Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Single Network Future: Supplemental Coverage from Space	)	GN Docket No. 23-65
	)	
	)	
Space Innovation	)	IB Docket No. 22-271
	)	
	)	

REPORT AND ORDER AND FURTHER NOTICE OF PROPOSED RULEMAKING

Adopted: March 14, 2024 **Released: March 15, 2024**

Comment Date: 30 days after date of publication in the Federal Register
Reply Comment Date: 60 days after date of publication in the Federal Register

By the Commission: Chairwoman Rosenworcel and Commissioners Starks and Gomez issuing separate statements.

TABLE OF CONTENTS

I. INTRODUCTION

1. Today, we take a major step toward harnessing the power of hybrid satellite-terrestrial networks to connect everyone, everywhere to modern communications services. The regulatory framework we adopt—the first of its kind in the world—will enable collaborations between satellite operators and terrestrial service providers to offer ubiquitous connectivity directly to consumer handsets using spectrum previously allocated only to terrestrial service. We anticipate that supplemental coverage from space, or SCS, will enable consumers in areas not covered by terrestrial networks to be connected using their existing devices via satellite-based communications. SCS is a crucial component of the Commission's vision for a "single network future" in which satellite and terrestrial networks work seamlessly together to provide coverage that neither network can achieve on its own.

2. Our actions to facilitate the deployment of SCS will serve several important public interest goals for the nation. First, the SCS framework will expand the reach of communications services, particularly emergency services, so that connectivity and assistance is available in more remote places. Second, the SCS framework will spur advancements in cutting-edge, space-based technologies that will position the United States as a global leader in this arena. And third, the SCS framework will continue our efforts to promote the innovative and efficient use of our nation's spectrum resources in ways that foster creative collaborations among users.

3. In crafting this new framework, it is essential that we balance the desire to accelerate innovative SCS operations that will serve these critical public interest goals with the need to retain service quality of terrestrial networks, protect spectrum usage rights, and minimize the risk of harmful interference, both domestically and internationally. Accordingly, the framework we adopt in this *Report and Order* represents an initial step to encourage the development of SCS while minimizing the risks of harmful interference to existing terrestrial and satellite networks that support non-federal and federal users. In the future, as the marketplace for SCS develops, we plan to build on the framework we adopt today, to enable deployment of SCS in additional bands and scenarios.

4. In the *Report and Order*, to allow satellite communications on spectrum previously allocated only to terrestrial services, we modify the United States Table of Frequency Allocations to authorize bi-directional, secondary mobile-satellite service operations in certain spectrum bands that have no primary, non-flexible-use legacy incumbents, federal or non-federal. For these bands, we authorize SCS only where one or more terrestrial licensees—together holding all licenses on the relevant channel throughout a defined geographically independent area—lease access to their spectrum rights to a participating satellite operator, whose part 25 license reflects these frequencies and the geographically independent area in which they will offer SCS.

5. In recognition that this new offering has the potential to bring life-saving connectivity to remote areas, we apply interim 911 call and text routing requirements to ensure that help is available to those who need it today while we work toward enabling automatic location-based routing of all

emergency communications whether or not there is a terrestrial connection available. The *Further Notice of Proposed Rulemaking* we adopt today will help move us toward that goal.

6. We anticipate that the actions we take today will propel the United States towards a single network future that supports public safety, ubiquitous connectivity, technological innovation, sharing of spectrum resources, and global leadership, to the benefit of all Americans.

II. BACKGROUND

7. On March 17, 2023, the Commission released the *Notice of Proposed Rulemaking* seeking comment on a proposed regulatory framework necessary to enable SCS.[1] In the *Notice*, the Commission surveyed various partnerships between satellite service[2] providers and terrestrial wireless service[3] providers that are facilitating the development of satellite-terrestrial connectivity.[4] As the Commission explained, some partnerships rely on the use of spectrum allocated to satellite services, as opposed to spectrum allocated to terrestrial services, to provide expanded service options to subscribers using smartphones.[5] Other partnerships are premised on relationships between satellite operators and terrestrial wireless providers to use terrestrial wireless spectrum,[6] which is the scope of the new regulatory framework we adopt herein.

A. SCS Notice of Proposed Rulemaking

8. In the *Notice*, the Commission proposed to: (1) amend the U.S. Table to permit mobile-satellite service (MSS) on a co-primary basis in eligible flexible-use bands, operating as a non-conforming use where it conflicts with ITU allocations; (2) enable SCS only where a single terrestrial licensee holds all the spectrum access rights in a given channel in an entire geographically independent area (GIA)[7] and there are no primary, non-flexible-use incumbents in the band; and (3) require both a

[1] *See Single Network Future: Supplemental Coverage from Space; Space Innovation*, GN Docket No. 23-65, IB Docket No. 22-271, Notice of Proposed Rulemaking, FCC 23-22 (Mar. 17, 2023) (*Notice*).

[2] We use the term "satellite service" to mean "space radiocommunications." *See* ITU Radio Regulations No. 1.8 (defining space radiocommunications as "[a]ny radiocommunication involving the use of one or more space stations or the use of one or more reflecting satellites or other objects in space").

[3] We use the term "terrestrial wireless service," "terrestrial service," or "wireless service" to mean fixed and mobile services. *See* ITU Radio Regulations Nos. 1.7, 1.20, and 1.24. We use "terrestrial licensee" or "terrestrial provider" or "terrestrial service provider" to refer to a Commercial Mobile Radio Service (CMRS) provider.

[4] *See Notice* at 2-6, paras. 3-9.

[5] *Id.* at 3-4, paras. 4-5. In these scenarios, satellite operators are authorized under part 25 of the Commission's rules to use spectrum currently allocated for mobile-satellite service to provide such service (space-to-Earth) to smartphones. For example, the Globalstar and Apple partnership involves the use of Globalstar's licensed satellite spectrum to provide emergency messaging for Apple's recent iPhones when no cellular or Wi-Fi service is available. *See* Press Release, Apple, Emergency SOS via Satellite Available Today on the iPhone 14 Lineup in the US and Canada (Nov. 15, 2022), https://www.apple.com/newsroom/2022/11/emergency-sos-via-satellite-available-today-on-iphone-14-lineup/; Mitchell Clark, *Satellite-to-Phone Companies are Thrilled About SpaceX and T-Mobile, Actually*, (Aug. 27, 2022), https://www.theverge.com/2022/8/27/23324128/t-mobile-spacex-satellite-to-phone-technology-ast-lynk-industry-reactions-apple (Satellite-to-Phone Companies Aug. 27, 2022 Article). Apple advertises that its most recent iPhone 15 offers Emergency SOS via satellite in 14 countries and regions on three continents around the world, with plans to expand to additional countries. *See* Press Release, Apple, Apple Debuts iPhone 15 and iPhone 15 Plus (Sept. 12, 2023), https://www.apple.com/newsroom/2023/09/apple-debuts-iphone-15-and-iphone-15-plus/. Other partnerships are working toward "direct-to-device" offerings to enable messaging on cell phones using satellite spectrum. *See* Rachel Jewett, *Viasat, Ligado, and Skylo to Collaborate on Direct to Device Services*, (Mar. 2, 2023), https://www.satellitetoday.com/telecom/2023/03/02/viasat-ligado-and-skylo-to-collaborate-on-direct-to-device-services/.

[6] *See Notice* at 4-6, paras. 6-9.

[7] *See infra* para. 54.

lease agreement between the terrestrial licensee and non-geostationary satellite orbit (NGSO)[8] satellite operator and a modification of the satellite operator's part 25 license or market access authorization to enable the relevant transmissions. The *Notice* sought comment on this proposal and on expanding it to enable operations under additional circumstances, including where a single licensee does not control an entire GIA and where there are non-flexible-use incumbents.

9. Comments were due on May 12, 2023, and reply comments were due on June 12, 2023. During the comment period, the Commission received 39 comments, including one express comment, and 22 reply comments.[9]

B. Standardization Efforts Related to SCS

10. In the *Notice*, the Commission also noted the relevance of the 3rd Generation Partnership Project (3GPP)'s work regarding wireless standards insofar as it relates to collaborations between satellite operators and terrestrial service providers.[10] While some solutions are based on pre-Release 17 3GPP standards, 3GPP's Release 17 standards were the first to introduce features designed to efficiently support non-terrestrial network (NTN) operations with input from industry stakeholders and to address satellite's role in the development of 5G systems worldwide. Such specifications define support for New Radio (NR) based satellite access deployed in the Frequency Range 1[11] serving handsets and Very Small Aperture Terminals as well as narrowband Internet of Things and Long-Term Evolution Machine-Type Communication based access for enhanced machine-type communication using satellites.[12] In addition, 3GPP Release 18 includes extension of NTN to Frequency Range 2,[13] including operation in the Ku-band as well as enhancements for improved coverage, service continuity, and mobility between NTN and terrestrial networks.[14] More recently, 3GPP approved a plan to submit a 5G NR satellite access Radio Interface Terminal proposal to International Mobile Telecommunications-2020 (IMT-2020).[15]

11. 3GPP's focus has primarily been on incorporating bands allocated for satellite services into terrestrial devices, but some of the bands under consideration by 3GPP—such as the S band[16] and the

[8] *See* 47 CFR § 25.103.

[9] Parties that filed comments, reply comments, and *ex partes* in the proceeding are listed in Appendix A.

[10] *See Notice* at 3-4, 50, paras. 5, 130.

[11] Frequency Range 1 bands refers to bands below 24 GHz. Release 17 identified two bands with existing MSS allocations for 5G NTN provision: band 255 (1525 MHz-1559 MHz and 1626.5 MHz-1660.5 MHz) and band 256 (1980 MHz-2010 MHz and 2170 MHz-2200 MHz). *See* Munira Jaffar & Nicolas Chuberre, *NTN & Satellite in Rel-17 & 18*, (July 1, 2022), https://www.3gpp.org/news-events/partner-news/ntn-rel17 (NTN & Satellite July 1, 2022 Article).

[12] *See* NTN & Satellite July 1, 2022 Article. The authors suggest that terrestrial/satellite partnerships "will enable the full integration of satellite in the 3GPP ecosystem and define a global standard for future satellite networks. This will address the challenges of reachability and service continuity in unserved/underserved areas, enhance reliability through connectivity between various access technologies, and improve network resilience and dependability in responding to natural and man-made disasters." *Id.*

[13] Frequency Range 2 bands refers to bands above 24 GHz, specifically 24.25 GHz to 52.6 GHz.

[14] *See* 3GPP RP-232669 Work Item NR NTN enhancements Release 18.

[15] *See* 3GPP TR 37.911 V0.1.0 (2023-09) Technical Report: Study on self-evaluation toward the IMT-2020 submission of the 3GPP Satellite Radio Interface Technology (Release 18). IMT-2020 is a standard set of specifications for 5G networks issued by the ITU Radiocommunication Sector (ITU-R) of the ITU. The Commission submits information about U.S.-licensed satellites to the ITU and, after coordination is completed and a notification is filed with the ITU containing the final technical parameters of the system, the ITU subsequently places the frequency assignments in the Master International Frequency Register (MIFR). The Commission thereby must ensure that U.S.-licensed satellite operators will abide by ITU requirements for satellite operations.

[16] The S band includes frequencies from 2 GHz to 4 GHz.

Ku-band[17]—include overlapping terrestrial allocations. In the *Notice*, the Commission sought comment on 3GPP's work to address interference concerns related to satellite-based operations in flexible-use spectrum that was designated for terrestrial networks, and whether that work, or related work being done by other organizations, should be incorporated into this proceeding.[18] Satellite companies, such as EchoStar, have long encouraged 3GPP to incorporate satellite components.[19] These companies recognize that satellites can be an important means to provide connectivity to underserved and unserved areas.[20] We believe that the SCS framework that we adopt today will help advance technological innovation as it pertains to SCS operations. We will continue to monitor 3GPP and other international fora and welcome such efforts as they facilitate the realization of SCS systems and their efficient inter-operation with terrestrial networks that is key to safe and predictable end user experiences. We believe that the record in this proceeding provides a sufficient basis for moving forward with authorizing SCS services and adopting rules applicable to their operation.

C. SCS Development by Industry

12. As explained in the *Notice*, satellite operators and terrestrial service providers recognize the potential of using spectrum currently allocated for terrestrial wireless service to directly serve consumer handsets and other end-user devices from satellites.[21] Because these efforts rely on satellite operators using spectrum allocated to terrestrial services that is exclusively licensed to terrestrial service providers, this approach has, to date, required Commission review outside of the existing regulatory frameworks to permit satellite use. Specifically, the Commission has facilitated satellite and terrestrial partnerships that deliver connectivity over terrestrial spectrum by granting experimental authorizations, other limited authorizations, and ad hoc rule waivers.[22] The following is a summary of Commission action related to SCS.

13. *Experimental Authorizations.* As the *Notice* details, in 2017, the Commission's Office of Engineering and Technology (OET) and what was then the International Bureau (IB) granted Higher

[17] The conventional Ku-band refers to frequencies in the 11.7-12.2 GHz (space-to-Earth) and 14.0-14.5 GHz (Earth-to-space) bands. The extended Ku-band refers to frequencies in the 10.95-11.2 GHz (space-to-Earth), 11.45-11.7 GHz (space-to-Earth), and 13.75-14.0 GHz (Earth-to-space) bands.

[18] *See Notice* at 50, para. 130.

[19] *See* The Hughes Team, *Upcoming 3GPP Release 17 to Include Satellite in Global 5G Standard*, (June 22, 2021), https://www.hughes.com/resources/insights/5g/upcoming-3gpp-release-17-include-satellite-global-5g-standard; *see also* Press Release, EchoStar, EchoStar Begins Construction of Global S-band Network (Feb. 1, 2023), https://ir.echostar.com/news-releases/news-release-details/echostar-begins-construction-global-s-band-network (announcing EchoStar's agreement with Astro Digital for the construction of a global S-band MSS network to deliver global Internet of Things (IoT), machine-to-machine (M2M) and other data services through a constellation intended to "serve as a foundation for EchoStar to engineer 5G New Radio (NR) based NTN capabilities according to 3GPP release 17 specifications"); Skylo Team, *MediaTek and Skylo Collaborate on Next-Gen 3GPP NTN Satellite Solutions on Smartphones and Wearables*, (Feb. 14, 2023), https://www.skylo.tech/newsroom/mediatek-and-skylo-collaborate-on-next-gen-3gpp-ntn-satellite-solutions-on-smartphones-and-wearables (announcing the continuing partnership between Skylo, an NTN service provider, and chipset manufacturer MediaTek, to work toward the integration of "cellular and satellite connectivity into the same device").

[20] T-Mobile contends that incorporation of 3GPP work is not necessary because that group tends to follow the industry and 3GPP can therefore be expected to address SCS standardization issues going forward, as necessary. T-Mobile Comments, GN Docket No. 23-65, at 17 (rec. May 12, 2023). Fairspectrum observes that the SCS framework could apply pressure on 3GPP to work on co-channel spectrum sharing between satellite and terrestrial operations. Fairspectrum Oy Comments, GN Docket No. 23-65, at 2 (rec. May 15, 2023) (Fairspectrum Comments). Omnispace worries that SCS, as proposed, departs from consensus-driven international efforts like 3GPP and risks exacerbating global interference concerns. Omnispace LLC Comments, GN Docket No. 23-65, at 6, 12-14, 17-31 (rec. May 14, 2023) (OmniSpace Comments).

[21] *See Notice* at 4-6, paras. 6-9.

