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Re: Preliminary consultation on Mobile Satellite Service Developments and the Use of L and S Band Spectrum

Space Exploration Technologies Corp. ("SpaceX") appreciates the opportunity to provide responses to the Preliminary consultation on Mobile Satellite Service Developments and the Use of L and S Band Spectrum ("Consultation").¹ SpaceX looks forward to working with ISED to achieve our shared goal of connecting all Canadians quickly with resilient high-speed, low-latency mobile broadband across the nation's vast geography, including its northernmost territories.

- 1) Starlink in Canada:** Starlink has built a consistent track record of delivering the most innovative, high-speed satellite connectivity to people, communities, and enterprises in Canada, starting with the arrival of Starlink broadband services in late 2020, and Starlink Mobile direct-to-device coverage via its partnership with Rogers Canada in 2025.

Millions of Canadians use Starlink broadband daily for reliable, low-latency internet services directly to their homes, at their businesses, and for Canadian enterprise, especially in Canada's remote and rural communities. Applications range from everyday connectivity, in-motion mobility applications, and during emergent situations such as natural disasters, power outages, and telecommunications outages. Last year, following the catastrophic wildfires last summer across Manitoba, Ontario, and Saskatchewan, Starlink became a key source of connectivity, supporting over ten thousand Canadians and public safety personnel. SpaceX also donated dozens of kits to firefighters for on-the-go connectivity responding to the disaster and waived service charges for communities impacted by the community during the disaster.

In 2025, Starlink and Rogers introduced Starlink first-generation Direct to Cell system to Rogers' mobile subscribers, supporting Rogers customers with the ability to connect to supplemental satellite connectivity in areas with little to no terrestrial mobile coverage. Within one year, hundreds of thousands of Canadians have used this service to stay connected to messaging and light-data services on the Rogers' mobile network across the country.

Starlink services in Canada are supported by substantial ground network infrastructure investments in Canada to deliver the highest quality and lowest latency services to its Canadian subscribers, including 10 gateways, 2 PoPs, comprising millions of CAD in investments annually with further investments underway.

- 2) Plans moving forward for Starlink's second generation direct-to-device service:** Consumer uptake for Starlink's first generation direct-to-device services with its global

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mobile partners, and especially in Canada, with its partner Rogers, has seen explosive growth, with millions of Canadians already using the service especially in life-saving situations.

Because of this demand and Canada's unique geography, Starlink looks forward to deploying its second-generation direct-to-device service, designed to leverage the 2 GHz global mobile-satellite spectrum. This next-generation system will provide service speeds at least twenty times faster than even its current successful Direct to Cell system, and enable low-latency mobile broadband directly to the handsets of everyday Canadians no matter where they are.

Last October, Starlink announced its agreement to acquire, subject to regulatory approval, Echostar's rights to the 2 GHz mobile-satellite band, including its licenses around the world and its priority ITU filings.

These rights include:

- *Unpaired AWS-3 (1695-1710 MHz) access rights, exclusive terrestrial AWS-4 (2000-2020 MHz / 2180-2200 MHz) and AWS H Block licenses in the United States, along with its exclusive rights to provide Mobile Satellite Services in the U.S.;*
- *MSS spectrum licenses in the 2 GHz MSS in critical markets;*
- *Echostar's ITU filings and satellite systems, which carry the highest level of ITU priority for both GSO and NGSO systems, and Starlink will seek to operate as a part of its second generation direct-to-device offerings.*

With this acquisition, Starlink will hold both the most senior GSO ITU filings in the 2 GHz MSS band and the most senior NGSO filing, in addition to exclusive rights in the largest satellite markets in the world with access rights to the 2 GHz MSS band anticipated globally in short order. Hence, while any singular market for direct-to-device services cannot realistically support a standalone satellite constellation for direct-to-device services, Starlink nonetheless has the economic support to deploy its cutting-edge, next-generation system that will orbit over Canada and be optimized to use the 2 GHz MSS band.

To be sure, just as is the case with terrestrial licensees for mobile services, other operators will be able to leverage other harmonized MSS spectrum bands to develop competing services. In fact, following Starlink's purchase agreement announcement with Echostar, several operators including Amazon/Globalstar among others, announced similar transactions to acquire senior ITU priority in different MSS ranges to leverage global harmonized satellite spectrum for future services.

