



VIA ELECTRONIC MAIL

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Radio Spectrum Policy Group
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Re: Draft RSPG Opinion on assessment of different possible scenarios for the use of the frequency bands 1980-2010 MHz and 2170-2200 MHz by the Mobile Satellite Services beyond 2027

Dear RSPG Chairperson and Members:

Omnispace Ireland Limited¹ welcomes the opportunity to offer comments on the Draft Radio Spectrum Policy Group Opinion on assessment of different possible scenarios for the use of the frequency bands 1980-2010 MHz and 2170-2200 MHz by the Mobile Satellite Services beyond 2027 (henceforth referred to as the "Draft Opinion"). Omnispace appreciates the dedicated effort of the Draft Opinion's drafters which is evidenced in the detailed scenarios, usage, stakeholder, and technical analyses outlined. Omnispace further recognizes that there are legal and regulatory challenges related to implementing a common EU scenario including an EU-level selection process and supports the RSPG's efforts to reach a sufficient understanding regarding which scenario will be chosen and the respective next procedural steps at the EU level in the first half of 2025.

As the RSPG rightly captures in its Draft Opinion and list of stakeholder responses in section 2.6.2, Omnispace currently provides mobile-satellite service (MSS) in various countries around the world and wishes to offer its non-geostationary orbit (NGSO) satellite system's capabilities globally, and if possible, in the European Union. Omnispace believes that the European Union can achieve significant benefits by utilising the 2 GHz band for MSS Non-Terrestrial Network (NTN) systems to bring state-of-the-art 5G technology, including innovative direct-to-device (D2D) connectivity and Internet of Things (IoT), to all Member States, including in the hardest to reach regions.

Omnispace's current NGSO constellation which is comprised of one medium-Earth orbit (MEO) satellite and two low-Earth orbit (LEO) satellites offers an innovative alternative or addition to the existing 2 GHz MSS licensees. This system can provide compelling MSS today across all EU Member States without discriminating against certain northern Member States through diminished service quality. Furthermore, by using lower orbital altitudes and only LEOs for its future next-generation constellation, the first phase of which is expected to be comprised of 300 satellites and start operations in 2026 before the end of the existing 2 GHz S-band licenses in the EU, the Omnispace system can ensure low latency and global coverage therefore enhancing available service offerings and use cases. Importantly, Omnispace's NGSO system performance is sufficient to close the link with standard mobile phones which is challenging to provide from GSO infrastructure.

Omnispace strongly agrees with the Draft Opinion that a technology neutral competitive framework for MSS in the 2 GHz band that seeks to preserve the current EU-wide regulatory and technical harmonisation to the extent possible is the preferred approach. Omnispace views that, for the EU

¹ Omnispace Ireland Limited submits these comments on behalf of the Omnispace LLC family of companies.

2 GHz MSS process to be technology neutral, all the various applications described in Section 3.2 of the Draft Opinion including the in-flight connectivity service, 5G NTN as defined by 3GPP, as well as IoT applications should be considered together under the umbrella of generic MSS. Given that 3GPP Release 17 NTN appears to be the reason for convergence of the terrestrial cellular and MSS services and Release 17 utilized a minimum channel bandwidth of 5 MHz, Omnispace recommends the operator selection be focused on a limited number of options, ideally two or possibly three, when considering the future common scenario to segment the 2 x 30 MHz. Finally, Omnispace encourages the EU to consider potential new frequency band allocations, in particular the 2010-2025 MHz band, to expand competition for 2 GHz MSS systems.

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Comments on assessment criteria from section 3.1

Omnispace concurs with the RSPG that to allow for an adequate assessment of the current and possible future use cases/scenario(s) of the 2 GHz MSS bands, the determination of appropriate, clear, and concise assessment criteria is required. Omnispace highlights the most critical technical and procedural/administrative criteria from its perspective below.

Technical criteria: Spectrum sharing and coverage/geographical reach

As discussed below in the technical scenario section, Omnispace agrees with the RSPG that in the intended simultaneous coverage of European countries by at least two operators, a dedicated segmented spectrum assignment approach is required to ensure coexistence and quality of service between different MSS operators. Multiple operators may be supported by a variety of spatial, time and frequency separations. Given that industry is generally moving towards 3GPP-based solutions, temporal (*i.e.*, coordinated time-based access to common spectrum) does not appear to be a feasible method of allocating common spectrum to multiple entities. Since this is a pan-European allocation, spatial allocations covering unique areas is also not a feasible solution as it could cause significant border area interference between operators, or exclusion zones which will result in uncovered areas. While 3GPP-based systems require a minimum of 5 MHz channels, a single 5 MHz paired spectrum block may not provide sufficient capacity to produce an economically viable system.