[22] *Id.* at 6-8, paras. 10-15.

Ground LLC (Higher Ground) a waiver of the United States Table of Frequency Allocations (U.S. Table) and the fixed-satellite service (FSS) coordination rules for the company to use satellites in the 6 GHz band (allocated for the FSS and Fixed Service) to provide a commercially available text messaging service using a sleeve that attaches to smartphones.[23] This grant followed Higher Ground's initial operations under experimental licenses dating back to 2014.[24] In 2021 and 2022, OET granted Totum Labs, Inc. (Totum) two experimental licenses: one for a satellite communicating with a single earth station in San Diego, CA, and the other for satellite communications with the San Diego earth station as well as "mobile station locations."[25] These experimental licenses allow Totum to test satellite communication and tracking of IoT devices in the 2400-2483.5 MHz band using spread spectrum waveforms.[26] In 2021 and 2022, OET granted several experimental licenses allowing Lynk Global (Lynk) to test communications between satellites and "mobile station locations" in the 800 MHz band.[27] In 2022, OET also granted an experimental license to AST SpaceMobile (AST) for earth stations to communicate with a satellite licensed by Papua New Guinea and to be registered with the International Telecommunication Union (ITU) by Spain.[28] AST's experimental license permits testing to inform AST's plan to provide 4G and 5G broadband connectivity in unserved and underserved areas.[29] OET has also granted experimental licenses to Omnispace LLC (Omnispace) for testing communications with its Medium Earth Orbit satellite in the 2 GHz S band.[30] Various parties continue to file experimental license applications to test space-based communications with points on Earth, and the Commission will continue to process them.

14. *Lynk Global*. As described in the *Notice*, Lynk has partnered with a number of mobile network operators (MNOs) outside of the United States to provide satellite connectivity to user terminals currently operating as part of the MNOs' terrestrial network.[31] In 2022, IB authorized, with conditions, Lynk's request to operate an NGSO satellite system at locations outside the United States, and in

[23] *See Higher Ground Application for Blanket Earth Station License*, IBFS File No. SES-LIC-20150616-00357 Call Sign E150095, Order and Authorization, 32 FCC Rcd 728 (Jan. 18, 2017) (*Higher Ground Waiver Order*). Higher Ground is required to prevent the devices from transmitting where they may cause interference to the microwave links in the band. *Id.* at 732.

[24] *Higher Ground Waiver Order*, 32 FCC Rcd at 730 n.8.

[25] *See* ELS File No. 0391-EX-CN-2020 (granted Jan. 14, 2021); ELS File No. 0044-EX-CM-2022 (granted May 12, 2022). The relevant satellites are operated by Loft Orbital Solutions, Inc. pursuant to a satellite license conditional grant from IB in May 2021. *See* Loft Orbital Solutions, Inc., Application for Earth Exploration Satellite Service Other, IBFS File No. SAT-LOA-20200907-00105 (granted May 24, 2021).

[26] *See* ELS File No. 0391-EX-CN-2020; ELS File No. 0044-EX-CM-2022.

[27] *See* ELS File No. 0931-EX-CN-2020 (granted May 17, 2021); ELS File No. 0162-EX-CN-2021 (granted Mar. 19, 2021); ELS File No. 0656-EX-CN-2021 (granted Nov. 19, 2021). In May 2022, OET granted licenses to Lynk for additional satellites that were expected to launch in late 2022 and early 2023. *See* ELS File No. 0117-EX-CN-2021 (granted May 25, 2022); ELS File No. 0113-EX-CN-2022 (granted May 25, 2022). Lynk deployed and began operating the first satellite, Lynk Tower 1, in April 2022 pursuant to experimental authority. *See* ELS File No. 0656-EX-CN-2021 (granted Nov. 19, 2021); Letter from Shawn Marcum, Director of Legal and Regulatory Affairs to Lynk, to Marlene H. Dortch, Secretary, FCC, at 1 (filed Apr. 12, 2022).

[28] *See* ELS File No. 1059-EX-CN-2020 (granted June 2, 2022). This license was modified in early 2023 to add a mobile station location in Hana, Hawaii, and has since been renewed. *See* ELS File No. 0208-EX-CN-2022 (granted Feb. 9, 2023); *see also* ELS File No. 0130-EX-CR-2023 (granted May 8, 2023).

[29] *See* Narrative attached to AST & Science LLC application for ELS File No. 1059-EX-CN-2020 (granted June 2, 2022).

[30] *See, e.g.*, ELS File No. 0018-EX-CN-2023 (granted Feb. 14, 2023), which modifies ELS File No. 1343-EX-CN-2022 (granted Jan. 9, 2023) to add two station locations in Brewster, Washington, and Tysons, Virginia, to the already authorized location in Gainesville, Georgia.

[31] *See Notice* at 5, para. 8.

countries where Lynk has obtained agreements with MNOs and the requisite local regulatory authority to provide service.[32] IB authorized Lynk to deploy ten NGSO MSS satellites as part of a "cellular-based satellite communications network" that would provide connectivity by operating on most cellular frequencies used globally in the 617-960 MHz band in international markets only.[33] Lynk announced that it has contracts with more than 30 MNOs covering more than 50 countries where its "satellite-direct-to-standard-mobile-phone-system" is being deployed, providing emergency alerts and two-way Short Message Service (SMS) messaging.[34] Although Lynk has five low Earth orbit (LEO) satellites in orbit of its planned network of approximately 5,000 satellites, it has mentioned plans to expand its geographic coverage and service capabilities.[35]

15. *AST SpaceMobile*. AST has partnered with several MNOs for its planned satellite to smartphone service, including AT&T and Vodafone.[36] In 2020, as discussed in the Notice, AST originally filed applications with the Commission requesting U.S. market access for gateway links in the V-band for its SpaceMobile satellite system, which would be comprised of 243 LEO satellites.[37] Although AST requested authority to operate in the United States, it clarified that it was not seeking to operate on terrestrial frequencies independent of a terrestrial licensee partner,[38] and intended to seek specific authority to operate on terrestrial spectrum through future lease arrangements with a terrestrial partner.[39] At that time, AST stated that it was not seeking changes to the U.S. Table or waivers related to terrestrial frequencies allocated to parts 24 and 27 of the Commission's rules.[40] In 2023, following release of the *Notice*, AST and AT&T sought authorization from the Commission to provide SCS using certain bands licensed to AT&T pursuant to a leasing arrangement between the parties.[41] AST also filed an amendment to its pending market access petition to request part 25 authorization to offer SCS pursuant to its partnership with AT&T to lease certain of its terrestrial mobile broadband frequencies.[42] In 2024, AST filed an additional amendment whereby it requests a U.S. license, rather than a grant of U.S. market access, for its SpaceMobile satellite system and an increase in the size of its planned constellation from

---

[32] *See Lynk Global, Inc., Application to Deploy and Operate Space Stations Filed Under the FCC Streamlined Small Space Station Authorization Process, 47 CFR § 25.122*, ICFS File No. SAT-LOA-20210511-00064 Call Sign S3087, Order and Authorization, 37 FCC Rcd 10681, 10681 (IB Sept. 16, 2022) (*Lynk Order*); Lynk Global, Inc., ICFS File No. SAT-LOA-20210511-00064, Technical Narrative at 2. The then-International Bureau granted, with conditions, Lynk's application to construct, deploy, and operate ten NGSO satellites in low-Earth orbit (LEO). *Lynk Order*, 37 FCC Rcd at 10681, para. 1.

[33] *See generally Lynk Order*.

[34] *See* Press Release, Lynk, Lynk and Vodafone Cook Islands to Begin Sat2Phone Service for Subscribers (Aug. 8, 2023), https://lynk.world/news/lynk-and-vodafone-cook-islands-to-begin-sat2phone-service-for-subscribers/.

[35] *See* Jason Rainbow, *The Promise of Direct-to-Device*, (July 14, 2023), https://spacenews.com/the-promise-of-direct-to-device/; Letter from Margo R. Deckard, Chief Operating Officer, Lynk Global, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-65 et al., at 2 (filed Mar. 7, 2024) (Lynk Add'l Mar. 7, 2024, *Ex Parte*).

[36] *See Notice* at 5-6, para. 9.

[37] *See* AST & Science LLC, Amendment to Petition for Declaratory Ruling, ICFS File No. SAT-APL-20201028-00126 Call Sign S3065 (filed Oct. 28, 2020) (amending ICFS File Nos. SAT-PDR-20200413-00034 and SAT-APL-20200727-00088).

[38] *Id.*

[39] *Id.*

[40] *Id.*

[41] *See* ULS File Nos. 0010538493 (lead), 0010538588, 0010538610, 0010538635, 0010538647, 0010538661, and 0010538682 (notifying the Commission of AT&T's intention to "lease to AST certain 850 MHz cellular A and B block spectrum as well as certain Lower 700 MHz B and C block spectrum" in order to provide SCS).

[42] *See* AST & Science LLC, Amendment to Petition for Declaratory Ruling, ICFS File No. SAT-APL-20230717-00172 Call Sign S3065 (filed July 17, 2023).

243 to 248 satellites.[43] As part of this request, *inter alia*, AST updates its requested orbital parameters and includes a comprehensive overview of the frequencies upon which its planned constellation would be capable of operating—AST seeks initial authorization to operate the satellites only using the V-band in the United States and deferral of the request to provide SCS within the United States.[44] Commission staff are considering the pending AST requests for satellite-to-device authority.

16. *SpaceX.* As discussed in the *Notice*, in August 2022, Space Exploration Technologies Corporation (SpaceX) announced a partnership with T-Mobile in which SpaceX would use a block of T-Mobile's mid-band Personal Communications Services (PCS) spectrum held over a nationwide footprint to provide service to T-Mobile's subscribers in rural and remote locations, thereby filling coverage gaps in T-Mobile's terrestrial network.[45] Three Commission actions to date have provided an avenue for SpaceX and T-Mobile to deploy and test their proposed SCS system while review of their pending applications—and this proceeding—continue. First, in December 2023, the Space Bureau (SB) granted-in-part and deferred-in-part, with conditions, SpaceX's request for modification of its previously authorized second-generation (Gen2) Starlink constellation.[46] Specifically, SB authorized SpaceX to deploy a modified version of the previously-authorized Gen2 Starlink satellites with SCS-capable antennas, with the ability to operate in certain frequencies in the 1429 MHz to 2690 MHz range and on frequencies within the 1910-1915 MHz and 1990-1995 MHz bands for limited on-orbit check out of the antennas immediately following deployment of each satellite for a period of 10 days or less, to ensure initial functionality of the satellite antenna. Second, later in December 2023, SB approved SpaceX's earth station STA application for limited on-orbit testing.[47] Finally, also in December 2023, OET granted

[43] *See* AST & Science LLC, Amendment to Petition for Declaratory Ruling, ICFS File No. SAT-APL-20240311-00053 Call Sign S3065 (filed Mar. 11, 2024).

[44] *See id.* AST also seeks to provide off-nominal TT&C outside of the United States in the S-band and UHF band. *See id.* The application also includes frequencies that AST SpaceMobile may use for service links in foreign jurisdictions, but for which AST does not seek instant Commission action. *See id.*

[45] *See T-Mobile Takes Coverage Above and Beyond with SpaceX*, (Aug. 25, 2022), https://www.t-mobile.com/news/un-carrier/t-mobile-takes-coverage-above-and-beyond-with-spacex (T-Mobile Aug. 25, 2022 Article); Rachel Jewett, *Elon Musk Announces SpaceX Starlink Cellular Partnership with T-Mobile*, (Aug. 25, 2022), https://www.satellitetoday.com/telecom/2022/08/25/elon-musk-announces-spacex-starlink-cellular-partnership-with-t-mobile/.

[46] *See* Space Exploration Holdings, LLC Application for Modification of Authorization for the SpaceX Gen2 NGSO Satellite System to Add a Direct-to-Cellular System, ICFS File No. SAT-MOD-20230207-00021 Call Sign S3069 (granted-in-part, deferred-in-part Dec. 1, 2023) (SpaceX Gen2 SCS Modification Application). In December 2022, the Commission granted SpaceX authority to construct, deploy, and operate up to 7,500 NGSO satellites, using frequencies in the Ku- and Ka-bands, to provide FSS as part of its "second-generation" Starlink LEO constellation (Gen2 Starlink Order) subject to certain conditions. The Commission deferred consideration of SpaceX's use of the E-band frequencies and use of tracking beacons as well as the remaining 22,488 satellites in SpaceX's application. *See Space Exploration Holdings, LLC Request for Orbital Deployment and Operating Authority for the SpaceX Gen2 NGSO Satellite System*, ICFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105 Call Sign S3069, Order and Authorization, 37 FCC Rcd 14882, at 14884 (Dec. 1, 2022) (*SpaceX Gen2 Order*), *appeals pending sub nom. Int'l Dark Sky Ass'n v. FCC*, No. 22-1337 (D.C. Cir. filed Dec. 30, 2022), *Dish Network Corp. v. FCC*, No. 23-1001 (D.C. Cir. filed Jan. 3, 2023). Prior to this partial grant, on March 28, 2018, the Commission granted SpaceX authority to deploy and operate its first-generation NGSO satellite system comprising 4,425 satellites operating in the Ku- and Ka-bands for provision of FSS (Gen1 Starlink). *Space Exploration Holdings, LLC et al.*, IBFS File No. SAT-LOA-20161115-00118 Call Sign S2983, IBFS File No. SAT-LOA-20170726-00110 Call Sign S3018, Memorandum Opinion, Order and Authorization, 33 FCC Rcd 3391, 3391, 3403-04, paras. 1, 33 (2018). Subsequently, the Commission granted three license modifications for the Gen1 Starlink system, and a number of requests for Special Temporary Authority (STA) for LEOP and payload testing operations, and to adjust earth station elevation angles.

[47] *See* Space Exploration Holdings, LLC, Application for Special Temporary Authority, ICFS File No. SES-STA-20231201-02496 (granted Dec. 14, 2023).

SpaceX's part 5 experimental STA for testing in 25 terrestrial locations.[48]

17. SpaceX's requests for broader authority remain pending. SB and the Wireless Telecommunications Bureau (WTB) continue to consider the issues presented in SpaceX's Gen2 SCS modification request and the accompanying lease application filed by SpaceX and T-Mobile,[49] both of which are the subject of an April 2023 *Public Notice*.[50] In response, some commenters expressed concerns about potential interference that would result from the proposed operations.[51] AT&T argued that the parties have failed to meet the waiver standard with respect to the U.S. Table, failed to request other necessary rule waivers, and omitted necessary technical information.[52] Others expressed procedural objections to the applications.[53]

III. REPORT AND ORDER

18. Satellite-to-device connectivity can support critical public interest benefits, including ubiquitous connectivity, access to 911 service from remote areas, technological advancement, and innovative spectrum use. In recognition of these benefits, the Commission proposed an SCS framework to enable the rapid deployment of these systems while recognizing that the technical and legal complexities involved in allowing satellite transmissions on spectrum allocated for terrestrial service calls

[48] *See* Space Exploration Holdings, LLC, Application for Experimental Special Temporary Authority, ELS File No. 2398-EX-ST-2023 (granted Dec. 20, 2023); Space Exploration Holdings, LLC, Application for Experimental Special Temporary Authority, ELS File No. 2479-EX-STA-2023 (granted Dec. 20, 2023). On March 7, 2024, SpaceX reported that its initial launch and testing had been a "massive success," demonstrating SMS and data capabilities across a range of devices. Letter from David Goldman, Vice President of Satellite Policy, Space Exploration Technologies Corp, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-65 et al., at 1 (filed Mar. 7, 2024).