Under the terms of the deal with Echostar, its rights will transfer to Starlink in November 2027, which can support the Government's priority to facilitate satellite direct-to-device service for all Canadians. During this time, Starlink will quickly design and deploy its second-generation satellite system, so that it will be ready to turn on service immediately upon transfer of the rights. Starlink has already begun working with handset manufacturers to ensure that new devices will have the chipsets necessary to support the band. And critically, Starlink will use this time to work with Canadian mobile carriers to provide service to their customers—Starlink does not plan to offer its own standalone service nor does it plan to deal exclusively with any one carrier. Instead, Starlink plans to offer services available to all interested mobile carriers and their customers.



Notably, in the United States, the use of the unpaired AWS-3 in conjunction with the 2000-2020 MHz band will maximize the number of people who have access to robust satellite mobile broadband on day 1, ahead of the wider proliferation of mobile phones and chipsets compatible with future phone standards supporting mobile-satellite bands anticipated in 2027 and 2028.

3) **Responses to Consultation Questions:**

SpaceX stands ready to engage constructively to connect all Canadians as quickly as possible to robust satellite mobile broadband as soon as possible.

To achieve this goal, updated frameworks for mobile-satellite spectrum should take into account:

- The importance of ITU priority and global coordination rules in ISED's policies for the development of globally available satellite systems
- The benefits of harmonization with the band plans in the United States for mobile-satellite services
- The release of additional spectrum, such as the unpaired AWS-3 (1695-1710 MHz) band, that can be used in conjunction with mobile-satellite spectrum, to maximize availability of these services for Canadian consumers while NR-NTN compatible devices become increasingly available
- Allocations must be sufficiently contiguous in total bandwidth to enable robust mobile broadband services.
- Deployment milestones, including plans for license reassignment, in the case that satellite services are not deployed using these spectrum licenses.

Q1: Q1 ISED is seeking comments on the future demand for:

- a. Traditional MSS applications such as satellite phones and terminals***
- b. IoT MSS applications including NB IoT and LTE-M***
- c. D2D using MSS or terrestrial spectrum***
- d. ATC***
- e. Any additional emerging MSS use cases***

Given its geography and extensive arctic terrain, Canada is especially well-positioned to benefit from D2D deployment, which extends mobile coverage to everyday consumer devices in regions where traditional cell tower infrastructure is economically or logistically prohibitive.

Traditional MSS applications such as satellite phones and terminals, and traditional ATC services, are relics of the past. Business models premised on these types of services and devices did not achieve sufficient scale to succeed. D2D for unmodified smartphones and specialized IoT to specialized low-cost devices are the most efficient and in-demand uses of the MSS bands.



SpaceX anticipates that D2D services to unmodified smartphones will continue to be the leading use case for future growth of MSS services based on its experience with its first generation system, which delivers supplemental mobile coverage services including light-data and messaging in addition to enterprise-grade IoT services (a very small proportion of utilization compared to consumer use by mobile subscribers).

SpaceX is making substantial investments in a second generation direct-to-device system to deliver mobile-broadband premised on the immediate and strong demand for Starlink's first generation Direct to Cell system around the world which has scaled to well over 40+ countries. Starlink's first generation satellite-to-mobile service today (Starlink Direct to Cell) uses small bandwidth of 5 MHz blocks of terrestrial spectrum to enable supplemental connectivity on unmodified mobile phones already in use today. Compared to Starlink's first generation of D2D services, its second generation services using NR-NTN standards will support an overall capacity increase of more than 100x using the wider bandwidth operations enabled by this spectrum purchase, and optimized 5G protocols. In most environments, SpaceX's planned system will enable full 5G cellular connectivity with a comparable consumer experience to current terrestrial LTE service. But this level of performance (text, voice calling, data or broadband services) demands sufficiently wide bandwidth and the optimized pairing of spectrum resources for uplink and downlink.

SpaceX expects limited demand for IoT MSS applications, which can support low-cost devices such as weather sensors and livestock tracking with narrow slivers of spectrum. These use cases can be efficiently delivered through coordinated use of satellite spectrum in wide contiguous bands such as the L-band through commercial access agreements. The demand and availability of these services are insufficient to warrant reservations of dedicated bandwidths to achieve.