As outlined in its previous submission and in the Draft Opinion, there are numerous benefits to Europe to the deployment of 3GPP-based systems including economies of scale for user equipment. Therefore, Omnispace recommends channelization of the spectrum into blocks of multiples of 5 MHz and using out-of-band emissions and frequency tolerance limitations consistent with 3GPP standards. While operators primarily rely on their dedicated frequencies, operators should be allowed to coordinate with one another to use the spectrum through spectrum leases or other agreements. The 2 GHz MSS S-band only entails 2 x 30 MHz at this time in the EU, so licensing authorities should consider how best to foster competition. While multiple operators would provide a competitive environment, too small an allocation could yield a severely limited technical system that will not have the capabilities to create a viable competitor.

Coverage is another key element for operator selection criteria. Reliable MSS coverage and connectivity from geostationary satellites to high latitude areas can be difficult (particularly for portable end-user devices), which can limit public protection and disaster relief, among other things, to those who are among the most unconnected in the EU. Omnispace's existing MEO satellite OMNISPACE F2 currently provides global coverage. In 2018, Omnispace tested service capabilities using the F2 satellite over European Economic Area (EEA) Member Norway, proving that it can effectively serve northern EU Member States located above 60 degrees. Additionally, Omnispace has been at the forefront of the NTN developments, working at 3GPP, and additionally partnered with Thales Alenia Space to build and launch two LEO satellites in the 2 GHz MSS band.

Post-launch, 5G NTN Internet of Things (IoT) technology and service capabilities were tested over France using an experimental license from ARCEP. As discussed further in our previous submission to the RSPG questionnaire, IoT, broadband, and high reliability communications are included in the 3GPP specification for NTN finalised in 2022 in Release 17. Standardisation of NTN within 3GPP will have a positive impact on economies of scale, an important topic noted by the RSPG.

Section 3.1: Procedural/Administrative criteria for the implementation of a scenario

Omnispace recognizes that to implement a scenario supporting EU policy and objectives, various legal steps must be taken into account at the ITU, EU, and national level. Omnispace limits its comments to the timelines at the ITU, which is its subject matter area of expertise.

The S-band is subject to first-in-time processing at the ITU. Potential S-band MSS operators, therefore, must file, coordinate, and notify operations before perfecting radiofrequency coordination and operational priority status. For the S-band, Omnispace satisfied the legal prerequisites by filing the relevant coordination requests (CR/Cs),² bringing into use, notifying them, and completing radiofrequency coordination as necessary. Omnispace's F2 filing holds one of the highest priority ITU filings in the S-band, which carries significant strategic coordination and operational advantages when deploying in the EU and globally, particularly when considering the hundreds of satellite systems that have been filed after the Omnispace 2 GHz S-band filings.

Such S-band MSS filings were possible given the globally harmonised MSS allocations. Outside of the 2 GHz S-band MSS, however, various regulatory and operational challenges abound. For example, the L-band MSS (1525-1559 MHz and 1626.5-1660.5 MHz) is subject to memoranda of understanding supporting GSOs. The L-/S-band MSS (1610-1626.5 MHz and 2483.5-2500 MHz) is subject to power limits that may prevent robust service deployment, TDMA modulation-based services that cannot share spectrum, or a daunting ITU filing priority queue that may not allow for meaningful coordination.

The Draft Opinion further requests information about the incentives and benefits of the considered business cases to EU policy, including EU security or EU interest, and / or to EU companies. Omnispace considers that its proposal to use 5G NTN MSS to serve EU Member States will bring the following benefits to EU consumers, businesses, and governments:

- Increased consumer demand exists globally for satellite-based services, particularly user device connectivity, given 86% of Europe's population has already subscribed to terrestrial mobile services.³ If Omnispace's 5G NTN direct-to-device service becomes available in the EU, remote, unserved, and underserved areas in all Member States will receive desired connectivity for the first time, because terrestrial deployments remain unlikely in these areas due to technical and financial realities. This will meet EU interests of connectivity and provide new business cases for services in remote areas.
- In addition to advancing ubiquitous wireless coverage across the EU, Omnispace's MSS expands the availability of emergency communications to consumers and the geographic range of first responders in the EU to provide critical services while promoting competition in the provision of wireless services to EU consumers, among others.
- The 3GPP 5G NTN standard is being incorporated into devices and offers economies of scale for development and deployment suitable for consumer and enterprises. The result

² See F2 (Papua New Guinea), CRC/C 3434 (Aug. 13 2013); M5L2SAT (Papua New Guinea), CR/C 5023 (Mar. 24, 2019).