[49] *See* SpaceX Gen2 SCS Modification Application, ICFS File No. SAT-MOD-20230207-00021; ULS File Nos. 0010303032, 0010303146, 0010303124, and 0010303084 (filed Dec. 6, 2022 and amended Feb. 7, 2023).

[50] *Space Bureau and Wireless Telecommunications Bureau Seek Comment on Filings of SpaceX and T-Mobile Requesting to Establish Supplemental Coverage from Space; Space Exploration Holdings, LLC Application Accepted for Filing*, GN Docket No. 23-135, ICFS File No. SAT-MOD-20230207-00021, Public Notice, DA 23-338 (WTB/SB Apr. 28, 2023); *see* 47 CFR § 25.151.

[51] *See, e.g.*, National Radio Astronomy Observatory Opposition, GN Docket No. 23-135, at 4-5 (rec. May 4, 2023) (NRAO Opposition) (arguing that the proposed operations would create harmful interference with the National Radio Quiet Zone); Rural Wireless Association, Inc. (RWA) Comments, GN Docket No. 23-135, at 2-3 (rec. May 18, 2023) (expressing concern that the proposed operations may cause adjacent channel harmful interference to operations in the PCS C-Block in rural and remote areas); Opposition of Omnispace, LLC, GN Docket No. 23-135, at 5-7 (rec. May 18, 2023) (Omnispace Opposition) (arguing that SpaceX's downlink MSS operations within the United States may cause interference with MSS uplink operations outside the United States); TerreStar Solutions Reply, GN Docket No. 23-135, at 2-4 (rec. May 30, 2023) (TerreStar SpaceX Filing Reply) (expressing concern about harmful interference to domestic and international MSS operators, as well as to operations in adjacent channels).

[52] *See* AT&T Comments, GN Docket No. 23-135, at 4-6 (rec. May 18, 2023). Specifically, AT&T contends that SpaceX and T-Mobile should request a waiver of several part 24 rules, including those addressing equipment authorization, calculation of heigh above average terrain, frequency restriction, power and antenna height limits, interference protection, and maintenance of station location information. *Id*. at 4-8. Further, AT&T argues that SpaceX should submit detailed information regarding how it will comply with part 24's frequency stability requirements, field strength limits, and OOBE limitations. *Id*. at 10-12.

[53] *See, e.g.*, NRAO Opposition, GN Docket No. 23-135, at 5 (arguing that it is premature for the Commission to consider the request); Petition to Dismiss or Deny of DISH Network Corporation, GN Docket No. 23-135, at 2, 5 (rec. May 19, 2023) (arguing that the application violates section 25.159 of the Commission's rules, which limits pending applications and unbuilt satellite systems, and suggests that the number of waiver requests run the risk of "swallowing the rules").

for an incremental approach.[54] In response to the *Notice*, a substantial number of commenters expressed support for the establishment of an SCS framework.[55] Today, we adopt this framework, with some modification from the Commission's initial proposal. We adopt rules that modify the U.S. Table to authorize bi-directional, secondary MSS operations in certain spectrum bands that have no primary, non-flexible-use legacy incumbents, federal or non-federal. For these bands, our rules authorize SCS only where one or more terrestrial licensees—together holding all licenses on the relevant channel throughout a GIA—lease access to their spectrum rights to a participating satellite operator, whose part 25 license reflects these frequencies and the GIA in which they will offer SCS.

A. Establishing a Framework for Supplemental Coverage from Space

19. The Commission is charged with regulating radio spectrum across the United States in a manner which serves the public interest.[56] In order to promote administrative efficiency, predictability, and consistency, it prefers to do so by generally-applicable rules, adopted through notice-and-comment proceedings such as this one, rather than by issuing individual waivers in those cases where the Commission finds good cause.[57] This approach allows the Commission to carefully consider the entire landscape of an issue and make comprehensive policy—rather than being limited only to the specific facts before it—while maintaining the "safety valve" of waivers for circumstances that differ from the norm and justify unique treatment.[58] As the Commission described in the *Notice*, even before the start of this proceeding, several stakeholders supported the Commission's initiation of a rulemaking on this issue.[59] However, in response to the *Notice*, some commenters suggest that the best path forward is a waiver-based or case-by-case approach, and not a new regulatory framework. For example, AT&T states that the Commission should proceed with a waiver-based approach to SCS, not the adoption of new rules or allocations, stressing that SCS is a supplement to terrestrial networks which must be protected first and foremost.[60]

20. Under the suggested waiver-based approach, parties would apply to the Commission and be required to demonstrate with predictive models that SCS operations would not interfere with terrestrial systems.[61] AT&T, Verizon, and T-Mobile argue that a waiver-based approach using existing rules is a better approach than the adoption of a new regulatory framework essentially because it would be premature to adopt complex rules given the nascent and supplemental nature of SCS.[62] CTIA suggests a

[54] *See Notice* at 19, para. 42.

[55] *See, e.g.*, Association of Public-Safety Communications Officials-International, Inc. Comments, GN Docket No. 23-65, at 1-2 (rec. May 12, 2023) (APCO Comments); AST SpaceMobile, Inc. Comments, GN Docket No. 23-65, at 1 (rec. May 14, 2023) (AST Comments); Boulder Regional Emergency Telephone Service Authority Comments, GN Docket No. 23-65, at 1-2 (rec. June 12, 2023) (BRETSA Comments); Rural Wireless Association, Inc. Comments, GN Docket No. 23-65, at 1-3 (rec. May 12, 2023) (RWA Comments); TechFreedom Comments, GN Docket No. 23-65, at 2-3 (rec. May 12, 2023); Viasat, Inc. Comments, GN Docket No. 23-65, at 1 (rec. May 12, 2023) (Viasat Comments); T-Mobile USA, Inc. Reply Comments, GN Docket No. 23-65, at 3-4 (rec. June 12, 2023) (T-Mobile Reply).

[56] 47 U.S.C. § 301; *WAIT Radio v. FCC*, 418 F.2d 1153, 1157 (D.C. Cir. 1969).

[57] *See WAIT Radio*, 418 F.2d at 1159; *see also Mary V. Harris Foundation v. FCC*, 776 F.3d 21, 28-29 (D.C. Cir. 2015); *Delta Radio, Inc. v. FCC*, 387 F.3d 897, 900-01 (D.C. Cir. 2004).

[58] *See Indus. Broad. Co. v. FCC*, 437 F.2d 680, 683 (D.C. Cir. 1970); *WAIT Radio*, 418 F.2d at 1156, 1157, 1159.

[59] *See Notice* at 12, para. 24 n.92.

[60] AT&T Services, Inc. Comments, GN Docket No. 23-65, at 2-3, 5-7 (rec. May 12, 2023) (AT&T Comments); AT&T Services, Inc. Reply, GN Docket No. 23-65, at 1-2 (rec. June 12, 2023) (AT&T Reply).

[61] AT&T Comments at 7-9; AT&T Reply at 4. Verizon agrees with AT&T's proposals. Verizon Reply, GN Docket No. 23-65, at 4-5 (rec. June 12, 2023) (Verizon Reply).

[62] Verizon Comments, GN Docket No. 23-65, at 7 (rec. May 12, 2023); T-Mobile USA, Inc. Comments, GN Docket No. 23-65, at 2 (rec. May 12, 2023) (T-Mobile Comments).

similar process that relies on secondary market rules, technical demonstrations, and "targeted rule waivers."[63]

21. In contrast, Omnispace, SpaceX, AST, and Lynk disagree with commenters who favor a waiver-based approach. Omnispace opposes reliance on case-by-case waivers, noting that "virtually every communications service provider participating in this proceeding" indicates an interest in SCS.[64] SpaceX argues that proceeding exclusively by waiver would restrict flexibility, undermine the Commission's goal of fostering innovation and rapid deployment of competitive operations, and subject "all applications to regulatory gamesmanship."[65] AST appreciates that the Commission will continue to process waiver requests, but argues that waivers should not become the "norm" because they would "create undue burden and uncertainty for applicants."[66] Lynk recommends that interim waivers be available to interested parties, but that the Commission should adopt a rules-based approach to SCS "to provide long-term certainty, consistency, and transparency for operators and other spectrum users."[67] Lynk adds that a rules-based approach with technology-neutral rules "ensures that licenses are granted through open processes, based on objective, pre-determined qualifications, rather than subjective, case-by-case assessments."[68]

22. We find that a hybrid approach of adopting rule changes to execute a new regulatory framework for SCS—while continuing to actively monitor the nascent SCS marketplace to consider modifications and to address proposals that do not fit neatly within our framework by waiver—is the best path forward, that this approach is reasonable in light of the record developed in this proceeding particularly regarding technical issues, and that such an approach satisfies the need to be fair, transparent, and efficient, all in serving the public interest.[69] The complexity inherent in fusing satellite and terrestrial operations calls for transparent, consistent, predictable rules that will support growth and innovation in the United States. We anticipate that our rules will inform our counterparts in other countries as we all face similar interference management challenges in fostering these types of collaborations and services.

23. While we today establish a framework to enable SCS on a variety of bands in all parts of the United States, we recognize, as the Commission did in the *Notice*,[70] that there are particular SCS implementations that may not align with this framework. Because we do not want to discourage or delay other innovative solutions for supplemental satellite coverage, we will continue to consider on a case-by-case basis filings for waiver or STA made by interested parties for SCS, including proposals to operate in bands not identified as eligible for SCS in the framework we adopt today. Additionally, in the future, as the marketplace for SCS develops, we plan to build on this framework, to enable deployment of SCS in additional bands and scenarios.

24. Some commenters raise concerns that the Commission should not move forward in

[63] CTIA Comments, GN Docket No. 23-65, at 6-7 (rec. May 12, 2023).

[64] Omnispace LLC Reply, GN Docket No. 23-65, at 30-33 (rec. June 12, 2023) (Omnispace Reply) (arguing that, while international consensus on the use of spectrum for SCS is necessary prior to moving forward with the adoption of an SCS framework, a comprehensive rule change is ultimately preferable to a waiver approach).

[65] Space Exploration Holdings, LLC Reply, GN Docket No. 23-65, at 6-7, 9 (rec. June 12, 2023) (SpaceX Reply).

[66] AST Comments at 14-15.

[67] Lynk Global, Inc. Reply, GN Docket No. 23-65, at 2 (rec. June 12, 2023) (Lynk Reply).

[68] *Id*.

[69] Letter from Jameson Dempsey, Principal, Space Exploration Technologies Corp, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-65 et al., at 1 (filed Feb. 28, 2024) (SpaceX Feb. 28, 2024, *Ex Parte*) ("This dual-track approach will more quickly deliver the Commission's vision of a Single Network Future for consumers here and abroad, and will set a strong example for others to follow.").

[70] *Notice* at 12-20, paras. 24-43.

adopting the proposed SCS framework without first achieving international consensus.[71] National Radio Astronomy Observatory (NRAO) and Omnispace suggest that SCS should be an agenda item for the World Radiocommunication Conference 2027 (WRC-27), where it can be studied and there can be an opportunity to build international consensus.[72] Omnispace goes so far as to claim that the adoption of our proposed framework "will vitiate decades of American diplomacy and risk destroying U.S. influence as a spectrum policy leader for the world."[73] We disagree. We believe that it would serve the public interest to address any domestic impediments, enable innovations and investments in efficient and effective use of the spectrum, and foster U.S. leadership in spectrum-based services. In addition, developing a successful domestic framework without delay is an important opportunity to spur innovation and offer our domestic experience and leadership to the international community as the marketplace for SCS continues to evolve. We agree with commenters who recognize that international regulators are looking to the FCC for leadership on how to address novel SCS services.[74] We believe the rules we adopt today strike the appropriate balance between speed and comprehensiveness that will enable SCS to continue to develop and mature under our continued—and constantly evolving—supervision. We also agree with SpaceX that an approach that waits for international consensus before acting would leave American innovation at the mercy of "lengthy and cumbersome international harmonization effort[s]," could harm American companies, and would "delay global development of this new life-saving technology, potentially for decades."[75] We note that the World Radiocommunication Conference 2023 decided to add an agenda item for WRC-27 to study several candidate bands already allocated to the mobile service and identified for terrestrial International Mobile Telecommunications (IMT) to assess whether these bands can be used for MSS that would be delivered directly to terrestrial IMT user equipment to complement terrestrial mobile coverage.[76] We will participate in these ITU studies and other international undertakings to ensure significant progress to establish an international regulatory framework in the ITU Radio Regulations for SCS.

25. Our hope is that our domestic proceeding will improve the deployment of this exciting new service in the United States, with the added benefit of informing how other countries approach the challenges involved in enabling satellite-to-device connectivity and serving as a regulatory model for other administrations. We are keenly aware of the need to minimize the risk of harmful interference, and that goal is at the center of our SCS framework. First, we note that the new MSS allocations we add to the U.S. Table will remain subject to the United States' international obligations under treaties, bilateral or multilateral agreements, the International Radio Regulations, and other instruments of the ITU. Furthermore, we are adding an MSS allocation to certain bands to permit SCS operations on a secondary basis domestically, not on a co-primary basis as proposed in the *Notice*.[77] As suggested by Kepler,[78] we

[71] Omnispace LLC Reply, GN Docket No. 23-65, at 3, 18-20 (rec. June 12, 2023) (Omnispace Reply).

[72] NRAO Comments, GN Docket No. 23-65, at 4 (rec. May 8, 2023) (NRAO Comments); Omnispace Reply at 19-20.

[73] Omnispace Reply at 2.

[74] *See, e.g.*, Letter from Margo R. Deckard, Chief Operating Officer, Lynk Global, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-65 et al., at 1, 2 (filed Dec. 11, 2023); SpaceX Reply at iii; SpaceX Feb. 28, 2024, *Ex Parte* at 1-2 (stating the SCS framework "will balance the strong interest in bringing American innovation to international markets with the Commission's role as filing administration").

[75] SpaceX Reply at 10.

[76] *See* International Telecommunication Union (ITU) World Radiocommunication Conference (WRC-23), Provisional Final Acts, (WRC-23 Provisional Final Acts). Res Com 6/9 (WRC-23) Studies on possible new allocation to the MSS for direct connectivity between space stations and IMT user equipment to complement terrestrial IMT network coverage, WRC-23 Provisional Final Acts at p. 567-569, https://www.itu.int/dms_pub/itu-r/opb/act/R-ACT-WRC.15-2023-PDF-E.pdf.

[77] *See infra* paras. 46-52.

[78] Kepler Communications Comments, GN Docket No. 23-65, at 5-6 (rec. May 14, 2023) (Kepler Comments).

are enabling certain SCS operations domestically in the United States while also reminding our licensees that SCS operations shall not cause harmful interference to other countries' operations that conform to the ITU Radio Regulations and shall eliminate any harmful interference immediately. We will continue to monitor ongoing international work on SCS and adjust our approach as needed. We believe, however, that the record in this proceeding provides a sufficient basis for moving forward with authorizing SCS services and adopting rules applicable to their operation.