Starlink Mobile's next-generation V2 satellites, which will operate in the 2GHz MSS band, will expand on these capabilities by providing broadband directly to mobile phones via the highest performing satellite-to-mobile network ever built. Through this system, Starlink will offer 5G speeds from space and enable a true elimination of mobile "dead zones." SpaceX anticipates strong demand for mobile broadband services that are available in the toughest to reach geographies and when terrestrial networks are unavailable due to natural disasters or other disruptions.

Q2 ISED is seeking comments on the timelines for the development of the equipment ecosystems for the MSS use cases.
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Starlink's Gen2 system, featuring higher-power satellites with advanced beamforming and improved link budgets, is expected to dramatically expand compatibility with unmodified smartphones, enabling a wide array of mainstream smartphones from manufacturers such as Apple, Samsung, Google, and others to achieve full voice, text, and data functionality, with broad commercial availability of natively supported devices in late 2027.

The availability of these devices across Canada will depend on consumer adoption rates of new generation devices. ISED can seek to maximize the availability of advanced direct-to-device connectivity by harmonizing with the band plan intended for services in the United States, including the release of terrestrial spectrum, such as the unpaired AWS-3 (1695-1710 MHz) band, that can be used in conjunction with mobile-satellite spectrum, to maximize



availability of these services for Canadian consumers on existing market available devices, while consumers transition to NR-NTN compatible devices.

Standards for MSS user equipment were first defined by 3GPP Release 17 (2022), which introduced the n256 band (1980-2010 / 2170-2200 MHz) for integrated satellite-terrestrial operations modeled on the FCC's AWS-4 framework. 3GPP release 19 is introducing Band n252 (2000-2020 / 2180-2200 MHz), covering international MSS allocation only, demonstrating 3GPP's evolution toward standards that enable global deployment of MSS capabilities. Major device manufacturers, such as Samsung, are actively testing n252 NTN capabilities. The ecosystem around MSS is maturing, but continued ecosystem progress requires predictable exclusive licensing and ITU priority protection.

For that reason, each country's cooperation and support for ITU priority directly impacts the device ecosystem. Chipset and device manufacturers invest in developing MSS technologies on the assumption of usable, interference-free spectrum access for users at global scale. If individual regulators deviate from the ITU priority framework when licensing new operators, they risk rendering MSS spectrum unusable in their territory for both new entrants and incumbents. As discussed in the response to Q10, the FCC found that MSS sharing is technically impractical. Deviating from the ITU priority system would therefore harm the MSS equipment ecosystem by reducing a major market for chipset and device manufacturers.

Q3 ISED is seeking comments on the amount of spectrum that would be required for the MSS use cases and the types of service (e.g. text, voice calling, data or broadband services) that would be provided under each use case, including any assumptions made in terms of numbers of subscribers or devices, frequency reuse factors, etc.

Obtaining matching licences in Canada will deliver a proportionally higher-quality service to Canadian mobile subscribers. Starlink is designing the system with flexibility to operate on smaller contiguous bandwidths if necessary—but operations on reduced channel sizes will mean that subscribers will receive an inferior service compared to the rest of the world. SpaceX urges ISED to rapidly open a consultation to consider allocating the 1695-1710 MHz band for MSS uplink use throughout Canada, so that it can be combined with the 2 GHz S-band.

For this reason, ISED should move swiftly to align the MSS S-band frequencies in Canada with the United States. The second-generation Starlink Mobile system will be optimized for the uplink and downlink channels in the United States (40 MHz of downlink at 2000-2020 MHz and 2180-2200 MHz and 15 MHz of uplink at 1695-1710 MHz).

To deliver satellite-based mobile broadband services that provide the same performance as conventional terrestrial networks, contiguous globally harmonized spectrum are critical. With respect to the MSS S-band, the clearest and most compelling use of the spectrum is for mobile broadband services delivered directly to mass market smart phones. Above all, ISED should not fragment the MSS S-band in Canada. The spectrum is already optimally configured for MSS D2D. The current 2000-2020 MHz / 2180-2200 MHz licensing framework should remain in place to ensure that Canadians are not left behind.

