are also more suitable for the use of smaller earth stations. This enables widespread deployment of the smaller and more affordable consumer satellite terminals.

Regulatory certainty in access to satellite spectrum in Ka-band is essential for ensuring that European operators continue to make the investments required to meet user demands for high-throughput satellite services and ensure the continued viable access to the Ka-band frequency for current and future satellite services. Satellite operators and service providers are already implementing and actively providing services in the Ka-band. Ka-band spectrum is essential to enable satellite operators to ensure that consumers, businesses and governments will continue to receive and expand the critical services that are currently provided in and planned for this band.

### **Q/V Bands**

We also agree with ANACOM that the Q/V band (40/50 GHz) is growing in importance. These are the most exciting bands for growth in satellite services, and will be critical for satellite broadband. The satellite industry is making substantial investment in the development of several new systems (both GSO and non-GSO) that intend to make use of these bands. For example, ESA's Alphasat is in service today and is testing a Q/V band payload expressly to explore these new frequencies for future telecom applications.<sup>11</sup> Eutelsat is currently using an experimental Q/V-band payload on the brand-new SSL-built EUTELSAT 65W satellite.<sup>12</sup> We expect to see significant use of Q/V band for satellite services in the future, and protection from harmful interference to satellite earth stations and preserving co-primary status for FSS is critical to enabling the future of broadband.

All these development in Q/V bands necessitate bringing the Portuguese National Table of Frequency Allocations in line with CEPT Rules and Regulations and with Article 5 of the ITU Radio Regulations. Currently, the NTFA omits the FSS allocations in the 37.5-51.4 GHz range.

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<sup>11</sup>[http://www.esa.int/Our\\_Activities/Telecommunications\\_Integrated\\_Applications/Alphasat/Aldo\\_Paraboni\\_Q\\_V\\_Band\\_Payload](http://www.esa.int/Our_Activities/Telecommunications_Integrated_Applications/Alphasat/Aldo_Paraboni_Q_V_Band_Payload)

<sup>12</sup><http://news.eutelsat.com/pressreleases/eutelsat-and-space-systems-loral-test-potential-of-extremely-high-frequencies-ehf-on-eutelsat-65-west-a-as-a-blueprint-for-future-broadband-systems-1389857>

## **In response to the Annex on Spectrum Management:**

ESOA is pleased to see reference to the ITU work on ESIMs, and we respectfully request ANACOM to adopt both ECC Dec. (13)01, *The harmonised use, free circulation and exemption from individual licensing of Earth Stations On Mobile Platforms (ESOMPs) within the frequency bands 17.3 - 20.2 GHz and 27.5 - 30 GHz* (adoption of which we understand is scheduled for 2016 in Portugal), and ECC Dec. (15)04, *The harmonised use, free circulation and exemption from individual licensing of Land and Maritime Earth Stations On Mobile Platforms (ESOMPs) operating with NGSO FSS satellite systems in the frequency ranges 17.3 - 20.2 GHz, 27.5 - 29.1 GHz and 29.5 - 30.0 GHz*.

### **CEPT Decision(s)**

As a reminder, ECC/DEC(05)01 provides that *coordinated* FSS earth stations can be deployed *anywhere* in the 27.5 - 29.5 GHz band.

Even if this CEPT decision gives priority to the FS in certain frequency ranges of the 27.5 - 29.5 GHz band, its intention is not to exclude satellite services from any of those frequency ranges. This spectrum is often used for FSS gateways or feeder-links which require significant amounts of contiguous spectrum in the order of 1 GHz or more, subject to coordination with other users of sub-bands between 27.5 and 29.5 GHz. It is therefore essential for the satellite community to be able to obtain licenses in the full 27.5 - 29.5 GHz frequency range, on a coordinated basis. It is also important to note that such gateway earth stations are very limited in number, typically one or two per country. As a result, their impact on the deployment of terrestrial services is very limited.<sup>13</sup>

ESOA is eager to make sure this interpretation of the CEPT decision ECC/DEC(05)01 is well shared by all CEPT countries and notes that Portugal adopted this Decision by determination of 25 March 2009 in its National Table of Frequency Allocations.

Following the adoption of the Ka-Band report on *The Use of the Frequency Bands 27.5 - 30.0 GHz and 17.3 - 20.2 GHz by Satellite Networks*,<sup>14</sup> the CEPT has studied the possibility of using the 27.5 - 29.5 GHz spectrum for ubiquitous FSS terminals using satellite space-to-Earth communications to ensure further deployment of FSS services in this band.

ESOA is therefore keen that ANACOM as well as all other European national regulators carefully consider this ongoing harmonization effort when licensing any terrestrial wireless operators in the 27.5 - 29.5 GHz band, to avoid making decisions which might run contrary to the harmonisation measures which were developed.

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<sup>13</sup> With regard to the bands 27.8285-28.4445 GHz and 28.9485-29.4525 GHz identified for the (terrestrial) Fixed Service (FS), the CEPT Decision (see decides 5) only states "*that CEPT administrations shall not authorise the deployment of uncoordinated FSS earth stations in the bands mentioned in Decides 3*". The CEPT Decision does not in any way state that the bands 27.8285-28.4445 GHz and 28.9485-29.4525 GHz are exclusively available for use only to the FS. Furthermore the entire frequency band 27.5 – 29.5 GHz is allocated on a co-primary basis in the ITU Radio Regulations Article 5 in ITU Region 1 to the Fixed Satellite Service (FSS) in the earth-to-space direction.

<sup>14</sup> ECC Report 152 of September 2010.

## **CONCLUSION**

ESOA supports ANACOM's strategic plan, which has recognised the importance of satellite communications and the substantial investment that satellite operators have made in systems (geostationary orbit ("GEO"), medium-Earth-orbit ("MEO") and low-Earth-orbit ("LEO")) that currently support the operation of mass-market MESs, VSATs, SITs, ESIMs and other earth stations in Portugal. We highlight in particular the need to protect these existing satellite services in Portugal and elsewhere from the risk of harmful interference. We also support ANACOM's proposal to establish the regulatory framework and appropriate technical conditions to ensure the continued viable and sustainable access to use the higher frequency bands, namely the Ka band (20/30 GHz) bands and the Q/V (40/50 GHz). Finally, we urge ANACOM to add the FSS allocations in the 37.5-51.4 GHz range the Portuguese National Table of Frequency Allocations to come in line with CEPT Rules and Regulations and with Article 5 of the ITU Radio Regulations. ESOA and its members remain at your disposal for any further information you may require from us.

Sincerely,



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