26. *Section 316 of the Act.* We note that, in the *Notice*, the Commission tentatively concluded that the SCS framework that we adopt today would not be a modification of any terrestrial licenses under section 316 of the Act.[79] The record shows no opposition to this tentative conclusion.[80] We therefore find that since the SCS leasing framework that we adopt today is built upon the rights that terrestrial licensees already have and is merely enabling a new—supplemental—method of providing gap coverage within the existing geographic area covered by the existing license, permitting SCS under this framework is not a modification of any terrestrial licenses under section 316 of the Act.[81]

B. Spectrum Bands Available for SCS

27. In the *Notice*, the Commission proposed a new regulatory framework for SCS that provides a path for rapid implementation of this new offering across certain spectrum bands allocated and licensed exclusively on a terrestrial basis to enable transmissions from space stations to end-user devices.[82] Because of the complexity of this undertaking, and to minimize the risk of harmful interference, the Commission focused its present efforts on a selection of spectrum bands where there are no primary, non-flexible-use legacy incumbent operations, federal or non-federal.[83] The Commission explained that it proposed these flexible-use bands for inclusion in the proposed framework because commercial wireless services have been deployed on these bands, which are allocated and assigned for terrestrial mobile service, and because the bands contain at least one spectrum block with an existing licensee holding rights sufficient for a satellite operator to meet the proposed entry criteria.[84]

1. SCS Bands

28. In the *Notice*, the Commission explained in detail how each of the following bands satisfies the proposed entry criteria.[85] We adopt as eligible for SCS the list of bands proposed in the *Notice* with two exceptions. We will not include the Wireless Communications Service (WCS) band (2305-2320 and 2345-2360 MHz), and we will add the 758-769/788-799 MHz band licensed to the First Responder Network Authority (FirstNet)[86] as a band eligible for SCS under our framework. Accordingly, the list of bands that will be available for the provision of SCS (the SCS Bands) is as follows:

- 600 MHz: 614-652 MHz and 663-698 MHz;
- 700 MHz: 698-769 MHz, 775 MHz-799 MHz, and 805-806 MHz;
- 800 MHz: 824-849 MHz and 869-894 MHz;
- Broadband PCS: 1850-1915 MHz and 1930-1995 MHz; and

[79] *Notice* at 30, para. 71; 47 U.S.C. § 316.

[80] Skylo Technologies, Inc. Comments, GN Docket No. 23-65, at 11 n.11 (rec. May 12, 2023) (Skylo Comments) ("Skylo agrees with the Commission's conclusion that the proposed framework would not constitute a modification of any terrestrial licenses under Section 316 of the Communications Act."). No other commenters addressed this question.

[81] 47 U.S.C. § 316.

[82] *See generally Notice*.

[83] *See id.* at 12-13, para. 24.

[84] *See id.* at 14-15, para. 29.

[85] *See id.* at 9-12, 16-19, paras. 18-23, 34-39.

[86] *See id.* at 17, para. 35.

- AWS-H Block: 1915-1920 MHz and 1995-2000 MHz

29. We recognize that some of the bands that we find currently suitable for SCS present a degree of technical complexity that may require us to more closely examine the SCS proposals that would be submitted pursuant to the framework we adopt today, but these case-by-case situations do not preclude us from adopting generally applicable service rules under which the risk of harmful interference can be minimized. Some commenters are concerned about the effects of SCS operations in certain segments of the proposed bands. For example, Shure expresses concern that SCS operations in the 614-617 MHz sub-band may cause interference to wireless microphones and calls for further analysis and testing.[87] Other commenters are concerned that SCS operations could cause interference with radio astronomy operations.[88] Because the protection of radio astronomy is applicable to all SCS operations, we discuss those concerns in depth later in this *Report and Order*.

30. With the exception of significant concerns raised with respect to the WCS band, the concerns regarding the possibility of potential interference or requests for additional protections or studies prior to the adoption of our framework do not convince us to exclude the remaining spectrum bands from our initial framework for SCS operations. Under the rules we adopt today, terrestrial service providers and satellite operators collaborating to provide SCS will be required to protect adjacent band and cross-border operations. We also note that, while our selection of the SCS Bands gives stakeholders a path to accelerated SCS operations, our entry criteria and application processes are intended to ensure compliance with the rules and requirements that will protect existing operations.

31. Moreover, the MSS allocation that we are adding to the SCS Bands is on a secondary, not a co-primary, basis as the Commission had initially proposed,[89] meaning that the stations shall not cause harmful interference to stations of a primary service nor claim protection from harmful interference from those stations operating on a primary basis. Accordingly, protection of existing primary services from harmful interference from SCS operations in the SCS Bands is built into the new allocation. Finally, we emphasize that just because a band is available for SCS operations pursuant to our framework, it does not guarantee that the Commission will automatically authorize an SCS collaboration in the requested band.[90] Upon submission of the SCS application, the Commission will conduct a rigorous analysis of the technical materials submitted to ensure compliance with our entry criteria and any applicable rules and requirements.

2. Exclusion of the Wireless Communications Service Band

32. Although the Commission proposed in the *Notice* to authorize SCS in the WCS band,[91] after a careful examination of the record, we find that the risk of harmful interference to existing operations should we permit SCS in the WCS band outweighs the benefits of inclusion at this time. The Commission noted in the *Notice* that WCS' placement—straddling the Satellite Digital Audio Radio

[87] Shure Incorporated Comments, GN Docket No. 23-65, at 2 (rec. May 12, 2023) (Shure Comments).

[88] *See, e.g.*, California Institute of Technology Comments, GN Docket No. 23-65, at 1-2 (Caltech Comments); National Academy of Sciences' Committee of Radio Frequencies Comments, GN Docket No. 23-65, at 5-6, 10-12 (CORF Comments); NRAO Comments at 2-3.

[89] *See Notice* at 13-16, paras. 25-32.

[90] For instance, the spectrum in the 600 MHz band referenced by Shure as a concern, 614-617 MHz, is a guard band that has no licensees, so its inclusion in an SCS Band available for SCS operations does not mean that SCS will be permitted there. *See generally Promoting Spectrum Access for Wireless Microphone Operations; Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, GN Docket Nos. 14-166 and 12-268, Report and Order, 30 FCC Rcd 8739 (2015); *Promoting Spectrum Access for Wireless Microphone Operations; Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, GN Docket Nos. 14-166 and 12-268, Order on Reconsideration and Further Notice of Proposed Rulemaking, 32 FCC Rcd 6077, 6080-81, para. 4 (2017).

[91] *See Notice* at 18, para. 37.

Service (SDARS)—and the adjacency of federal operations present difficult coordination concerns and sought comment on ensuring the goals of our service rules were met in any SCS framework.[92] Aerospace and Flight Test Radio Coordinating Council, Inc. expresses concerns that SCS operations in the WCS band at 2345-2360 MHz could cause harmful interference to adjacent band aeronautical mobile telemetry operations and suggests that additional protections are needed.[93] Lockheed Martin suggests that additional coordination should be required for SCS operations in this part of the WCS band.[94] SiriusXM expresses concerns about SDARS protection stating that "the overall interference environment for SDARS has . . . worsened in recent years" and notes the need to ensure protection from possible future SCS operations.[95]

33. In addition to these comments, on February 16, 2024, the National Telecommunications and Information Administration (NTIA) filed a white paper in the record on this proceeding prepared by the National Science Foundation (NSF) that raises concerns about the impact on radio astronomy from SCS operations in the WCS band.[96] NSF describes the WCS band as "the top band[] recommended for removal from consideration for allocations" given its use for S/X Celestial Reference Frame legacy observations.[97]

34. Based on our review of the record, we do not believe the concerns with SCS operations in the WCS band can be resolved by interference protection rules. Instead, given the serious concern that permitting SCS in this band could potentially interfere with important adjacent band operations, and our interest in authorizing SCS in the near-term where feasible, we will not include the WCS band as available for SCS at this time.

3. Inclusion of 700 MHz Public Safety Broadband Spectrum

35. In the *Notice*, the Commission sought comment on whether to include the 758-769/788-799 MHz band, often referred to as "Band 14," which is not currently licensed for commercial use to serve consumer handsets, but rather used to provide public safety services.[98] Specifically, as suggested by some parties prior to adoption of the *Notice*, the Commission asked whether it should include 700 MHz spectrum licensed to FirstNet on a nationwide basis in the framework.[99] FirstNet and several other commenters support the inclusion of the Band 14 spectrum as an authorized band for SCS.[100] They argue that the use of FirstNet's spectrum for SCS would advance vital public safety objectives, in particular, "utilizing Band 14 to provide SCS for FirstNet users may present an opportunity to better support first

[92] *See id.* at 11-12, 18, paras. 23, 37.

[93] Aerospace and Flight Test Radio Coordinating Council, Inc. Comments, GN Docket No. 23-65, at 5-10 (rec. May 12, 2023) (AFTRCC Comments).

[94] Lockheed Martin Corporation Comments, GN Docket No. 23-65, at 6 (rec. May 12, 2023) (Lockheed Martin Comments).

[95] Sirius XM Radio Comments, GN Docket No. 23-65, at 7-9 (rec. May 12, 2023) (Sirius XM Comments).

[96] *See generally* National Science Foundation, A Preliminary Assessment of Potential Impacts to Radio Astronomy Systems from Supplementary Coverage from Space, GN Docket No. 23-65 (2024) (*NSF White Paper*).

[97] *Id.* at 23.

[98] *See Notice* at 17, para. 35.

[99] *Id*. at 17, para. 35 & n.112. As noted, these parties submitted comment on the public draft notice of proposed rulemaking released on February 23, 2023. *Id*. The 758-769 MHz and 788-799 MHz segments of the 700 MHz band are licensed to FirstNet. *Id*. at 17, para. 35 & n.113. These segments are also known as "Band 14."

[100] *See, e.g*., First Responder Network Authority Comments, GN Docket No. 23-65, at 3-4 (rec. May 12, 2023) (FirstNet Comments); Nextivity, Inc. Comments, GN Docket No. 23-65, at 3-4 (rec. May 12, 2023) (Nextivity Comments); AST SpaceMobile, Inc. Reply, GN Docket No. 23-65, at 17-18 (rec. June 12, 2023) (AST Reply); AT&T Reply at 12; Lynk Reply at 4.

responders and the communities they serve nationwide."[101] AST and AT&T agree that authorizing SCS on Band 14 preserves the potential for using SCS technology to enhance the communications capabilities of first responders.[102] More specifically, AST explains that SCS will enhance the utility of FirstNet's network in rural areas where terrestrial coverage does not extend, provide important capabilities in the aftermath of disasters during power failures, and fill coverage gaps in FirstNet's network in remote regions such as national parks and Native American reservations.[103] We agree that SCS offers important benefits to public safety subscribers of FirstNet and will include FirstNet's 700 MHz spectrum in the SCS Bands. Improving public safety is an overarching goal of this proceeding, and permitting SCS operations on the 700 MHz public safety spectrum licensed to FirstNet on a nationwide basis is likely to further this goal.

36. The only commenter that directly opposes the inclusion of FirstNet's 700 MHz spectrum as a band available for SCS is T-Mobile, arguing that the spectrum used by FirstNet is not flexible-use spectrum and citing to its comments in a different proceeding regarding the relationship between FirstNet and AT&T.[104] We are not persuaded by this argument in the context of choosing bands to include in our initial SCS framework. While we focus our SCS framework on flexible-use bands due to the nature of the wireless services they enable, there is nothing about our SCS proposal which rests on the flexible-use nature of a given band. Instead, we will enable SCS in bands which we believe are well-suited for it, and we find that this spectrum meets this criteria.

37. As explained by FirstNet in its comments, while the inclusion of Band 14 for SCS "has the potential to provide additional benefits to public safety," any such use would need to occur in accordance with the parameters of the FirstNet program, pursuant to the 2012 Act.[105] This difference—which means that FirstNet would not be able to utilize SCS using the part 1 leasing framework we adopt for SCS today—is noted by AT&T and Lynk as well.[106] Indeed, we recognize that FirstNet is unique in terms of its organizational and licensing structure, and does not fit squarely into our SCS framework. As FirstNet notes, the Commission's framework that includes part 1 leasing as a requirement is not applicable in the Band 14 context which is governed by a separate statutory structure.[107] Nonetheless, the compelling public safety benefits of including the FirstNet spectrum in the bands available for SCS, particularly for first responders in emergency situations, support our decision to include FirstNet's 700 MHz spectrum in the SCS Bands. As a result, we will enable FirstNet to satisfy our entry criteria for SCS collaborations through a non-leasing mechanism, as discussed in the FirstNet SCS authorization section later in this *Report and Order*.[108]

4. Declining to Include Other Spectrum Bands

38. The SCS Bands, with important qualifications and notes as described in the *Notice*, are ones that can accommodate collaborations that can satisfy the entry criteria adopted herein. Given the complexity of this undertaking, the Commission also sought comment in the *Notice* on whether there are any other flexible-use terrestrial bands that we should consider for initial or future SCS operations.[109]

---

[101] FirstNet Comments at 3.

[102] AST Reply at 17-18; AT&T Reply at 12.

[103] AST Reply at 18-20.

[104] T-Mobile Reply at 12.

[105] FirstNet Comments at 3.

[106] *See* AT&T Reply at 13; Lynk Reply at 4.

[107] FirstNet Comments at 3-4.

[108] *See infra* paras. 105-09.

[109] *See Notice* at 19, para. 41. We clarify that suggestions to permit SCS operations on unlicensed spectrum are outside the scope of this proceeding. *See, e.g.*, LoRa Alliance Comments, GN Docket No. 23-65, at 1 (rec. May 11, (continued….)

Some commenters responded by suggesting that the Commission should not apply the SCS framework only to a particular set of bands.[110] By and large, these commenters recommend that, rather than limiting SCS operations to specific bands, the Commission should permit SCS operations in all flexible-use spectrum provided that the parties can demonstrate to the Commission that their proposed SCS operations will not cause harmful interference and will comply with applicable conditions.[111]

39. We reject this suggestion and find it in the public interest to focus our initial SCS framework on a defined set of SCS Bands as proposed in the *Notice*. A primary goal of this proceeding is to adopt an SCS framework that will rapidly realize the public safety benefits of SCS in areas that are currently unserved or underserved while minimizing the risks of harmful interference as this technology—and the marketplace it will enable—develop. In order to meet this goal, our framework is measured and focused on SCS operations that present less technically complex interference protection scenarios. This approach applies to all aspects of our framework, including the choice of bands. In particular, we reject the recommendation to expand our initial set of bands eligible for SCS operations to include bands with primary, non-flexible-use incumbents. This expansion would require the Commission to undertake complicated, time-consuming interference analyses on a band-by-band basis that could delay our support for a rapid roll-out of SCS.

40. Several commenters support the spectrum bands identified in the *Notice* as bands that should be available for potential SCS operations, recognizing the need to protect existing networks.[112] Limiting SCS operations to the SCS Bands is a way to encourage this supplemental service while substantially minimizing the risk of harmful interference to existing terrestrial networks. AT&T "applauds" the Commission's goal of minimizing the risk of harmful interference and protecting adjacent band and cross-border operations, stating that "protecting licensed, primary terrestrial operations is paramount," and our limiting available bands in our initial framework is an important way to accomplish this goal.[113] In the future, as the marketplace for SCS develops, we anticipate that our framework will expand to include additional bands and scenarios. We address each of the specific bands commenters suggest should be included in the SCS Bands in turn.

41. *1670-1675 MHz Band.* Ligado recommends that the Commission include the 1670-1675 MHz band for SCS operations.[114] Although this band aligns with our framework in that it is allocated and licensed for commercial wireless operations, it does not satisfy our band requirement that there are no primary, non-flexible-use incumbent operations, federal or non-federal, in the band. As the Commission stated in the *Notice*, commercial wireless operations in this band must protect three federal earth stations

2023) (LoRa Comments) (proposing the Commission allow SCS in the unlicensed 902-928 MHz band); Fleet Space Reply, GN Docket No. 23-65, at 3 (rec. June 12, 2023) (Fleet Space Reply) (suggesting that all unlicensed spectrum should be assessed to determine whether it could support SCS).

