

I. Standardization at 3GPP and Advances in Satellite Technology are Spurring Demand for D2D Services.

Significant portions of the world are unable to connect to terrestrial mobile networks due to a lack of coverage from ground-based infrastructure. In the Americas, for example, 14% of the rural population is not covered by any terrestrial mobile signal at all, while an additional 4% only have access to a 2G network—meaning that 18% of that population is unable to access the Internet.² There has thus been a continued and growing need for alternative technologies to provide critical connectivity for underserved populations and to expand connectivity. Not only that, but satellite networks are also enabling competition across multiple large and diverse customer segments, such as industrial, government, agriculture, automotive, and others. These industries, in addition to the personal consumer use vertical, benefit greatly from the reliability, redundancy, and coverage characteristics that satellites provide.

Satellite technologies are playing a significant role in satisfying this growing need. Advances in satellite technology have reduced deployment costs and accelerated the convergence of terrestrial and satellite service standardization. Advances like the 3GPP Non-Terrestrial Network (“NTN”) standards have further encouraged development of D2D. In 2022, MSS operators scored major achievements at 3GPP by advancing NTN work items. First, in Release 17, 3GPP designated the L- and S-bands (specified as bands n255 and n256) as the two standardized MSS spectrum bands for the deployment of NTN services. Further, standardization of New Radio (“NR”) NTN bands were completed in June 2022 and Internet of Things (“IoT”) NTN standardization was completed in December 2022. These standards enable the ecosystem for 5G terrestrial systems to integrate with satellite networks, supporting services directly to

² ITU Facts and Figures 2023, ITU, <https://www.itu.int/itu-d/reports/statistics/2023/10/10/ff23-mobile-network-coverage/>.

small devices, including mass-market consumer smartphones. These standards, for the first time, allow satellite services access to the economies of scale of the mobile industry that come with being included in the 3GPP ecosystem. Several MSS operators are planning to leverage these 3GPP defined NTN standards to provide services to consumers' mobile devices, while chip, device and infrastructure vendors are poised to provide technology, devices, and network equipment. These mass-market smartphones and IoT devices will be able to integrate with terrestrial mobile networks and/or with NTN based systems when out of range of terrestrial networks to ensure ubiquitous connectivity.

While there has been important progress at 3GPP, there has also been significant advances in satellite technology. As reported in the Satellite Industry Association's State of the Satellite Industry Report, recent investment in the space sector is helping to generate cost-saving innovations such as: smaller and more sophisticated satellites, digital engineering, progress in spot-beam technologies, and improved multi-use launch vehicles, among others.³ These trends are indicative of the health of the satellite industry writ large where MSS operators play an important role. Consumers across various markets will continue to reap the benefits of these significant advancements.

II. MSS Operators Continue to Invest and Innovate for the Emerging D2D Market.

Satellite operators have long been using MSS spectrum to provide connectivity to the public—including for safety-of-life, emergency response, national security, and other critical applications.⁴ But MSS operators have not been content to rest on their past contributions;

³ See Satellite Industry Association, *2023 State of the Satellite Industry Report*, <https://sia.org/news-resources/state-of-the-satellite-industry-report/>.

⁴ See, e.g., *Satellite technology gives lone and at-risk workers a helping hand from space*, GLOBALSTAR, <https://www.globalstar.com/en-us/blog/case-studies/satellite-technology-gives-lone-and-at-risk-worker>; *Iridium Enables Rescue Squadron to Work Faster and Stay*

rather, they have actively sought to leverage cutting-edge technologies to bring innovative services to the public using licensed MSS spectrum, and are investing billions of dollars to do so. The evolving D2D ecosystem offers particularly exciting possibilities, as D2D services will allow satellite operators to provide seamless connectivity to unmodified cell phones and other consumer devices. Indeed, the advent of D2D services is transformative for the satellite industry, unlocking new market segments and new ways to use MSS spectrum to provide connectivity to consumers without the need for specialized equipment.

These developments are no longer hypothetical—satellite operators are implementing them today. Globalstar launched a partnership with Apple in November 2022. Through this partnership, certain Apple iPhones are equipped with Apple’s “Emergency SOS via satellite” feature using Globalstar’s MSS network. Remarkably, just one month later, this feature allowed rescuers in Alaska to locate a stranded snowmobiler by the GPS coordinates sent from the phone via satellite while travelling outside of terrestrial cellular coverage.⁵

And Globalstar is not alone. Many other MSS operators are similarly pursuing opportunities to introduce D2D offerings using varying spectrum and satellite configurations. At the end of 2023, Viasat, in partnership with Skylo Technologies and Ligado’s SkyTerra Network, announced the launch of the world’s first global D2D network. This L-band network will allow Mobile Network Operators (MNOs), device manufacturers, and chipset makers the

Connected, Iridium, <https://www.iridium.com/case-studies/iridium-enables-rescue-squadron-to-work-faster-and-stay-connected/>; *The Future of Maritime Safety 2023: collaboration and data are key in tackling safety challenges*, Inmarsat, <https://www.inmarsat.com/en/insights/maritime/2023/the-future-of-maritime-safety-2023.html>.

⁵ *Apple's iPhone Emergency SOS Helps Locate Stranded Man in Alaska*, CNET, (Dec. 2, 2022) <https://www.cnet.com/tech/mobile/apples-iphone-emergency-sos-feature-saves-man-in-alaska/>.

ability to bring products to market leveraging the 3GPP Release 17 standards. The network will support smartphone services as well as, IoT, automotive and defense applications.⁶

Relatedly, Omnispace and Ligado Networks announced a memorandum of understanding in early 2023 to use their respective licensed MSS spectrum resources to enable global D2D solutions for voice, text, and data connectivity. This collaboration envisions utilizing large blocks of satellite spectrum in the L- and S-bands with multi-orbit satellite offerings to enable ubiquitous mobile connectivity for more than 5 billion mobile subscribers around the world where terrestrial cellular coverage does not exist today.

III. D2D Services Can Effectively Utilize Licensed MSS Spectrum.

The L- and S-bands are internationally harmonized and allocated by the ITU on a primary basis for MSS in the following bands:

- 1518-1525 MHz (space-to-Earth) paired with 1668-1675 MHz (Earth-to-space)
- 1525-1559 MHz (space-to-Earth) paired with 1626.5-1660.5 MHz (Earth-to-space)
- 1610-1626.5 MHz (Earth-to-space) paired with 2483.5-2500 MHz (space-to-Earth)
- 1980-2010 MHz (Earth-to-space -- 1980-2025 MHz in Region 2) paired with 2170-2200 MHz (space-to-Earth – 2160-2200 in Region 2)

The MSS bands are shared satellite resources, and these sharing mechanisms are established through the International Telecommunication Union (ITU) satellite coordination and notification procedures (ITU Radio Regulations Articles 9, 11, and 18).⁷ Cross-border and adjacent band interference concerns and spectrum requirements have been addressed and updated as the needs

⁶ *Viasat and Skylo Technologies Launch First Global Direct-to-Device Network*, VIASAT (Nov. 16, 2023) <https://news.viasat.com/viasat-and-skylo-technologies-launch-first-global-direct-to-device-network>.

⁷ ITU Radio Regulations, 2020 (as amended by WRC-23).

of MSS spectrum have evolved through certain Resolutions. Therefore, D2D using licensed MSS bands is straightforward from a sharing perspective.

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For all of these reasons, MSSA expects the competition and innovation in the D2D market to continue to be fierce in the years to come which will directly benefit the public. MSSA appreciates the Commission's efforts to advance the interests of the satellite industry generally and MSS operators specifically.

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