³ See, *The Mobile Economy*, GSMA, <https://bit.ly/3CykAjG> (last viewed June 16, 2023).

is all EU Member State consumers will see more robust coverage with minimal to no pricing difference.

- Omnispace's proposed arrangement enables innovation and investment in nascent EU-based satellite and terrestrial interoperable technologies⁴ and cross-industry stakeholder partnerships to flourish. Again, EU Member State consumers will enjoy improved service quality without being financially hamstrung.
- Using 5G NTN 3GPP specifications promotes cryptographically secure communications in line with EU objectives.
- Following the well-vetted and deployed ITU and 3GPP framework ensures higher and better spectrum usage and establishes sound, reliable spectrum policy that will give certainty and predictability for ongoing investment.

Section 3.2: Omnispace comments on the assessment of different possible technical scenarios for the use of the 2 GHz MSS frequency band beyond 2027

Section 3.2 scenario 1 discusses one current usage of part of the MSS 2 GHz band, in-flight broadband connectivity service, the European Aviation Network (EAN), which consists of a satellite component and a complementary ground component (CGC). Omnispace supports technology neutrality among MSS technologies and views the EAN as part of MSS.

In scenario 2, the RSPG discusses generic MSS which it defines as individual voice and data to user terminals and user equipment. Scenario 3 covers the M2M/IoT ecosystem including D2D for IoT and D2D for M2M with the options of narrowband and/or wideband implementation provided by either NGSO or GSO. Scenario 4 comprises 5G NTN. From Omnispace's perspective, both the M2M/IoT and the 5G NTN ecosystems fall under the scope of generic MSS as they can be viewed as applications of generic MSS.

The RSPG Draft Opinion notes that given wide support from industry to develop future IoT/M2M applications and to stimulate innovation, a small duplex portion of spectrum below 1 MHz could be considered for operators. Omnispace offers IoT/M2M solutions today in the form of asset and animal tracking, smart agriculture, oil and gas monitoring, and maritime connectivity. There are multiple benefits to the European market from such solutions that will enable key national industries.

Omnispace understands the RSPG interest to allocate 2 x 1 MHz in the S band for IoT/M2M systems in Europe; however, larger bandwidth harmonized generic MSS allocations may be more appropriate due to the limited bandwidth available and the fact that all varieties of IoT/M2M including NR-NTN, LoRa and NB-IoT could be utilised within the generic larger bandwidth block sizes as part of the RSPG commitment to technology neutrality. Should operators wish to use less than 2 x 1 MHz of spectrum, they could coordinate and lease spectrum from the operators that have the larger allocations. Additionally, new agenda items were approved at the World Radiocommunication Conference 2023 (WRC-23) to study potential new allocations for the MSS in the 2 GHz band, which means the additional spectrum for MSS may be available at the end of 2027. This is excellent timing for the EU 2 GHz MSS process because additional spectrum for MSS operators would then be available for assignment as the EU transitions from its current S-band licensee framework.

⁴ See, NanoAvionics press release: <https://nanoavionics.com/news/nanoavionics-selected-by-thales-alenia-space-to-build-the-first-two-satellite-buses-for-omnispace-constellation/>. In addition to working with Thales Alenia Space on its two LEO satellites launched in 2022, Omnispace also partnered with NanoAvionics, which has operations in Lithuania, to manufacture its two satellite buses.

As noted, Omnispace envisages scenario 4 wideband MSS NTN D2D also within the regulatory framework of generic MSS. Omnispace is following the 3GPP 5G NTN standard for its next generation global MSS NGSO LEO constellation which will provide direct connectivity between satellites and 5G smartphones in the 2 GHz band. 3GPP specifies 5 MHz channels for 5G NTN in each direction to deliver services, including voice and data to consumer smartphones. Omnispace described the technical features of the 3GPP 5G NTN system in detail in its response to the RSPG questionnaire but to re-emphasize, the more bandwidth assigned to the MSS operator for NTN, the greater the capacity that can be offered to EU consumers, governments, and businesses. Two blocks of 2 x 15 MHz are ideal for interested operators to implement the 5G NTN service in 3GPP Band n256. This block size provides an equal size for two operators to co-exist and will allow the deployment of the most advanced 5G NTN services. One caveat about moving beyond the two-licensee scenario to a three-licensee scenario with smaller bandwidths is that the viability of all operators may be impacted due to the limited capacity available and the risk of self-interference due to insufficient spectrum to create a viable reuse plan. This could impact the opportunity for delivering high-quality service in Europe.