[110] *See, e.g.*, AST Comments at 15-16; CTIA Comments at 9-10; Intelsat License LLC Comments, GN Docket No. 23-65, at 6 (rec. May 12, 2023) (Intelsat Comments); Kuiper Systems LLC Comments, GN Docket No. 23-65, at 3 (rec. May 12, 2023) (Kuiper Comments); Space Exploration Holdings, LLC Comments, GN Docket No. 23-65, at 4-6 (rec. May 14, 2023) (SpaceX Comments).

[111] *See, e.g.*, AST Comments at 15-16; CTIA Comments at 9-10; Intelsat Comments at 6; Kuiper Comments at 3; SpaceX Comments at 4-6.

[112] *See, e.g.*, Lockheed Martin Comments at 4-5 (agreeing with our decision to initially confine SCS operations to bands that do not include any primary, non-flexible use legacy incumbent operations); DISH/EchoStar Comments at 4 (supporting the spectrum bands identified in the *Notice* as candidates for SCS leasing arrangements); Omnispace Comments at 32-33 (supporting the proposal to license SCS operations only in spectrum bands that meet our entry criteria and licensing requirements).

[113] AT&T Comments at 7.

[114] Ligado Networks LLC Comments, GN Docket No. 23-65, at 9-11 (rec. May 12, 2023) (Ligado Comments).

through advanced coordination.[115] Nevertheless, Ligado contends that the 1670-1675 MHz band is well suited for SCS because it is a nationwide license with a single terrestrial licensee, and it will be technically easier to fill coverage gaps in this mid-band spectrum.[116] Moreover, Ligado explains that it has experience coordinating with and protecting co-primary federal earth stations and adjacent band operations from interference.[117] Although we appreciate Ligado's position and suggestions, the spectrum bands we are including in our initial SCS framework do not include bands with non-flexible-use incumbent licensees. Excluding bands with incumbent operations helps us to move forward expeditiously with the rollout of SCS operations, while greatly minimizing the risks of harmful interference to existing terrestrial networks and other critical operations which rely on predictable, harmful interference-free spectrum access.

42. *1695-1710 MHz Band.* In the *Notice*, the Commission sought comment on whether an unpaired band at 1695-1710 MHz would be suitable for SCS operations.[118] Like the 1670-1675 MHz band, this band does not satisfy our band requirement that there are no primary, non-flexible-use incumbent operations, federal or non-federal, in the band. Specifically, non-flexible-use operations in the band are concentrated in particular areas.[119] TerreStar suggests that the most efficient use of this band would be a broad allocation for MSS in ITU Region 2.[120] In opposition, T-Mobile responds that this suggestion is beyond the scope of the instant proceeding.[121] We agree. Here, we are focused on identifying eligible bands for SCS operations in order to move forward expeditiously with SCS while minimizing the risks of harmful interference to existing terrestrial networks and other important public safety interests.

43. *The 1.4 GHz Band*. MidWave Wireless, Inc. (MidWave) suggests that the Commission include the 1.4 GHz band (1390-1392 MHz, 1392-1395 MHz, and 1432-1435 MHz bands) in the SCS framework that we adopt today.[122] The 1.4 GHz band is a terrestrial band whose licenses are held by one licensee, MidWave, nationwide, and is adjacent to spectrum that is used for wireless medical telemetry service (WMTS).[123] Pursuant to a condition in the *TerreStar 2020 Order*, MidWave is required to "use a

[115] *See Notice* at 52-53, para. 139.

[116] Ligado Comments at 9-10.

[117] *Id.* at 10.

[118] *See Notice* at 52-53, para. 139.

[119] *Id.*

[120] TerreStar Solutions, Inc. Comments, GN Docket No. 23-65, at 4 (rec. May 12, 2023) (TerreStar Comments).

[121] T-Mobile Reply at 20.

[122] Letter from John M. R. Kneuer, Chief Executive Officer, MidWave Wireless, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-65 et al. (filed Oct. 30, 2023) (MidWave Oct. 30, 2023, *Ex Parte*). The commercial 1.4 GHz band includes the unpaired 1390-1392 MHz band, and the A and B Blocks of the paired 1392-1395 MHz and 1432-1435 MHz bands. *See TerreStar Corporation Request for Temporary Waiver of Substantial Service Requirements for 1.4 GHz Licenses*, WT Docket No. 16-290, Order on Reconsideration, 35 FCC Rcd 4354, 4355, para. 3 (WTB 2020) (*TerreStar 2020 Order*). In 2002, the Commission established fixed and mobile allocations for the 1.4 GHz band and adopted governing service rules. *See Reallocation of the 216-220 MHz, 1390-1395 MHz, 1427-1429 MHz, 1429-1432 MHz, 1432-1435 MHz, 1670-1675 MHz, and 2385-2390 MHz Government Transfer Bands, et al*., ET Docket No. 00-221, Report and Order and Memorandum Opinion and Order, 17 FCC Rcd 368 (2002) (allocating the 1.4 GHz band to fixed and mobile services (with the exception of aeronautical mobile) on a primary basis). In taking this action, the Commission decided to license operations in this band as a part 27 Wireless Communications Service, thereby applying the technologically neutral regulatory and licensing framework of part 27 to these operations. *See TerreStar 2020 Order*, 35 FCC Rcd at 4355, para. 3.

[123] Specifically, the 1.4 GHz band spectrum at 1390-1395 MHz is adjacent to the WMTS spectrum at 1395-1400 MHz, and the 1.4 GHz band spectrum at 1432-1435 MHz is adjacent to the WMTS spectrum at 1427-1432 MHz. *See TerreStar 2020 Order*, 35 FCC Rcd at 4355-56, paras. 3-5. The Commission established three WMTS bands in (continued….)

significant portion of spectrum associated with each of its licenses for the deployment of WMTS operations."[124] WMTS systems are used to monitor patients' health at thousands of hospitals and other medical facilities throughout the country. They include devices to measure patients' life-critical health parameters, including oxygen saturation, blood pressure, respiration, and electrocardiogram, among others.[125] MidWave suggests that the 1.4 GHz band is "an excellent candidate for the provision of SCS" since it was cleared to begin deploying additional, flexible-use services in the 1.4 GHz band in August 2023.[126] Moreover, MidWave states that authorizing SCS in this band will align with the longstanding Commission goal of "allow[ing] 1.4 GHz [b]and licensees the flexibility to pursue a variety of business plans while affording adjacent users sufficient protection from interference."[127] MidWave also states that it has "already taken action to protect existing and adjacent WMTS uses of the band" and has "published extensive technical information demonstrating the feasibility" of non-WMTS uses in the band.[128]

44. We decline to add the 1.4 GHz band to the SCS Bands at this time.[129] While a primary goal of this proceeding is to increase innovation, investment, and competition, we believe that the best path forward to achieving those goals is by implementing an SCS framework that will minimize the risks of harmful interference. This means that the framework that we adopt today is geared towards enabling SCS operations that present less technically complex interference protection scenarios, which is not the case in the 1.4 GHz band. Pursuant to the *TerreStar 2020 Order*, MidWave is required to dedicate a significant amount of the band to WMTS use, and to provide for WMTS use in at least 2,000 health care facilities nationwide.[130] In creating these requirements, a key element of the *TerreStar 2020 Order* involved the Commission's concern that "non-WMTS use of the 1.4 GHz Band would place WMTS in the adjacent bands at significant risk of harmful interference."[131] Thus, in granting the waiver, WTB

2000, allocating 14 megahertz to WMTS on a primary basis: 608-614 MHz, 1395-1400 MHz, and 1427-1432 MHz. *Id.* The channels in 1427-1432 MHz are shared by WMTS and non-WMTS devices such as utility telemetry devices. *See* 47 CFR §§ 90.259(b), 95.2363(a)(3).

[124] *See TerreStar 2020 Order*, 35 FCC Rcd at 4369-70, para. 35; *see also id.* at 4369-70, para. 34.

[125] *See id.* at 4355-56, para. 4. WMTS devices are also used for monitoring fetal heart rate and other activity in the womb prior to and during the birthing process. *Id.* The physiological data of multiple patients can be transmitted simultaneously via a radio link to a remote location equipped with a specialized radio receiver, such as a nurses' station, allowing early detection of life-threatening developments and enabling timely medical intervention. *Id.*

[126] MidWave Oct. 30, 2023, *Ex Parte* at 1.

[127] *Id.* at 2 (citing *TerreStar 2020 Order*, 35 FCC Rcd at 4355, para. 3).

[128] *Id.*

[129] We note that the Commission's decision today envisions a hybrid approach to SCS licensing that does not foreclose any party with proposals for providing SCS that do not satisfy our framework from applying to the Commission and requesting a waiver of relevant rules. AFTRCC states that such proposals should include demonstrations that the proposed SCS operations will not cause harmful interference to existing co-band and adjacent band operations. *See* Letter from Edward A. Yorkgitis, Jr., Counsel to Aerospace and Flight Test Radio Coordinating Council, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-65 et al., at 2-3 (filed Mar. 7, 2024) (AFTRCC Mar. 7, 2024, *Ex Parte*). In its letter, AFTRCC also asks the Commission to require MidWave to demonstrate "that adjacent band safety-of-flight Federal and non-Federal aeronautical mobile telemetry operations will be protected from harmful interference" should MidWave seek to deploy SCS in the 1432-1435 MHz bands. *Id*. at 3. We decline to address these issues because we are not including the 1.4 GHz band as an SCS Band at this time.

[130] *See TerreStar 2020 Order*, 35 FCC Rcd at 4369-74, paras. 34-35; *see also id.* at 4370, para. 34, n.104.

[131] *See TerreStar 2020 Order*, 35 FCC Rcd at 4369-70, para. 34. The *TerreStar 2020 Order* granted in part the TerreStar, ASHE, and GE Healthcare petitions for reconsideration of the *TerreStar 2017 Order*, and we granted TerreStar a limited and conditional waiver of the substantial service construction requirement under section 27.14(a) associated with the Licenses. *Id.* at 4363-74, paras. 20-43; *see also TerreStar Corporation Request for Temporary*

(continued….)

required that WMTS use in the 1.4 GHz band continue indefinitely so that the deployment and costly investment by health care facilities is not potentially disrupted by "possibly incompatible applications" such as terrestrial flexible-use operations permitted after TerreStar meets its performance milestones, which happened in August 2023.[132] Because a significant portion of the 1.4 GHz band at several locations is encumbered, we decline to include the 1.4 GHz band as an SCS Band at this time.[133]

45. *The 2.5 GHz Band*. In response to the Commission's request in the *Notice* for comment on the unique circumstances regarding the 2.5 GHz band (2496-2690 MHz), TechFreedom submits that the Commission should include the band as available for SCS operations as a way to gain maximum use for this spectrum.[134] While TechFreedom's comments note the advantages of this mid-band spectrum, they do not explain how inclusion of this band in the SCS framework would accommodate the unique, complex circumstances currently at play in the band.[135] Notably, the Commission changed the regulatory framework for this band in 2019 to afford incumbent users more flexibility,[136] but the configuration of the band continues to support a wide range of uses. The band includes two different radio services with different licensing structures.[137] While the Commission eliminated the special educational eligibility requirements that formerly applied in one portion of the band,[138] much of the band is currently occupied by incumbent licenses with 35-mile radius geographic service areas, many of which consist of irregular shapes.[139] Furthermore, the Commission also established a Tribal Priority Window to improve access to services in rural Tribal areas,[140] and it has issued over 300 licenses to federally-recognized Tribes and Tribally controlled entities in response to applications filed in that window.[141] Finally, the formerly educational portion of the band contains a three-tiered overlay structure where spectrum rights can automatically revert to a different licensee if a pre-existing license is cancelled or terminated.

Waiver of Substantial Service Requirements, WT Docket No. 16-290, Order, 32 FCC Rcd 7480 (WTB MD 2017) (*TerreStar 2017 Order*).

[132] *See* TerreStar 2020 Order, 35 FCC Rcd at 4369-70, para. 34. The TerreStar 2020 Order provided that once TerreStar had satisfactorily met its Final Deployment Obligation, TerreStar could pursue deployment of additional (i.e., non-WMTS) services using its licenses in the 1.4 GHz band. *Id*. at 4370 n.112. The TerreStar 2020 Order provided that "TerreStar may commence deployment of [ ] additional services 90 days after release of [the] Public Notice absent an affirmative finding by the Bureau that such additional services will cause harmful interference to WMTS." *Id*.; *see also Wireless Telecommunications Bureau Seeks Comment on TerreStar Corporation Filings Seeking to Offer Additional Services in the 1.4 GHz Band*, WT Docket No. 16-290, Public Notice, DA 23-424 (WTB 2023); Letter from Bryan M. Tramont, Counsel for TerreStar Corporation, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 16-290 (filed Feb. 14, 2023) (certifying that it met its Final Deployment Obligation and providing a full technical demonstration of how addition use of the spectrum will not cause harmful interference to WMTS). Comments were received from AFTRCC and TerreStar Corporation. *See* Aerospace and Flight Test Radio Coordinating Council, Inc. Comments, WT Docket No. 16-290 (rec. June 30, 2023); TerreStar Corporation Comments, WT Docket No. 16-290 (rec. July 17, 2023). *See generally* AFTRCC Mar. 7, 2024, *Ex Parte* at 3.

[133] We likewise note that airborne and space-to-earth operations are prohibited in the 1390-1400 MHz band, further complicating possible SCS deployments. *See* 47 CFR § 2.106(c)(79).

[134] *See Notice* at 54, para. 143; TechFreedom Comments at 17.

[135] *See* TechFreedom Comments at 17.

[136] *See Transforming the 2.5 GHz Band*, WT Docket No. 18-120, Report and Order, 34 FCC Rcd 5446 (2019) (*2.5 GHz Report and Order*).

[137] *See* 47 CFR pt. 27, subpt. M.

[138] *See 2.5 GHz Report and Order*, 34 FCC Rcd at 5451-56, paras. 15-25.

[139] *See id.* at 5449, para. 10.

[140] *See id.* at 5463-69, paras. 47-65.

[141] *See* FCC, *2.5 GHz Rural Tribal Application Details*, https://www.fcc.gov/25-ghz-rural-tribal-application-details (last visited Feb. 16, 2024) (listing granted Rural Tribal Priority Window applications).

Accordingly, we decline to add the 2.5 GHz band to the SCS Bands at this time.

C. Adding a Mobile-Satellite Service Allocation to Bands Available for SCS

46. After review of the record, we adopt new allocations, including appropriate modifications to the U.S. Table and a new non-federal footnote,[142] for secondary MSS (space-to-Earth and Earth-to-space) operations in the SCS Bands to permit SCS to the subscribers of the relevant terrestrial networks using those bands.[143] In the *Notice*, the Commission proposed to modify the U.S. Table, by footnote,[144] to authorize co-primary MSS operations in the SCS Bands to permit SCS to the subscribers of the relevant terrestrial networks using those bands. Specifically, the Commission proposed to add the footnote allocation in bands where one incumbent terrestrial licensee holds all co-channel licenses throughout a GIA and there were no non-flexible-use incumbent operations in the band.[145] The Commission also sought comment on whether the proposed allocation should be on a secondary rather than a co-primary basis and whether it should make direct changes to the U.S Table rather than relying solely on a footnote allocation.[146] Finally, the Commission sought comment on whether to add an FSS allocation as well as an MSS allocation and whether to permit fixed as well as mobile use in the bands.[147] While the approach we adopt today differs from the lead proposal in the *Notice*, the Commission sought comment in the *Notice* on each element of the approach adopted herein and received a robust record in response. We believe that the allocation we adopt today accurately reflects the status of licensees in the SCS Bands—and the operational rights of these entities under the SCS framework we adopt today—while providing regulatory certainty for nascent SCS operations and sufficient protection for terrestrial networks.