Q4 ISED is seeking comments on whether there are any changes to the existing MSS policy framework that could be made to facilitate and/or improve the availability of any of



the MSS use cases.

Yes. With respect to the MSS 2 GHz S-band, the most efficient use of spectrum would be harmonization with the configuration in the United States described in our response to Q3: designating 1695–1710 MHz for MSS uplink, paired with 2000–2020 MHz and 2180–2200 MHz for MSS downlink.

Additionally, the current MSS framework should reflect internationally harmonized coordination procedures at the ITU and remove requirements that require coordination with Canadian systems as a pre-requisite to market access in Canada. We recommend that Canada continue to apply ITU priority rules within its MSS policy framework. Respecting ITU priority is consistent with Canada's longstanding approach to international spectrum coordination, and it provides the regulatory certainty that satellite operators need to plan multi-market deployments. Because MSS constellations depend on broad international market access to recover launch, infrastructure, and operating costs, a framework that does not honour ITU priority status would introduce uncertainty likely to deter investment and delay service availability for Canadian consumers.

This is particularly important in the MSS band, where user terminals are portable and omnidirectional and therefore especially sensitive to interference from competing systems. A domestic pre-coordination requirement that operates independently of ITU priority risks produce outcomes inconsistent with ISED's connectivity goals for Canadian consumers.

The United States has recently affirmed ITU priority status as a key factor in determining MSS spectrum access, including by declining applications from U.S. operators in bands where foreign entities hold senior ITU rights, and by proposing reciprocal treatment based on how other countries treat U.S. operators abroad. We recommend ISED consider a similar approach: maintaining ITU priority as the basis for domestic access.

Q5

ISED is seeking comments on the need for additional MSS spectrum.

SpaceX supports the identification of further mobile-satellite spectrum to be necessary in the future, especially as a path forward for upcoming systems looking to further standardize additional satellite bands for globally available services. Further harmonized mobile-satellite spectrum will further support healthy competition, especially to enable prospective operators, seeking to compete with global operators such as Amazon, SpaceX, and Viasat who have invested in globally harmonized spectrum.

SpaceX also agrees with ISED's approach to consider commercially harmonized mobile-satellite bands suitable for direct-to-device communications. In the Americas, the MSS L-band is nearly **[100 MHz]** in the aggregate across all allocated segments, compared to **[40 MHz]** in the S-band. In fact, European or United Kingdom entities hold the vast majority of MSS spectrum suitable for direct-to-device communications around the world.

Q6 ISED is seeking input on planned business cases for the MSS systems, including consumer models, target markets, planned partnerships, and timing for services.

SpaceX's second generation of direct-to-device services using the 2GHz S-band will ensure people across Canada—and around the world—have access on everyday mobile phones as



quickly as possible. SpaceX estimates that it will begin launching its next-generation Starlink direct-to-device satellites with service beginning by late 2027. While this pace and capability far outstrip the deployment plans of other satellite operators, by moving this rapidly, Starlink will be able to provide its partners with life-saving data services by Q3 2027, with voice following within months. By the end of 2028, Starlink will have already rapidly upgraded the constellation by launching thousands more satellites, providing continuous full global coverage to become the first—and most likely the only—direct-to-device provider to offer true coverage in high-latitude polar regions.

Q7 ISED is seeking comments on whether a Canadian coverage requirement should be applied to MSS space station licences.

Any MSS operators seeking to serve Canada should be required to commit to nation-wide service coverage, especially in its hardest-to-reach areas and northern-most regions. Service at these northern-most latitudes require dedicated launches, often at higher costs, to reach polar inclinations for service. ISED should accordingly affirm its coverage requirements as quickly as possible, while affirming the review of an operators' track-record and timeline to deliver high inclination coverage as a matter of urgency.

Q9 ISED is seeking comments on whether there should be spectrum reserved for Canadian system(s) and/or whether Canadian networks should be prioritized.

This objective should be balanced with ensuring Canadians receive the same benefits and access to the same high-quality mobile broadband services available globally. Should ISED decide to reserve spectrum for future Canadian systems and networks, these policy decisions should ensure that the spectrum reserved will not harm the deployment of important direct-to-device services for Canadian consumers by preserving contiguous spectrum allocations in globally harmonized and commercialized bands such as the S-band.