Given the renewed interest in 2 GHz MSS, the RSPG is urged to support allocating an additional 2 x 15 MHz for generic MSS, which would also increase competition in the band. This could be accomplished by the extension of the current S-band to include the 2010-2025 MHz for uplink and 2160-2170 MHz for downlink MSS operations in rural and hard to reach areas. Region 2 (the Americas) has already allocated the 2010-2025 MHz and 2160-2170 MHz bands on a primary basis for MSS, so an expansion of that allocation to include Region 1 is logical so that global NGSO operators can provide international coverage and economies of scale in service and devices.

Section 3.3: Number of operators and frequency block size

For the continuity scenarios outlined by the RSPG, the following options are under consideration: Option 1 proposed by the RSPG would maintain the existing band segmentation with two selected operators: (1) European Aviation Network (EAN)/Complementary Ground Component (CGC) and any MSS evolution with 2 x 15 MHz EAN/CGC and 2) 2 x 15 MHz Generic MSS (individual voice/data, IoT and any other evolution). The RSPG notes that this “continuity scenario” may limit competition in MSS provision. Omnispace supports the idea of maintaining two operators each with 2 x 15 MHz, *if* new entrants are allowed to compete for the licenses. Block selection should be technology neutral and that the same EU frequency bands should apply throughout all Member States.

Options 2-4 outline scenarios to introduce competition based on the current regulatory situation. In these cases, limited parts of the segmented spectrum would remain available for the current selected operator to continue providing services and exploiting infrastructures already developed (e.g., the European Aviation Network, MSS generic and IoT) while new entrants would be allowed to enter and utilise their choice of technology such as wideband 5G NTN D2D or any other evolution of MSS. As noted previously, these systems may find it difficult to be economically viable and may diminish the opportunity for the new players to provide a cost-effective high quality service.

- option 2 is four operators: two each with 2 x 10 MHz and two each with 2 x 5 MHz
- option 3 is three potential operators each with 2 x 10 MHz blocks and
- option 4 is three potential operators, one with 2 x 15 MHz, one with 2 x 10 MHz and one with 2 x 5 MHz.

Omnispace does not support options 2 or 4 because they would severely limit some of the block sizes in the name of competition. However, option 3 may be possible to facilitate greater competition in different services with the caveats mentioned above. As a future 5G NTN global operator interested in participating in the European licensing process, Omnispace prefers the ability to obtain a license of 2 x 15 MHz across Europe so our preference is option 1 which is to maintain two operators of 2 x 15 MHz, *as long as new entrants are allowed to compete for both licenses.*

Conclusions on possible future usage

Omnispace agrees with the RSPG to recommend to the EC and to Member States to examine the underlying 2 GHz MSS legislation and framework for a competitive outcome including Decision 2007/98/EC to preserve the technical harmonisation for MSS in the 2 GHz band in the EU, in a timely manner, specifically by the second quarter of 2025, when authorisation procedures begin to take shape in different Member States. In conclusion we offer the following key summary points:

- Omnispace offers 2 GHz MSS and IoT NGSO global services today and its next generation constellation will be based on the 3GPP 5G NTN specification for band n256. The 3GPP 5G NTN standard is being incorporated into devices and offers economies of scale for development and deployment suitable for consumer and enterprises. The result is all EU Member State consumers will see more robust coverage with minimal to no pricing difference. Following the well-vetted and deployed ITU and 3GPP framework ensures higher and better spectrum usage and establishes sound, reliable spectrum policy that will give certainty and predictability for ongoing investment.
- Omnispace Ireland wishes to compete in the process and obtain a license to provide various types of pan-European telecommunications services regardless of the location of end users. These services could improve coverage of rural areas in the Community, thus bridging the digital divide in terms of geography. The introduction of new systems providing MSS would potentially contribute to the development of the internal market and enhance competition by increasing the offering and availability of pan-European services and end-to-end connectivity as well as encouraging efficient investments. In addition to advancing ubiquitous wireless coverage across the EU, Omnispace's MSS can expand the availability of emergency communications to consumers and the geographic range of first responders in the EU to provide critical services while promoting competition in the provision of wireless services to EU consumers, among others.
- Omnispace's preferred arrangement of two operators with 2 x 15 MHz each will enable innovation and investment in the EU satellite industry, provide technologies interoperable with terrestrial infrastructure, and cross-industry stakeholder partnerships to flourish. Again, EU Member State consumers will enjoy improved service quality without being financially hamstrung. It is important that this proposed arrangement be technology neutral and open to new entrants.

Omnispace thanks the RSPG for exploring productive and intensive uses for the 2 GHz MSS bands in Europe. The current technical, regulatory, and policy deliberations will unlock critical considerations for the inevitable convergence of satellite-terrestrial services and ubiquitous connectivity. Omnispace looks forward to supporting the RSPG and EU Member States on this matter.

Respectfully submitted,

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