47. We hereby modify the U.S. Table by adding a secondary MSS allocation in each of the SCS Bands along with the following non-federal footnote NG33A, which will limit the operations to providing SCS:

> NG33A: The secondary MSS operations in the bands 614-652 MHz and 663-769 MHz, 775-799 MHz, and 805-806 MHz, 824-849 MHz and 869-894 MHz, and 1850-1920 MHz and 1930-2000 MHz are limited to Supplemental Coverage from Space (SCS) and are subject to the Commission's SCS rules in part 25 of this chapter.

This allocation indicates that bidirectional MSS operations (space-to-Earth and Earth-to-space) apply to the provision of SCS and is added for the entire spectrum range of each of the SCS Bands. Prospective satellite operators and terrestrial licensees that intend to provide SCS should refer to the service rules for each band to identify the specific frequencies over which SCS service can be provided as well as any limits regarding signal directionality (i.e., uplink versus downlink). As a secondary service, SCS operations may not cause harmful interference to—and are not entitled to interference protection from—any primary service operating in the relevant band.[148]

---

[142] Non-federal footnotes consist of the letters "NG" followed by one or more digits and denote a stipulation applicable only to non-federal operations. They only appear in the non-federal portion of the U.S. Table. 47 CFR § 2.105(d)(5)(iii).

[143] *See supra* para. 28.

[144] Proposed footnote NG33A: "The bands 614-652 MHz and 663-758 MHz, 775 MHz-788 MHz, and 805-806 MHz, 824-849 MHz and 869-894 MHz, 1850-1920 MHz and 1930-2000 MHz, and 2305-2320 MHz and 2345-2360 MHz are allocated to the MSS on a co-primary basis. MSS operations in these frequency bands are subject to the Commission's rules for Supplemental Coverage from Space set forth in part 25 of this chapter." *See Notice* at 13-14, para. 26.

[145] *Notice* at 13-14, para. 26.

[146] *Id.* at 13-14, paras. 26, 28.

[147] *Id.* at 15-16, paras. 30-31.

[148] *See* 47 CFR § 2.105(c)(2).

48. We believe that this approach will support the Commission's efforts to facilitate the expansion of wireless coverage across the United States—particularly in rural and underserved areas—by providing satellite operators and terrestrial licensees with the certain, stable regulatory framework that they need to rapidly deploy. Specifically, we find that making the new MSS SCS allocation secondary to existing co-primary services, including terrestrial operations, is consistent with the SCS regulatory framework—which requires satellite operators to obtain a lease agreement with a terrestrial licensee(s) within a given GIA prior to initiating service—and will ensure that there is no confusion regarding the status of these services vis-à-vis their terrestrial counterparts. We agree with Lynk that a secondary allocation will also more accurately reflect the relationship between the satellite operator and the terrestrial licensee since SCS operations are not independent and, instead, are provided as a supplement to the terrestrial licensee's existing network.[149] We find that the secondary allocation accurately reflects this operating relationship, as reflected in our SCS service rules, while providing an appropriate level of protection to the satellite service in the SCS Bands. We also find that satellite operators should be able to provide service to any subscriber device, fixed or mobile, rather than being limited to only mobile devices. This flexible approach has broad support in the record.[150]

49. In addition, granting satellite operators secondary status in the SCS Bands is consistent with our approach to the international framework for this new supplemental service. Some commenters raise concerns about adopting the proposed co-primary allocation on the grounds that, since SCS has not been allocated internationally, granting SCS co-primary status would be inconsistent with Article 5 of the ITU Radio Regulations.[151] As Kepler argues, a secondary allocation would be more appropriate since it would clearly indicate that satellite operators do not have international status in the SCS Bands and that satellite operations shall not cause harmful interference to operations that conform with the International Table of Frequency Allocations (International Table).[152] We emphasize that any new allocations remain subject to the United States' international obligations under treaties, bilateral or multilateral agreements, the International Table, and other international instruments.[153]

50. Some commenters support the Commission's lead proposal to make SCS co-primary with existing services in the SCS Bands.[154] Notably, AST contends that granting a co-primary allocation to SCS would ensure that the services they provide to terrestrial licensees are afforded priority over other secondary users in the band and that any concerns regarding the relative priority of the SCS operations and the terrestrial service offerings could be addressed in lease and operating agreements.[155] While we agree with AST that the agreements between the terrestrial licensee and the satellite operator are key factors in establishing the technical boundaries of their relationship, in no circumstance under the rules we adopt today is it permissible for the satellite operator to provide SCS without consent from a terrestrial licensee. As a supplemental service, SCS satellite operations are inherently secondary to the terrestrial

[149] *See* Lynk Global, Inc. Comments, GN Docket No. 23-65, at 5-6 (rec. May 12, 2023) (Lynk Comments).

[150] *See, e.g.*, Aalyria Technologies, Inc. Comments, GN Docket No. 23-65, at 9 (rec. May 23, 2023) (Aalyria Comments), SpaceX Comments at 4, Kepler Comments at 6-7, Lynk Comments at 5-6. Moreover, as Iridium notes, the Commission previously allowed Iridium to provide service to fixed devices on an ancillary, nonconforming basis. *See* Iridium Communications, Inc. Comments, GN Docket No. 23-65, at 9 (rec. May 12, 2023) (Iridium Comments) (citing *Motorola Satellite Communications for Modification of License*, Order and Authorization, 11 FCC Rcd 13952, 13955-56, para. 10 (1996)).

[151] Kepler Comments at 5; Omnispace Comments at 31-32 ("Any new domestic MSS allocations in the identified bands should be on a secondary basis, to align with U.S. obligations in relation to use of the ITU Radio Regulations Section 4.4 to legitimize operations with respect to other country's radiocommunications services.").

[152] *See* Kepler Comments at 5.

[153] *See infra* paras. 224-36.

[154] AST Comments at 29; TechFreedom Comments at 14; Skylo Comments at 7-8.

[155] *See* AST Comments at 29.

operations in the bands, and under the rules we adopt herein, SCS access to the relevant bands requires permission of the relevant terrestrial licensees through the use of our leasing framework.[156] Moreover, commenters have not presented any evidence of other secondary services that could cause harmful interference to SCS operations in the SCS Bands. As such, we find that a secondary allocation accurately reflects the operational hierarchy and the status of SCS operations vis-à-vis terrestrial operations and will provide operational certainty for satellite operators without creating confusion for the public or terrestrial licensees.

51. Some commenters—including CTIA, AT&T, T-Mobile, and Verizon—oppose adding any allocations for SCS MSS to the U.S. Table and suggest that we should, instead, address all requests to provide SCS on a case-by-case basis.[157] These commenters claim that the addition of any MSS allocation to the U.S. Table could lead to confusion regarding the rights of MSS operators vis-à-vis terrestrial licensees.[158] These commenters support a waiver-based approach that they claim would provide the Commission, and individual parties, with the flexibility to develop and implement case-specific SCS solutions and would ensure that terrestrial networks are fully protected from MSS operations.[159] They claim that, since SCS operations are inherently ancillary to the networks operated by terrestrial licensees, the Commission should use its existing rules to establish a framework for processing and evaluating SCS applications and issuing waivers of the U.S. Table, and other rules, as needed.[160] We disagree with these assertions and find that establishing a secondary allocation will more effectively advance the Commission's goals in moving forward to a single network future. We believe that the public interest will be best served by establishing clear and transparent rules—including not only a regulatory framework but also U.S. Table allocations—for the provision of SCS. Such rules will provide a predictable framework and environment for this new service to flourish, facilitate the efficient use of spectrum resources, establish this approach as a guide for other regulators seeking to introduce SCS, and provide sufficient flexibility for new technologies and business models to take hold.[161]

52. We also find that our approach addresses many of the substantive issues raised by the commenters in their objections to granting SCS status in the U.S Table.[162] AT&T, T-Mobile, Verizon, and CTIA all emphasize that the Commission must make it clear that satellite operators may only use

[156] While Skylo argues in favor of co-primary MSS allocations for SCS operations, they acknowledge that "licensing SCS on a non-harmful interference basis is vital in these bands in order to protect current terrestrial users and maximize efficient spectrum use." *See* Skylo Comments at 7. We believe that a secondary MSS allocation will more effectively further this goal.

[157] *See* Verizon Comments at 7-14; T-Mobile Comments at 3-5; AT&T Comments at 12-14; CTIA Comments at 2-7.

[158] *See* Verizon Comments at 13 ("An MSS allocation—a primary allocation in particular—would cause needless confusion and undermine the notion that SCS 'supplements' a terrestrial wireless service.").

[159] *See* AT&T Comments at 12-14; Verizon Comments at 7-14.

[160] *See* Verizon Comments at 7-14; T-Mobile Comments at 3-5; AT&T Comments at 12-14; CTIA Comments at 2-7. T-Mobile also proposes an alternate model, similar to a proposal by SpaceX, whereby the Commission would simply "clarify" that SCS is a service that terrestrial operators may provide under their existing licenses via lease, without any changes to the U.S. Table. *See* T-Mobile Comments at 5; SpaceX Comments at 2-4.

[161] *See* AST Comments at 14-15 ("Waivers create undue burden and uncertainty for applicants. . . . [T]he Commission can create the certainty necessary to attract capital and spur innovation by developing flexible rules designed to accommodate the rapid pace of advancement in technology."); *see also* SpaceX Reply at 7-8.

[162] Verizon directly opposes adding even a secondary allocation for SCS. *See* Verizon Reply at 7 ("Similarly, there is no reason to adopt a secondary allocation for SCS. SCS is only supplemental to an underlying terrestrial license and wireless service in the event the wireless licensee chooses to pursue an SCS partnership. There is no independent basis to operate standalone SCS in a terrestrial wireless band."); *see also* CTIA Comments at 5 ("Adopting new allocations for specific bands or other rules governing SCS operations would be premature at this stage.").

designated spectrum bands for SCS on a secondary basis and, as such, must not cause harmful interference to any terrestrial operations.[163] We agree and find that the approach we adopt today addresses this concern by ensuring that MSS is secondary to terrestrial operations in all SCS Bands, that such operations will be limited solely to SCS, and that SCS may only be provided pursuant to a lease agreement with a terrestrial licensee(s) within a given GIA.[164] Indeed, since SCS operations may only commence pursuant to a part 1 lease arrangement or as it relates to FirstNet, an agreement with a terrestrial licensee in a given GIA, the terrestrial licensee controls which, if any, satellite operator is authorized to transmit within that GIA and the terms under which satellite operators are permitted to provide SCS.[165] We believe that this approach provides the protection, flexibility, and security sought by AT&T, CTIA, Verizon, and T-Mobile,[166] while also establishing regulatory certainty and clear rules for satellite operators and terrestrial licensees intending to provide SCS. [167]

D. SCS: Space Station Operations

53. As we strive to realize the public interest benefits of SCS as rapidly as possible in this proceeding, we remain cognizant of the need to balance rapid deployment with our responsibility to establish rules that would minimize the risk of harmful interference. Introducing satellite operations in flexible-use terrestrial spectrum presents new technical challenges, in particular with regard to dealing with potential co-channel interference in adjacent license areas.[168] In balancing our desire to expedite the deployment of SCS with the need to minimize technical complexities and harmful interference, the *Notice* proposed to initially limit our SCS framework to circumstances that meet certain entry criteria wherein a single terrestrial licensee holds all co-channel licenses in the relevant band throughout a GIA and the partnering NGSO satellite operator holds an existing part 25 license or grant of market access.[169] The *Notice* also asked for comment on whether we should expand the SCS regulatory framework beyond the limited proposal. Although we are expanding the entry criteria to allow for greater participation than originally proposed, we find that a GIA restriction and initial entry criteria are essential to SCS

[163] *See* T-Mobile Comments at 7; AT&T Comments at 5-9; Verizon Comments at 12-14; CTIA Comments at 6-12.

[164] *See* T-Mobile Comments at 6 ("As part of grant of SCS authority, the Commission should make clear that use of terrestrial spectrum by space station operators conveys authority to provide SCS only on a secondary basis and does not create any expectation that the spectrum is being designated for satellite use."); AT&T Comments at 8 ("[A]pplicants should also be required to demonstrate how its proposed SCS operations would avoid interfering with—or displacing—any existing terrestrial services . . .").

[165] We note that AT&T argues that adopting a co-primary allocation MSS would exceed the Commission's authority under the Communications Act, violate the APA, and be considered an unconstitutional "regulatory taking." *See* AT&T Reply at 7-8. While we need not address the merits—such as they are—of AT&T's arguments, given that we decline to adopt a co-primary MSS allocation and have explained that decision, nothing in our decision should be read as an endorsement of AT&T's assertions or conclusions.

[166] *See* Lynk Reply at 7-8 (arguing that a secondary allocation addresses concerns raised by Verizon and T-Mobile and more accurately reflects the relationships between satellite operators and terrestrial licensees.).

[167] For the same reasons, we also reject SpaceX's suggestion to simply include SCS in the existing definition of Mobile Service and permit SCS operations in all exclusively licensed, flexible use spectrum bands. *See* SpaceX Comments at 1-6; SpaceX Reply at 2-5, 7. We also note that SpaceX's proposed approach would provide even less regulatory certainty and protection to satellite operators and terrestrial licensees that provide SCS than the case-by-case approach advocated by AT&T, T-Mobile, Verizon, and CTIA, and would effectively strip the Commission of any oversight role for this nascent technology.

[168] The record includes comments suggesting that we accept applications for SCS from non-satellite, non-terrestrial service platforms, such as high-altitude platform stations (HAPS). *See, e.g.*, High Altitude Platform Stations Alliance Comments, GN Docket No. 23-65, at 1-2 (rec. May 11, 2023) (HAPS Comments); Intelsat Comments at 3-4. However, in the *Notice*, the Commission stated that the proposed framework did not make proposals regarding, or seek comment on, the issue of satellite service to airborne devices, including HAPS. *See Notice* at 12-13, para. 24 n.93. Accordingly, we will not address these comments as they are outside the scope of this proceeding.

[169] *See Notice* at 19, para. 42.

implementation at this time.