For instance, the more widely available contiguous bandwidth in the L-band *may* offer an opportunity to prioritize Canadian networks without constraining commercial innovation or new market entrants. Conversely, reserving the S-band, which is already one of the narrowest MSS slivers available, for domestic operators would disadvantage the only provider currently delivering D2D satellite service in Canada.

However, ISED should continue to look towards ITU coordination procedures in frequency ranges, such as the MSS bands of this consultation, where sharing amongst non-coordinated operators cannot be achieved. These global procedures should be weighted more than the satellite operator's country of origin. Departing from ITU priority would create interference risks for operations with higher ITU rights and undermine the international coordination framework that enables global satellite operators to have the certainty needed to invest in and deploy systems benefiting users worldwide.

Q10 ISED is seeking comments on the ability of MSS systems to coexist when using the same frequencies in the same geographic area and whether there are any considerations needed for coexistence between new and legacy MSS systems.



Co-existence is not possible for MSS systems operating in the same frequencies and in the same geographic area under two operators. Adding a new entrant into same-frequency, same-geographic area as an incumbent operator would prevent both operators from successfully serving end users. Modern MSS D2D systems use NGSO satellite constellations that orbit the entire Earth, unlike legacy GSO satellites that operate over a fixed geographic area. A new entrant licensed by ISED would still face global ITU coordination requirements. Without successful ITU coordination with higher-priority systems, the Canadian new entrant would face a challenging interference environment around the world, thus undermining or eliminating its business case to serve Canada.

The FCC issued an order in April 2026 (DA 26-398) to this effect, noting the ubiquity and portability of MSS user terminals, and their use of omni-directional antennas, which presents significant harmful interference challenges. The order dismissed all applications from SpaceX, Kepler, Sateliot, and AST, and rejected petitions for rulemaking that sought to allow MSS sharing between multiple operators, citing the technical impracticality for new entrants to deploy without causing harmful interference. In doing so, the FCC reiterated its commitment to respect priority status from the ITU as the key consideration for satellite operators' access to MSS spectrum.

Q11 ISED is seeking comments on whether MSS technology advances, including the use of advanced multiplexing schemes, would facilitate sharing of the same band in the same geographic area.

While technological advances in MSS systems, including advanced multiplexing schemes, may facilitate band sharing, the fundamental technical challenges outlined above make shared use of these bands by different operators infeasible.

Q12 ISED is seeking comments on the ability of the different MSS use cases (described in section 6.1) to share the existing MSS spectrum, and whether the band plans of the existing MSS bands need be reviewed. Should MSS bands be segmented to allow for multiple satellite operators and/or to facilitate different types of MSS (i.e. traditional, D2D and IoT)?

With respect to the MSS S-band, there is no need to change the current band plan. Doing so would place Canadian consumers at a disadvantage compared to those in the United States and the rest of the world. ISED should fully align the use of the MSS S-band in Canada to the United States, both because it will provide the best possible D2D service to Canadians and maximize service coverage close to the highly populated Canada-US border.

The allocations in the 2 GHz mobile-satellite band should align with global standards and ITU allocations and harmonizations of this band. Any reductions in spectral bandwidth will result in harm to meet the following objectives which Starlink seeks to accomplish with its global S-band service:

- To achieve **high service quality**, specifically a sufficiently high data rate for 5G services
- To ensure **sufficient capacity to serve strategic areas across Canada** where simultaneous use of the system is likely such as highways and states with low 5G deployment



- To **maximize resiliency and utility of the service to Canadians** during natural disasters and emergencies

Q15 ISED is seeking comments on the key regulatory considerations that should be factored in examining the evolution of MSS in L-band, including the shifted interest in use from GSO to NGSO systems.

Q17 ISED is seeking comments on the key regulatory considerations that should be factored in examining the evolution of MSS in L/S-band.

Q19 ISED is seeking comments on the key regulatory considerations that should be factored in examining the evolution of MSS in S-band, including the shifted interest in use from GSO to NGSO systems.

