

13 September 2024

Innovation, Science and Economic Development Canada
Engineering, Planning and Standards Branch
Senior Director, Space Services and International
satelliteplanning-planificationsatellite@ised-isde.gc.ca

Re: Consultation on a Policy, Licensing and Technical Framework for Supplemental Mobile Coverage from Space (SMCS) – Canada Gazette, Part 1, Volume 158, Number 26, 29 June 2024, document SMSE-006-24

Omnispace LLC (Omnispace) submits these comments in response to Innovation, Science, and Economic Development Canada's (ISED) *Consultation on a Policy, Licensing and Technical Framework for Supplemental Mobile Coverage by Satellite* (SMSE-006-24), as published in the Canada Gazette, Part I, Volume 158, Number 26 on June 29, 2024.

Omnispace has specific interests in the 2 GHz S-band given that it operates a global non-geostationary orbit ("NGSO") satellite system in the bands 1980-2025 MHz Earth-to-space and 2170-2200 MHz space-to-Earth. Omnispace's NGSO system has been brought into use in accordance with applicable International Telecommunication Union ("ITU") regulations.

Omnispace currently holds mobile satellite services (MSS) authorizations and provides capacity in various markets through its operational F2 satellite network. This network is the first element of the NGSO constellation that will be capable of providing 24 x 7 coverage and connectivity around the globe ("Omnispace System").

In 2022 Omnispace launched two S-band LEO satellites which are being used to test the company's next generation 5G NTN, which will be a significant expansion of the Omnispace NGSO system. This Omnispace next-generation LEO constellation will power critical global communications, including 3GPP Release 17 and 18 compatible 5G NTN and Internet of Things (IoT) connectivity, directly from satellites to mobile devices. Omnispace is building upon the investments it has already made to validate 3GPP standards-based 5G products and technologies and to demonstrate 5G connectivity from space.

On February 9, 2024, Omnispace joined Terrestar Solutions, Viasat, Inc., Ligado Networks and Al Yah Satellite Communications Company PJSC (Yahsat), as a founding member of the Mobile Satellite Services Association (MSSA) (www.mss-association.org). MSSA will bring significant scale and choice to promote and advance the emerging Direct-to-Device (D2D) ecosystem.

MSSA seeks to develop a global ecosystem utilizing over 100 MHz of L-band and S-band spectrum already allocated and licensed for mobile satellite services (MSS), which is well-suited for integration into a broad range of mobile devices. The non-profit industry association is aligned with 3rd Generation Partnership Project (3GPP) standards to extend terrestrial mobile coverage for both Mobile Network Operator (MNO) and Over-the-Top (OTT) internet services.

D2D in MSS spectrum represents an opportunity to increase the potential of satellite services to expand connectivity and meet policy goals across Canada, particularly in rural and remote areas. It uses already allocated and licensed MSS spectrum for D2D and is feasible within the existing regulatory framework. Notably, spectrum in the L- and S-bands has been widely authorized globally for MSS by regulators and the required co-existence and sharing mechanisms have been established. MSS D2D services can be offered seamlessly in these bands without requiring additional national or international regulatory action.

The potential introduction of Supplemental Mobile Coverage by Satellite (SMCS) in bands allocated to mobile services (MS) presents regulatory and technical considerations which must be further studied to avoid interference into existing spectrum uses. Sharing studies for D2D operations in MS bands are currently underway in preparation for WRC-27, and there are risks associated with authorizing such operations before these studies are completed. Any decision made at this stage to permit commercial use of SMCS in MS spectrum could prematurely lock in a regulatory regime ahead of the conference, or complicate the implementation of WRC-27 outcomes, potentially affecting previously approved plans and consumer services.

Omnispace's comments below seek to provide input and guidance to ISED focused on avoiding interference and ensuring that all current and potential users of relevant satellite services can access high-quality, high-value services.

The remainder of this contribution addresses specific questions included in the consultation.

Please contact me at +1 858 210 2037 or email: mgavin@omnispace.com should there be a need for clarification or additional information. Thank you again for the opportunity to provide comments on the consultation paper.

Sincerely,

A handwritten signature in black ink, appearing to read "Molly Gavin".

Molly Gavin
Vice President,
International Regulatory and Spectrum Policy
Omnispace LLC

Responses to specific consultation questions

Upper PCS band

Q5 ISED is seeking comments on its proposal to apply the SMCS framework to the following initial bands:

600 MHz (617-652 MHz/663-698 MHz)

700 MHz (698-756 MHz and 777-787 MHz)

800 MHz Cellular (824-849 MHz/869-894 MHz)

PCS (1850-1915 MHz/1930-1995 MHz)

AWS-1 (1710-1755 MHz/2110-2155 MHz)

AWS-3 (1755-1780 MHz/2155-2180 MHz)

Omnispace advises ISED to approach the introduction of SMCS with caution given that utilising satellite in spectrum allocated for terrestrial services and licensed to mobile operators presents challenges that have not yet been fully studied or addressed. Among other things, there is a general lack of understanding as to the risks that SMCS operations could pose to other operators—including MSS operators like Omnispace.