1. Geographically Independent Area

54. In the *Notice*, the Commission proposed to limit the provision of SCS "to instances where a single terrestrial licensee holds all co-channel licenses in the relevant band throughout one of six GIAs."[170] The Commission explained that it was seeking to minimize the possibility for interference between geographically adjacent markets and noted that there are no Commission-licensed land areas adjacent to each proposed GIA and that there is significant geographic separation between the proposed GIAs.[171] Further, the Commission reasoned that the limitation was necessary so that SCS could be provided without the presence in each GIA of co-channel licensees requiring interference protection.[172] The Commission sought comment on the costs and benefits of its initial proposal regarding the GIA requirement, as well as on extending the SCS framework to include additional scenarios, including where there are multiple unaffiliated flexible-use licensees in a given GIA, but all licensees in that area agree to jointly provide SCS to their customers in cooperation with a satellite operator.[173]

55. After careful analysis of the record, we find it in the public interest to adopt the Commission's proposal to limit SCS authorizations to the following GIAs: (1) the contiguous United States (CONUS); (2) Alaska; (3) Hawaii; (4) American Samoa; (5) Puerto Rico/U.S. Virgin Islands; and (6) Guam/Northern Mariana Islands.[174] Given the novel technical challenges at play when introducing satellite communications to terrestrial spectrum, we believe that a GIA restriction is necessary in the initial SCS framework because it minimizes the risk of potential interference to geographically-adjacent, co-channel license areas. When we refer to all co-channel licenses throughout a GIA in our discussion of the SCS entry criteria and application requirements in this *Report and Order*, we mean that, to provide SCS under a part 25 authorization, a satellite operator must be the lessee of one or more valid lease arrangement(s) covering (1) all frequencies over which it provides SCS, as identified in its part 25 SCS application, and (2) the entire area of a GIA. This requirement is not met, for example, if a significant portion of the GIA's geography is not licensed (i.e., remains in the Commission's inventory).[175]

56. Some commenters argue that restricting SCS to GIAs is unnecessary as long as the satellite operator demonstrates to the Commission that it will not cause harmful interference to adjacent licensees.[176] For example, AST argues that SCS should be permitted in additional scenarios such as when the terrestrial service provider's licenses cover less than a full GIA as long as the satellite operator

---

[170] *See id.* at 20, para. 45. The proposed GIAs are: (1) CONUS; (2) Alaska; (3) Hawaii; (4) American Samoa; (5) Puerto Rico/U.S. Virgin Islands; and (6) Guam/Northern Mariana Islands. *Id*.

[171] *Id.*

[172] *Id*.

[173] *See id.* at 53-54, paras. 141-144.

[174] *See id.* at 20, para. 45.

[175] We recognize, however, that there may be a scenario in which only a small portion of the GIA is not licensed. In that case, we will assess the facts of the particular SCS application on a case-by-case basis to determine whether the lease(s) covers the functional equivalent of the entire area of a GIA. If so, then we will consider the entry criteria to be met with regard to the GIA restriction, but the parties will be required to demonstrate to the Commission how they will ensure that terrestrial devices connecting to their SCS network will only operate on the SCS network within the boundaries of the licensed areas of the GIA.

[176] *See, e.g.*, AST Comments at 5-7; AT&T Comments at 15-17; Kuiper Comments at 6-7; Lynk Comments at 8-11; Letter from Margo R. Deckard, Chief Operating Officer, Lynk Global, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-65 (filed Dec. 21, 2023); Letter from Margo R. Deckard, Chief Operating Officer, Lynk Global, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-65, at 2-3 (filed Feb. 16, 2024) (Lynk Feb. 16, 2024, *Ex Parte*); Lynk Add'l Mar. 7, 2024, *Ex Parte* at 3; Letter from Henry G. Hultquist, Vice President-Federal Regulatory, AT&T Services, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-65 et al., at 2 (filed Mar. 7, 2024) (AT&T Mar. 7, 2024, *Ex Parte*).

demonstrates that it will not interfere with adjacent users.[177] Similarly, Lynk argues that rather than implementing a GIA restriction, the Commission should adopt service rules specific to SCS establishing "signal strength thresholds at the edge of neighboring areas."[178] This *Report and Order* seeks to simplify the provision of SCS that presents interference protection scenarios that are less technically complicated while still permitting action on alternative proposals via our waiver process. Our GIA restriction accomplishes that objective by focusing on those SCS implementations which eliminate one major harmful interference risk and thus are more amenable to generally applicable service rules based on the current record. But we emphasize that our decision today incorporates a hybrid approach to SCS licensing whereby proposals that satisfy our entry criteria can proceed pursuant to the rules we establish, while still leaving the door open for other implementations to be approved by waiver. It does not foreclose the ability for parties with proposals for providing SCS that do not satisfy our framework from applying to the Commission and demonstrating that they will not cause harmful interference under the proposed parameters specific to their SCS operations.[179] While we anticipate that SCS applications meeting our entry criteria will benefit from the simplified processing that a rules-based framework provides, we are committed to ensuring that all complete SCS proposals which fully address technical and legal concerns will receive expeditious consideration by the Commission.

57. Kepler agrees that our GIA restriction "would simplify the initial deployment of satellite systems operating in bands shared with terrestrial mobile" and facilitate "rapid" deployment.[180] Omnispace supports the Commission's proposal to license SCS only where applicants can satisfy the Commission's entry criteria and licensing requirements, specifically noting that the GIA limitation would help to avoid technical complexities that could arise.[181] Verizon also acknowledges that provision of SCS in areas smaller than a GIA would be more technically complicated because these operations would not have "the protection buffer GIAs otherwise provide between SCS and adjacent terrestrial operations."[182] DISH and EchoStar also agree with the Commission's initial SCS licensing framework.[183] These comments support our decision to take a measured approach to SCS rules to initially minimize the risk of harmful interference from complex technical scenarios by including GIAs in our entry criteria.

58. *Multiple Licensees Jointly Satisfying the GIA Requirement.* Some commenters suggest the proposal in the *Notice*, wherein a single terrestrial licensee must hold all co-channel licenses in a given GIA, would limit SCS to large carriers with nationwide authority over a block of spectrum, or otherwise exclude smaller or regional terrestrial operators from participation in the framework.[184] We are sensitive to these concerns, and in response, we expand our entry criteria so that multiple terrestrial service providers may work with a satellite operator to provide SCS, as long as together those service providers hold all the licenses in the relevant channel throughout a GIA. These more expansive entry criteria than what the Commission proposed in the *Notice* help provide an opportunity for broader

[177] AST Comments at 12-13; AST Reply at 2-6.

[178] Lynk Comments at 8-11; Letter from Margo R. Deckard, Chief Operating Officer, Lynk Global, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-65 at 1-2 (filed Jan. 12, 2024).

[179] *See* AT&T Mar. 7, 2024, *Ex Parte* at 2; *see also* Lynk Add'l Mar. 7, 2024, *Ex Parte* at 3. We agree that our hybrid approach permits us to process SCS applications that do not satisfy our entry criteria that nonetheless demonstrate that the proposed operations will not cause harmful interference.

[180] Kepler Comments at 3.

[181] Omnispace Comments at 32-33.

[182] Verizon Reply at 5-6.

[183] DISH/EchoStar Comments at 4-5.

[184] *See, e.g.*, Aalyria Comments at 5-6 (regarding the CONUS GIA); AST Comments at 5-7 (regarding the CONUS GIA); AT&T Comments at 15-17 (regarding the CONUS GIA); OptimERA Holdings, Inc. Reply, GN Docket No. 23-65, at 4-5 (rec. June 12, 2023) (OptimERA Reply) (regarding the Alaska GIA); Competitive Carriers Association Reply, GN Docket No. 23-65, at 5-9 (rec. June 12, 2023) (CCA Reply); Skylo Comments at 17-18.

deployment of SCS both spectrally and geographically, and allow additional licensees to participate, while still minimizing the risk of harmful interference. Some commenters suggest this approach as a way to make SCS more accessible.[185] For example, CCA suggests that to be more inclusive, the Commission could permit "collaborations among carriers at the outset to provide SCS," and Kuiper suggests "allowing satellite operators to partner with multiple terrestrial licensees that, when considered together, act as a GIA-exclusive licensee."[186] In adopting these criteria—while keeping the GIA restriction—we anticipate that additional service providers will be encouraged to participate in SCS collaborations, thereby increasing competition in the provision of SCS.

59. Even with an expansion of the Commission's proposed entry criteria to allow for participation by multiple terrestrial providers that hold all the licenses throughout a GIA, there is a concern that licensees with larger service areas will "seize the market" and become dominant in the offering of SCS to consumers.[187] While we acknowledge this concern, we find it in the public interest to adopt a GIA restriction because it will accelerate SCS deployment in less technically complex interference protection scenarios. We encourage terrestrial service providers to consider all the GIAs available—not just CONUS—while also exploring opportunities to collectively provide SCS in areas where a group of cooperating licensees hold all relevant licenses. We also again highlight that we will continue to consider filings by interested parties seeking authority to provide SCS without meeting our initial entry criteria.

60. We believe our expansion of the entry criteria to allow licensees to jointly satisfy the GIA coverage requirement will enable more flexibility in SCS offerings, making additional bands available in GIAs even when multiple entities hold the relevant co-channel licenses. In its comments, AST argues that the proposed GIA restriction not only favors a small number of nationwide licensees, but also limits valuable spectrum for SCS, in particular low-band spectrum under 1 GHz in the CONUS GIA.[188] Once again, we recognize this concern, but we note that the SCS Bands include several sub-1 GHz bands (the 600, 700, and 800 MHz bands), and that we have expanded our entry criteria to permit multiple terrestrial licensees that together hold all co-channel licenses covering a GIA to participate in SCS collaborations, which should enable SCS by a wider variety of entities in those bands. We also remind commenters that, in addition to our waiver process for those SCS proposals that do not align with our framework, there are five GIAs in addition to CONUS that are available for SCS. We therefore encourage interested parties to think creatively when considering how to deploy SCS in its early stages while the technology and marketplace develop.

61. *Dynamic Spectrum Sharing*. Commenters also urge us to consider alternative paths for authorizing SCS which could increase competition. Aalyria supports the GIA restriction as "an eloquently simple means of preventing interference between co-channel licensees," but suggests that the Commission should also permit co-channel licensees to employ "dynamic network orchestration technologies" to provide SCS as a way of enabling greater competition.[189] These technologies, Aalyria claims, would enable participation by smaller and regional carriers to participate in the framework through spectrum sharing without causing harmful interference between adjacent market providers.[190] However, as noted by T-Mobile, dynamic spectrum management systems are "typically used when

[185] *See, e.g.*, CCA Reply at 8-9; Kuiper Comments at 6-7.

[186] CCA Reply at 9; Kuiper Comments at 6.

[187] Kepler Comments at 3-4 (expressing concerns regarding smaller regional operations ability to enter the market). *But see* Kepler Comments at 3 (supporting the Commission's GIA framework "as an initial step towards a broader policy").

[188] AST Comments at 5-10; AST Reply at 4.

[189] Aalyria Comments at 6. DSA also proposes the use of dynamic spectrum management for SCS operations. Dynamic Spectrum Alliance Comments, GN Docket No. 23-65, at 2-3 (rec. May 12, 2023) (DSA Comments).

[190] Aalyria Comments at 6-8.

spectrum is shared and not licensed on an exclusive basis."[191] As the Commission made clear in the *Notice*, our initial SCS framework is intended to provide coverage to a terrestrial mobile service licensee's subscribers operating in underserved or unserved areas within the licensee's service area on spectrum previously licensed exclusively on a terrestrial basis.[192] We therefore will not modify our framework and GIA restriction to allow spectrum sharing for SCS at this time. However, we note that terrestrial licensees' control of their networks means dynamic spectrum sharing may be an option they consider to enable these operations.

2. Part 25 License Entry Criteria

62. In order to perform commercial space station operations within the United States or through a U.S. license, operators must receive a part 25 license from the Commission that is tied to a specific satellite(s).[193] Applications for a part 25 license generally require the submission of information about the frequencies requested for use and relevant technical details, a plan for orbital debris mitigation, and for those seeking a U.S. license, materials for an ITU satellite network filing, which is submitted by the FCC to the ITU. As discussed in detail below, in instances where an applicant proposes to use spectrum on a non-conforming basis with respect to ITU Radio Regulations, the applicant needs to also prepare and submit to the Commission materials to indicate that the operations in derogation of international frequency allocations can be conducted without causing harmful interference to incumbent stations operating in accordance with international frequency allocations. Once the application is deemed acceptable for filing under our rules, it is placed on public notice. Following review of the application as well as the record, including any public comments, SB, on delegated authority, will grant a part 25 license if it determines that doing so would serve the public interest. Prior to this *Report and Order*, the SCS Bands were not allocated for satellite services or otherwise authorized for satellite services via rule.

63. Here, we adopt entry criteria that NGSO and geostationary satellite orbit (GSO) operators must meet in order to apply for or modify an existing part 25 license to operate satellites in the SCS Bands in the United States and its territories.[194] Specifically, we establish an SCS framework allowing satellite operators to apply to modify a current part 25 license to include SCS where: (1) the satellite operator has one or more leasing notification(s) or application(s), or in the case of FirstNet, a Form 601, on file with the Commission to access the spectrum allocated for MSS provision of SCS from a single terrestrial licensee or multiple licensees that hold, collectively or individually, all co-channel licenses throughout a GIA; (2) the current part 25 space station licensee or part 25 grantee of market access for NGSO or GSO satellite operation seeks modification of authority to provide SCS in the same geographic areas covered in the relevant GIA; and (3) the terrestrial devices involved in SCS qualify as "licensed by

[191] T-Mobile Reply at 12-13.

[192] *See Notice* at 12-13, para. 24.

[193] For ease of reference, when we refer to space station "licenses" within this *Report and Order*, we are referring to both part 25 U.S. licenses and part 25 U.S. market access authorizations granted to non-U.S.-licensed operators. In addition, although the terms have different definitions in section 25.103 of the Commission's rules, for the purpose of this *Report and Order*, we use the term "space station" and "satellite" interchangeably. 47 CFR § 25.103.

[194] *See Notice* at 21, para. 48. We note that in the context of SCS that may be provided outside the United States, leasing of spectrum from a mobile service provider is not a relevant prerequisite. Each country has the right to regulate licensing, market access, and/or landing rights in its own territories, and even if a country requires some arrangement between an SCS provider and a mobile service provider, such arrangements can be struck in various ways, not just through spectrum leasing, under the laws of that country. *See* Margo R. Deckard, Chief Operating Officer, Lynk, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-65 et al., at 1-2 (filed Mar. 5, 2024) (Lynk Mar. 5, 2024, *Ex Parte*); *see also,* Letter from Steve B. Sharkey, Vice President, Government Affairs, T-Mobile USA, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-65 et al. at 2, 4-5 (filed Mar. 6, 2024) (T-Mobile Mar. 6, 2024, *Ex Parte*).

rule" earth stations under the new provisions of part 25.[195] Similarly, satellite operators may apply for an initial part 25 license with authority to provide SCS if they meet requirements (1) and (3) above, and if in their part 25 application, those operators seek to provide SCS in the same geographic areas covered in the relevant GIA.

64. *Part 25 Licensing*. As an initial matter, the *Notice* proposed that a part 25 license is a necessary component of an SCS authorization,[196] and in the rules we adopt today, we confirm that the satellite operator in the SCS arrangement must obtain a part 25 license prior to commencing SCS.[197] The Commission's rules contemplate that the transmission of energy, communications, or signals by space or earth stations requires a part 25 license, and we see no reason to deviate from this requirement today.[198] Under our existing part 25 rules, Commission staff must review the technical and narrative information presented in the application, including orbital debris information, in order to make a determination on whether a satellite can operate safely and without causing harmful interference. By applying our existing part 25 rules as part of the SCS framework that we adopt today, we believe that we will accomplish three goals. First, we will provide regulatory certainty for operators and Commission staff who have experience with part 25 space station application rules and understand their requirements. Second, we will streamline our processes by implementing a single rule part that applies to SCS and non-SCS. Finally, we will enable competition by applying identical rules for operators providing services under the SCS framework with those providing similar or related services though spectrum already allocated for satellite services.