The most important regulatory considerations that should be factored in examining the evolution of MSS is continued adherence to ITU priority. Moreover, ISED should consider imposing the following eligibility and deployment conditions to any MSS license to ensure Canadians benefit from affordable mobile-to-satellite services in a timely manner:

- **relevant ITU satellite filings** to be demonstrated by each licensee, taking into account the priority attached to that filing;
- **use it or lose it** conditions – so that the spectrum is not hoarded or under-utilised by speculators who only want to arbitrage the price of spectrum;
- **coordination and** interference management should be dealt with in accordance with ITU rules.

Any new NGSO operator would face mandatory coordination requirements from the ITU that cannot be satisfied due to the technical impossibility of MSS sharing with a higher priority GSO or a smaller NGSO system operated by a different satellite operator. Accordingly – across all spectrum ranges mentioned in this consultation, major transactions between global companies and systems have been completed to protect and adhere to ITU priority in D2D services in these ranges.

The treatments of these bands should occur on an equitable basis moving forward and ensure that major global operators are able to compete to deliver the best quality service to Canadian consumers by enabling spectrum access to harmonized mobile spectrum under ITU rules and global harmonization efforts.

The S-band (2000-2020 MHz / 2180-2200 MHz) provides optimal propagation for handheld devices but is highly sensitive to interference. Omnidirectional antennas on portable user terminals, such as mobile phones and IoT devices, make coordination unfeasible. Starlink, through its acquisition of EchoStar's 2 GHz MSS rights, holds high global ITU coordination priority in the S-band. Disregarding the ITU priority and licensing new entrants would result in either a violation of ITU coordination obligations due to harmful interference or a commercial license with limited practical usability to honor interference obligations from international coordination rules at the ITU.



Q16 ISED is seeking comments on how recent MSS developments impact the long-standing coordination agreements between satellite operators in this band, as well as any related considerations with respect to the ITU coordination process.

SpaceX appreciates ISED acknowledging that ITU coordination plays a critical role ensuring safe and efficient use of global spectrum resources, and in ensuring that operators have the necessary confidence in the international coordination process to enable them to invest in next-generation NGSO constellations.

The recent developments in the mobile-satellite bands in this consultation, including Amazon, SpaceX, Rocket Lab, and transactions in the Ligado band, affirm that the ITU frequency coordination process in MSS bands are essential to the advancement of globally available mobile-satellite services.

The United States recently reiterated its commitment to respect priority status from the ITU as the key consideration for satellite operators' access to MSS spectrum. As part of this commitment, the U.S. dismissed applications from U.S.-based operators to use bands where European/UK entities hold senior ITU rights. At the same time, the U.S. proposed to ensure all operators are treated in the U.S. the way their home countries treat U.S. operators. This mechanism ensures equitable access for all countries by requiring operators to demonstrate technical compatibility and avoid harmful interference, thereby respecting sovereign borders while creating a level playing field to enable many direct-to-device services to operate using globally harmonized bands.

Q18 Is the sharing of these bands on the basis of MSS still technically feasible using CDMA technology? Are there other access technologies for which shared MSS use could be facilitated?

While technological advances in MSS systems may facilitate band sharing, the fundamental technical challenges outlined above make shared use of these bands inherently difficult.

Q20 Given that the S-band is allocated to both MSS and mobile services on a co-primary basis, ISED is seeking comments on interest in using this band for MSS only, flexible use only, or a combination of both services (e.g. portions of the band designated for MSS and other portions for flexible use services).

As discussed above, Canada can optimize MSS services in Canada in the S-band by fully aligning its band plan to the United States, and by emphasizing MSS use as the primary and prioritized use of the band in Canada. Satellite providers should be empowered to use a combination of terrestrial and consumer antennas to deploy the most robust services necessary in support of a primary satellite-first service.

Q21 Given that the ecosystem for AWS has not materialized in the band, ISED is seeking comments on whether the AWS designation in 2020-2025 MHz should be rescinded.

Q22 ISED is also seeking comments on whether there is interest in using this band for narrowband MSS in Canada, and whether an MSS allocation should be added in the 2020-



2025 MHz band. If yes, ISED is seeking additional comments on whether it should be in the Earth-to-space direction to align with Region 2 and the adjacent band, or whether it should be in both directions to provide flexibility.

Any MSS allocations in this band, given its limited commercialization, must protect the commercialized satellite operations in the adjacent AWS-4 band downlink band. The approach in this portion of this band should be harmonized with Canada's neighbors in the United States which is still under consideration.