Omnispace has specific concerns with the 1850-1915 MHz/1930-1995 MHz bands (the PCS band), as outlined in ¶40. Specifically, Omnispace respectfully recommends that the 1980-1995 MHz band be excluded from consideration for SMCS. The 1930-1995 MHz downlink band, currently used by licensed mobile operators and proposed for SMCS downlink, creates potential for harmful interference with the ITU globally harmonized MSS (Earth-to-space) allocation in the 1980-2010 MHz band, which extends into 2025 in Region 2.¹ This use of the same frequency range for SMCS downlink and MSS uplink will cause interference from the SMCS downlink to the MSS uplink, degrading service quality.

Omnispace has submitted extensive interference analyses to the Federal Communications Commission in the United States regarding the use of the 1990-1995 MHz

¹ ITU Radio Regulations, 2024 Edition, Chapter II. Also note that 3GPP Band n256 additionally has specified 1980-2010 MHz as a global uplink band for MSS. See 3GPP 38.101-5, NR; User Equipment (UE) radio transmission and reception; Part 5: Satellite access Radio Frequency (RF) and performance requirements, <https://portal.3gpp.org/desktopmodules/Specifications/SpecificationDetails.aspx?specificationId=3982>

NTN satellite operating band	Uplink (UL) operating band Satellite Access Node receive / UE transmit FUL,low – FUL,high	Downlink (DL) operating band Satellite Access Node transmit / UE receive FDL,low – FDL,high	Duplex mode
n256	1980 MHz – 2010 MHz	2170 MHz – 2200 MHz	FDD
n255	1626.5 MHz – 1660.5 MHz	1525 MHz – 1559 MHz	FDD
n254	1610 – 1626.5 MHz	2483.5 – 2500 MHz	FDD
NOTE: NTN satellite bands are numbered in descending order from n256.			

band for Supplemental Coverage from Space (SCS) since Omnispace holds MSS authorizations in the 1980-2025 MHz band (Earth-to-space direction) in various countries outside of the United States which may suffer harmful interference if SCS (or SMCS in the case of Canada) is authorised in a contradictory direction.²

Such interference could possibly restrict the availability and effectiveness of emergency communications, a key use case for satellite connectivity in rural and remote areas. Additionally, degraded service could hinder the adoption of and confidence in both SMCS and MSS. Omnispace urges ISSED to ensure that the potential introduction of SMCS in Canada does not disrupt existing services and global allocations.

Omnispace encourages ISSED to ensure that the potential introduction of SMCS in Canada avoids interference to current services and allocations. Given that it is impossible to avoid interference between the SMCS downlink and MSS uplink in the same frequency band as shown in our own studies as well as third party studies, Omnispace's recommendation is for ISSED to exclude the 1980-1995 MHz band from consideration for the SMCS framework.

Omnispace notes that the 2155-2180 MHz band (AWS-3) is also included as a potential SMCS band and that this band also overlaps with the global MSS allocation (space-to-Earth direction), specifically the 2170-2180 MHz band. Omnispace is less concerned with this frequency band because the directionality for both SMCS and MSS will be the same (space-to-Earth / downlink) and, assuming that SMCS were to operate on a no interference, no protection, and ITU Radio Regulations (ITU RR) Article 4.4 basis, then there should not be unavoidable interference concerns. However, as noted above, this is not the case where the directionality is contradictory as in the case of the SMCS PCS band and the global ITU MSS 2 GHz band.

Secondary allocation

Q7 ISSED is seeking comments on its proposal to modify the CTFA to add new secondary mobile-satellite service allocations, through a footnote, for the provision of SMCS only.

Q8 ISSED is seeking comments on its proposal to enable SMCS on a no-interference, no-protection basis with respect to all radiocommunication services.

² See Omnispace LLC submission to the Federal Communications Commission, "Assessment of Interference to Authorized S Band Satellite Systems' Uplink Created by SpaceX's Non-conforming Use of the 1990-1995 MHz Band As Satellite Downlink," prepared by RKF Engineering Solutions, LLC August 2024, <https://www.fcc.gov/ecfs/document/1083120851173/1>. More information on Omnispace's interference analysis can be found in Omnispace's Comments and Reply Comments in the FCC's Single Network Future: Supplemental Coverage from Space, Notice of Proposed Rulemaking, GN Docket No. 23-65, IB Docket No. 22-271, FCC 23-22 (rel. Mar. 17, 2023) ("NPRM") filed respectively on [May 12, 2023](#) and [June 12, 2023](#), in Omnispace's Opposition to SpaceX/T-Mobile's request to modify the SpaceX Gen2 NGSO Satellite System to Add a Direct-to-Cellular System, GN Docket No. 23-135 and ICFS File No. SAT-MOD20230207-00021 filed respectively on [May 18, 2023](#) and [June 5, 2023](#), and its ex parte communications in the above mentioned proceedings filed on [June 1, 2023](#), [August 18, 2023](#), [October 20, 2023](#), [November 2, 2023](#), [November 17, 2023](#), [December 13, 2023](#), [February 9, 2024](#), and [May 17, 2024](#).

