

STRATEGIC SPECTRUM ROADMAP TOWARDS 5G FOR EUROPE
Draft RSPG Second Opinion on 5G networks
5 January 2017

As a leading global satellite operator with its headquarters located in Luxembourg, Europe, SES is pleased to submit this response to the RSPG for its consultation on the draft second opinion on 5G networks. SES fully supports the submissions made by ESOA on previous RSPG consultations. SES would add a few points of emphasis.

SES firmly believes that satellites will play an important role in the future 5G mobile ecosystem, as continuously emphasised through its active participation to the 5G Infrastructure Association in the 5G-PPP put in place by the EU Commission.

The latest and next-generation High Throughput Satellite (“HTS”) and Very High Throughput Satellite (“VHTS”) systems – operating in a variety of frequency bands – can and will deliver the multi-gigabit speeds needed for Enhanced Mobile Broadband (“eMBB”). Satellites already support Internet-of-Things (IoT) networks today (e.g. global asset tracking on ships and planes), 4G backhaul, and can scale to support future Massive Machine Type Communications (“mMTC”). Satellites can also support ultra-reliable and low-latency communications, especially as more non-geostationary constellations, as well as geostationary HTS and VHTS constellations come on line. In fact, for 5G terrestrial mobile networks to deliver applications that require the lowest latency (sub-1ms), it will be essential for commonly accessed content to be efficiently delivered to and stored at multiple cellular nodes for quick delivery – a point-to-multipoint or broadcast function at which satellites excel.

Based on extensive consultation of the industry, the RSPG has identified number of frequency bands for future 5G mobile use, some of which are used on current and future SES satellites and others are adjacent to the frequencies used by SES. In the mmWave spectrum, globally, SES operates two (2) geostationary satellites in portions of the 26 GHz band, nine (9) geostationary satellites in portions of the 27.5-29.5 GHz band, and a constellation of twelve (12) O3b satellites in Medium Earth orbit (“MEO”) in the whole 27.5-29.5 GHz band. In addition, SES has three (3) geostationary HTS systems under construction as well as another eight (8) O3b MEO satellites in 2018-19 – all using the 27.5-29.5 GHz band and offering the kinds of services, latency and capacity that will be part of the 5G ecosystem.

Therefore, the spectrum decisions under consideration for future 5G mobile networks should not, and need not to, be mutually exclusive of satellite services. The RSPG itself is highlighting “the role of satellite in achieving ubiquitous connectivity” (para 2 of the Opinion).

SES commends the RSPG for its recognition of the need “to maintain the possibility for continued development of incumbent satellite services (FSS and EESS/SRS)” in the 26 GHz pioneer band (para 9). In leaving Member States “fully responsible for granting or rejecting authorisation to a new satellite earth station application,” SES hopes the national administrations will encourage this development in Europe.

SES understands the RSPG's inclination to favour simplified licensing regimes notably under a general authorization scheme that facilitates the deployment of 5G services. Although this approach may be workable in bands that are not occupied such as the 66-71 GHz band, it is critical to guarantee proper operational conditions for the right coexistence between future terrestrial 5G systems and existing services that will share the same frequencies, such as in the 3.6 GHz or 26 GHz bands.

SES also welcomes the RSPG considerations to ensure appropriate sharing of 5G services with other co-primary services at 3.6 GHz. In particular, we note that "European Administrations should ensure the proper balance between the benefits of allowing 5G use and keeping access to satellite operators in this frequency band" (para A2.1.4 in Annex), which seems to unambiguously confirm that the 3400-3800 MHz band should remain accessible to satellites services on a continuous basis, in line with the EC Decision 2008/411/EC of 21 May 2008 (as amended by Decision 2014/276/EU Decision).¹

In the same vein, the RSPG indicates that for sharing with satellite earth stations at 26 GHz, "administrations are encouraged to maintain the possibility for additional earth stations to be deployed in their territory," also to be able "to respond to future requirements for which no current plans exist (including potentially from new stakeholders)" (para A2.1.4 in Annex). To this end, it is very likely that adequate provisions will be needed in the authorisation provisions.²

An appropriate licensing regime is all the more necessary to avoid risk of interference to services operating in the adjacent bands, notably above the frequencies under consideration. This is of potential concern in particular for satellite services operating in the 3.8-4.2 GHz band or above 27.5 GHz.

For instance, the impact of out-of-band interference into a satellite earth station operating above 3.8 GHz was investigated at length by the ITU and the CEPT, and it was found that the minimum required separation distances from mobile terrestrial systems are up to tens of kilometres (with no guard band), which decrease as the guard band increases.³ The risk for out-of-band interference can be mitigated

¹ Article 2 tells : "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." Recital 7 tells: "The designation and making available of the 3 400-3 800 MHz band in accordance with the results of the Mandate on BWA recognises the fact that there are other existing applications within these bands and 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)."

² It is to be reminded that the existing Authorisation Directive 2002/20/EC explicitly tells: "Members states shall facilitate the use of radio frequencies under general authorisations but, where necessary should make the use of radio frequencies subject to the grant of individual rights of use with a view to (cft Art 5.2 of Directive 2002/20/EC):

- Avoiding harmful interference
- Ensuring the technical quality of service
- Safeguarding efficient use of spectrum
- Fulfilling other general interest objectives defined by EU countries"

³ See ITU-R Reports M.2109, S.2199 and S.2368 and ECC Report 203

using the same geographic separation techniques as co-frequency interference, but as for the co-frequency case, a coordination procedure is required to ensure that the necessary separation distances are maintained.

On this regard, SES and all satellite operators expect that, and request the RSPG to ensure that, the forthcoming IMT 5G standards for operations in adjacent bands are based on the 5G unwanted emissions limits which the ECC has considered applicable in Europe (according to ERC/REC/74-01 of the CEPT).

As a conclusion, SES fully supports the RSPG's general approach in its invitation "to foresee the application of a general authorisation regime in the highest frequency bands (e.g. 66-71 GHz) while focusing on an individual licence regime in the 26 GHz band, where sharing constraints would be higher" (para A2.2 in Annex). SES thus counts on the EU Member States to adopt a reasonable and workable approach that benefits the safe operations of all services bringing essential connectivity to European citizens.