As highlighted above, Omnispace encourages Canada to exercise caution in prematurely authorising SMCS given sharing studies are ongoing. That said, Omnispace supports ISED's proposal, as described in ¶¶59-61, to add secondary MSS allocations to the Canadian Table of Frequency Allocations (CTFA), through a footnote, in the frequency bands where SMCS would be permitted, on a no-interference, no-protection (NINP) basis with respect to all radio services in any bands. Such an approach would align with Canada's obligations in relation to use of the ITU RR Article 4.4 to legitimize operations with respect to other country's radiocommunications services. As noted in the response to Q5, this does not apply to the 1980-1995 MHz band as Omnispace respectfully recommends that ISED remove this band entirely from consideration for SMCS due to the impossibility of avoiding harmful interference due to the differences in directionality between uplink of MSS and downlink of SMCS.

It is also worth reiterating that ITU RR Article 4.4 applies to all territories' radiocommunications services and not only cross-border radiocommunications. Since satellite systems are global in nature and NGSO systems are orbiting the globe rapidly and may be changing frequencies as they cross borders, it is essential that other countries' sovereignty is being respected.

Importantly, the Federal Communications Commission (FCC) acknowledges this point in its Supplemental Coverage from Space Order³,

Accordingly, we must take steps to ensure that for any frequency assignment we make that is not consistent with the International Table, which includes SCS operations pursuant to the domestic MSS allocation, the relevant station(s) do not cause harmful interference to, and shall not claim protection from harmful interference caused by, any station that is operating in accordance with the ITU provisions, including allocated services in the International Table. We find that it would serve the public interest to establish a regulatory framework to consider applications for SCS on an unprotected, non-harmful interference basis with respect to the services in other countries that are operating in accordance with ITU Radio Regulations. Such a framework ensures that we comply with our rights and obligations arising out of our ITU treaty commitments and protects incumbent services in other countries operating in conformance with the ITU Radio Regulations. This is particularly important in the case of authorization of satellite services, given that a satellite footprint can be larger than the footprint of a terrestrial base station and therefore in some cases may have more potential to impact the territories of other administrations.

Removing the 1980-1995 MHz from consideration of the list of bands for secondary SMCS allocation unless it were to operate in the same directionality of the global ITU MSS primary allocation will not only provide that SMCS operations inside Canada and the U.S. will operate on a no-protection, no-interference basis, but it will also ensure that that any satellites ISED authorizes for SMCS do not cause interference to systems of other administrations operating in accordance with the ITU Radio Regulations.

³ See paragraph 225 of Federal Communications Commission's Single Network Future: Supplemental Coverage from Space Order, March 15, 2024, <https://www.fcc.gov/document/fcc-advances-supplemental-coverage-space-framework-0>

SMCS is one potential component of a broader satellite ecosystem

Q29 ISED is seeking comments on any other considerations related to the introduction of SMCS in Canada which may not have been specifically addressed in this consultation.

Omnispace urges ISED to continue to evaluate the potential introduction of SMCS through the lens of the broader satellite services ecosystem, including coverage and service provided by MSS operators in geostationary orbit (GEO), medium-Earth orbit (MEO), and low-Earth orbit (LEO). 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 services, among other things, to users in remote and underserved northern areas. Multi-orbit solutions, as being pursued by Omnispace and others, using existing MSS spectrum, provide coverage and connectivity options that can meet critical needs for all Canadians.

Omnispace's current NGSO constellation, which operates in both MEO and LEO, can provide compelling global MSS today, including across northern latitudes. For example, Omnispace has successfully demonstrated its service capabilities using its existing MSS system in regions such as Canada and Norway, proving that it can effectively serve users located above 60 degrees. Such capabilities are an important component of the communications infrastructure required to serve all Canadians, including the provision of public safety services and ensuring achievement of universal service goals.

As ISED considers how best to incorporate SMCS into Canada's regulatory framework, Omnispace encourages maintenance of an approach that continues to enable the pursuit and deployment of multi-orbit MSS solutions capable of serving users nationwide.

Conclusion

Omnispace thanks ISED for inviting stakeholder feedback on this potential expansion of satellite connectivity options in Canada. 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 ISED on this matter.