65. In the *Notice*, the Commission proposed directing WTB and then-IB to evaluate and coordinate simultaneous processing of all applications required to be filed under our proposed entry criteria if adopted.[199] Several commenters support this proposal that SB (as successor to IB) should oversee the space-based aspect of SCS, and we agree.[200] SB routinely handles processing of part 25 applications, which, as we adopt today, are a key component of an SCS application. Operations in space bring their own set of complex issues, which must be evaluated prior to issuing a license or modification.

---

[195] *See* Appx. B (adding 47 CFR § 25.125). *See generally* SpaceX Feb. 28, 2024, *Ex Parte* at 1-2 (expressing support for the SCS framework).

[196] *See, e.g.*, *Notice* at 22-23, paras. 52-53.

[197] DISH/EchoStar Comments at 6. *But see* OneWeb Comments, GN Docket No. 23-65, at 1-2 (rec. May 12, 2023) (emphasizing that the SCS framework should be derived from existing terrestrial rights and keep additional licensing requirements to a minimum).

[198] 47 CFR § 25.102. We note that we recently released the *2023 Satellite and Earth Station Processing Report and Order and FNPRM* to streamline satellite licensing, and those actions taken will benefit operators wishing to implement SCS, as will any actions taken in response to that *FNRPM*. *Expediting Initial Processing of Satellite and Earth Station Applications; Space Innovation*, IB Docket Nos. 22-411 and 22-271, Report and Order and Further Notice of Proposed Rulemaking, FCC 23-73 (Sept. 22, 2023) (*2023 Satellite and Earth Station Processing Report and Order and Further Notice*). This recent action expanded upon previous streamlining initiatives. *See, e.g.*, *Further Streamlining Part 25 Rules Governing Satellite Services*, IB Docket No. 18-314, Report and Order, 35 FCC Rcd 13285 (2020); *Streamlining Licensing Procedures for Small Satellites*, IB Docket No. 18-86, Report and Order, 34 FCC Rcd 13077 (2019); *Comprehensive Review of Licensing and Operating Rules for Satellite Services*, IB Docket No. 18-86, Second Report and Order, 30 FCC Rcd 14713 (2015) (*Part 25 Streamlining Second Report and Order*); *Comprehensive Review of Licensing and Operating Rules for Satellite Services*, IB Docket No. 12-267, Report and Order, 28 FCC Rcd 12403 (2013).

[199] *Notice* at 22, para. 50. We note that, since the *Notice* was adopted, SB was created to lead policy and licensing matters related to satellite and space-based communications and activities at the Commission, and IB was dissolved. *See Establishment of the Space Bureau and the Office of International Affairs and Reorganization of the Consumer and Governmental Affairs Bureau and the Office of the Managing Director*, MD Docket No. 23-12, Order, 38 FCC Rcd 608, 609, para. 4 (2023).

[200] *See* Satellite Industry Association Reply Comments, GN Docket No. 23-65, at 4 (rec. June 12, 2023) (SIA Reply); Omnispace Comments at 3, 33; AST Comments at 23 n.58. *But see* OneWeb Comments at 1.

These issues can be most efficiently handled by SB where staff routinely analyze highly specialized technical issues and unique satellite-related legal issues, and coordinate with other federal government agencies as well as the international community, including the ITU, and border administrations. In addition to SB's authority to "facilitate the international coordination of U.S. spectrum allocations for space-based services," SB has authority to review the part 25 applications for SCS in order to "facilitate the international coordination of U.S. spectrum allocations for . . . frequency and orbital assignments so as to minimize cases of international radio interference involving U.S. licensees."[201] As such, SB can review part 25 applications for SCS pursuant to its delegated authority.

66. In the *Notice*, the Commission proposed that an NGSO satellite operator with an existing part 25 license may apply to modify such authorization to include SCS where that entity meets our entry criteria.[202] The Commission asked whether the framework should also include new satellite entrants seeking to provide SCS.[203] While some operators support limiting the SCS framework to operators with an existing part 25 authorization,[204] others support the inclusion of satellite operators who do not hold existing part 25 licenses in this framework.[205] We agree with commenters who favor including in this framework those satellite operators without an existing part 25 license that seek to provide only SCS. We find that including both existing and new entrants in this framework will most effectively encourage competition. We likewise believe that we can still achieve a streamlined authorization process for new entrants, who—in accordance with the rules we adopt today—will have already reached an agreement with one or more terrestrial licensees.[206] Furthermore, we are satisfied that our new part 25 rules, and the application review we conduct to ensure compliance with those rules, will prevent new entrants from frivolously applying under this framework.[207] In addition, experimental licensees who seek to transition to a part 25 SCS license may apply under this framework as a new part 25 entrant.[208]

67. In the *Notice*, the Commission sought comment on whether the SCS framework should also include GSO systems.[209] While Kepler and OneWeb question the viability of SCS service via GSO systems,[210] the majority of commenters favor including GSO systems within the framework.[211] Lockheed Martin notes that, despite higher latency that may be associated with GSO systems, the provision of many services via GSO is possible.[212] Kepler, in contrast, contends that GSO systems are unlikely to be capable of generating small enough beams to avoid interference and argues that the shorter lifetimes attributed to

[201] *See* 47 CFR § 0.51(c).

[202] *See Notice* at 21, para. 48.

[203] *See id.* at 24, para. 56.

[204] DISH/EchoStar Comments at 6; Lockheed Martin Comments at 9; Lynk Comments at 4-5; OneWeb Comments at 3-4.

[205] AST Comments at 23-24; AT&T Comments at 18; TechFreedom Comments at 9-10; T-Mobile Comments at 3; T-Mobile Reply at 18; Viasat Comments at 3; SpaceX Comments at 11; Sirius XM Radio Comments, GN Docket No. 23-65, at 12-13 (rec. May 12, 2023) (Sirius XM Comments).

[206] *See* AST Comments at 23-24; AT&T Comments at 18; TechFreedom Comments at 10; Viasat Comments at 3.

[207] AST Comments at 23-24.

[208] We will continue to permit experimental licensing for SCS in bands outside of those specified in this proceeding, including for regional coverage. *See* Lynk Comments at 13.

[209] *Notice* at 22, para. 51.

[210] Kepler Comments at 9; *see also* OneWeb Comments at 3-4 (opposing the inclusion of GSO systems).

[211] AT&T Comments at 18; DISH/EchoStar Comments at 6; Intelsat Comments at 3; Intelsat Reply at 2-4; SIA Reply at 3-4; Sirius XM Comments at 10; Sirius XM Radio Reply Comments, GN Docket No. 23-65, at 5 (rec. June 12, 2023) (Sirius XM Reply); T-Mobile Comments at 7; T-Mobile Reply at 18, Viasat Comments at 2; Skylo Comments at 5-6; *see also* CCA Reply at 12; TerreStar Comments at 2.

[212] Lockheed Martin Comments at 9.

NGSO systems provide the optimal means of ensuring continued development and improvement of the service and requisite technology.[213] We reject Kepler's arguments and find that the staff review of applications will prevent the authorization of any operations by entities who are not capable of providing the requisite interference protection. And any benefit from the shorter lifetimes of NGSO systems can be evaluated as a market decision of SCS satellite operators and terrestrial providers rather than a prohibition in our rules. We note that many similar services are provided by NGSO and GSO satellites today.[214] We believe our rules should foster maximum flexibility for parties to design SCS implementations that work for a particular use case, and this means both NGSO and GSO systems should be eligible to participate in the SCS framework. This decision will also promote competition and the rapid deployment of this new technology.[215]

68. Both U.S.- and non-U.S.-licensed operators will be eligible to apply for and receive a part 25 license for the provision of SCS. One commenter expresses concern that a non-U.S. satellite operator will face unique issues bearing on its ability to coordinate and integrate with a U.S. terrestrial licensee.[216] We are not persuaded. We do not see why a non-U.S.-licensed satellite operator would face unique issues in coordinating with a U.S. terrestrial provider. Because satellite operators must partner with a terrestrial provider(s) in a part 1 lease arrangement or agreement, both U.S.- and non-U.S.-licensed satellite operators would be subject to associated contractual obligations to a domestic terrestrial wireless provider. Both U.S.- and non-U.S.-licensed satellite operators would similarly need to comply with established regulations and the terms of its license.[217] Given the part 1 leasing requirements we establish herein, we find that it is in the public interest to permit non-U.S.-licensed operators who otherwise meet the entry criteria adopted herein to apply under this framework.[218] Doing so will increase competition and encourage innovation so that SCS technology may be deployed quickly.[219]

69. *Part 1 Leasing Requirement*. In the *Notice*, the Commission proposed that the SCS entry criteria require a part 25 licensee or applicant have on file a part 1 lease arrangement or agreement authorizing its use of frequencies licensed to a terrestrial licensee that holds all co-channel licenses for those frequencies throughout an entire GIA.[220] The Commission also proposed to require that the notifications(s), application(s), and arrangement(s) be approved prior to the lessee's operation for the

[213] Kepler Comments at 9.

[214] Inmarsat, a global satellite service provider that has been acquired by Viasat, as well as Ligado, are examples of GSO operators that have provided MSS within CONUS. *See* FCC, *Space Station Approval List* (updated Oct. 5, 2023), https://www.fcc.gov/approved-space-station-list; Ligado, *Solutions*, https://ligado.com/solutions/. Likewise, Iridium, Globalstar, and ORBCOMM are examples of NGSO operators that have used a constellation of LEO satellites to provide MSS within the United States. *See* Iridium, *Network*, https://www.iridium.com/network/globalnetwork/ (last visited Jan. 11, 2024); Globalstar, *Our Technology*, https://www.globalstar.com/en-us/about/our-technology (last visited Jan. 11, 2024); ORBCOMM, *ORBCOMM OG2*, https://www.orbcomm.com/en/networks/satellite/orbcomm-og2.

[215] *See Notice* at 25, para. 58; Sirius XM Comments at 12; Sirius XM Reply at 6; Viasat Comments at 3; Skylo Comments at 6.

[216] *See* TechFreedom Comments at 13.

[217] *See* AST Reply at 7.

[218] We remind stakeholders that satellite operators intending to enter into either a part 1 spectrum manager or *de facto* transfer leasing arrangement with a terrestrial licensee must meet the applicable foreign ownership eligibility requirements pursuant to section 310 of the Act. *See* 47 U.S.C. § 310 (license ownership restrictions); 47 CFR §§ 1.9020(d)(2)(ii), 1.9030(d)(2)(ii); *see also Rules and Policies on Foreign Participation in the U.S. Telecommunications Market; Market Entry and Regulation of Foreign-Affiliated Entities*, IB Docket Nos. 97-142, 95-22, Report and Order and Order on Reconsideration, 12 FCC Rcd 23891 (1997), recon. denied, 15 FCC Rcd 18158 (2000).

[219] *See* AST Reply at 8.

[220] *See Notice* at 21, para. 48.

purpose of receiving a part 25 SCS license grant.[221] We received various comments about the proposal that satellite operators must provide evidence of a part 1 lease prior to receiving a part 25 license to provide SCS within the United States. Some commenters argue that a lease should not be required for the Commission to issue a license granting partial part 25 authority to launch equipment that will be used to provide SCS.[222] Rather, these commenters prefer a "two-step" licensing model starting with a deployment grant which would not require a lease and followed by an operations grant which would require a lease.

70. Other commenters object to the proposed requirement that a satellite operator must have a part 1 lease with a terrestrial licensee in order to receive any part 25 license to provide SCS. Lynk argues that satellite operators should not be required to enter into a lease before receiving a part 25 license to provide SCS, and instead argues that grant of the part 25 license should be conditioned on the satellite operator having a terrestrial partner for the relevant geographic area prior to provision of SCS.[223] Lynk further argues that requiring a part 1 lease before grant of a part 25 license would stifle competition, add unnecessary regulatory delay in the deployment of satellite networks, and would not meaningfully add any protection for the terrestrial partners.[224] Intelsat rejects requiring a lease entirely, arguing that the Commission should not mandate commercial arrangements as a prerequisite for providing SCS, that this limits the number of SCS providers, and will ultimately cause SCS to be more homogenous and slower to market.[225]

71. We find that it is in the public interest to require satellite operator(s) and terrestrial licensee(s) partners to have a part 1 lease arrangement or agreement on file with the Commission so that the relevant ULS file numbers can be included in the SCS part 25 application. We also find that the lease(s) or agreement(s) must be granted or accepted before the Commission issues the part 25 license or modification of an existing license to both deploy and operate satellites that will provide SCS. Likewise, satellite operators must ensure that the part 1 lease(s) remain valid while the satellite operator provides SCS. The Commission has authority to issue licenses "for the use or operation of apparatus for transmission of energy, or communications, or signals by radio."[226] Establishing an SCS framework in which we would issue a partial grant for only deployment of satellites without authority to transmit or receive communications via spectrum would not align with the traditional part 25 licensing processes or authority of the Commission.[227] Moreover, a two-step part 25 licensing process, as proposed by some commenters, would require duplicative and inefficient use of staff resources.

72. We believe requiring grant or acceptance of a part 1 lease arrangement or agreement prior to granting a part 25 license or modification to provide SCS will best allow the Commission to determine whether an operator can effectively deploy SCS. WTB's process and rules for filing for a part 1 lease arrangement or agreement for use of spectrum were established in 2003 and are well understood by

---

[221] *See id.* at 29-30, paras. 70-71.

[222] T-Mobile Reply at 14-17; SpaceX Comments at 7-8; SpaceX Reply at 9; T-Mobile Reply at 14-15.

[223] *See* Lynk Comments at 7; Lynk Reply at 6-7; CCA Reply at 14.

[224] *See* Lynk Comments at 7.

[225] *See* Intelsat Reply at 9.

[226] 47 U.S.C. § 153(49); *see also id.* § 308.

[227] As previously noted, during the pendency of this rulemaking, SpaceX received authorization to deploy its Gen2 NGSO satellites with the capability to utilize certain frequencies that were identified in this proceeding for SCS. The authorization did not cover the provision of SCS. SpaceX was subsequently authorized to engage in experimental operations, but has not, to date, been authorized to provide SCS using these satellites. The grant was issued subject to the outcome of this proceeding. The grant also stated that any action taken or expense incurred as a result of operations is solely at SpaceX's own risk. *See* SpaceX Gen2 SCS Modification Application, ICFS File No. SAT-MOD-20230207-00021, conditions 6 and 11. Regardless of the grant, the satellites deployed by SpaceX would have been launched as part of SpaceX's Gen2 system, operating on separate frequencies.

operators and Commission staff, which will lead to efficient processing.[228] Documents filed with the Commission regarding lease arrangements can also be viewed by the general public, which provides transparency and public notice.[229] Moreover, a lease demonstrates that a terrestrial licensee consents to the satellite operator's use of the spectrum,[230] which will mean that a satellite operator can begin and is actually authorized to provide SCS soon after receiving an SCS part 25 license. Furthermore, in previous Commission decisions we have made clear the rights and responsibilities for both the lessor and lessee for each part 1 lease type, which will ensure that the terrestrial licensee's rights are not infringed upon and create a safeguard against the risk of harmful interference.[231]

73. We recognize that requiring Commission approval of a part 1 lease arrangement or agreement prior to receiving a part 25 license grant, rather than relying on post-grant conditions, may restrict flexibility of satellite operators that wish to find a terrestrial partner once they are already licensed. However, we have determined that the clear rights and responsibilities as it pertains to each party to a part 1 leasing arrangement or agreement, the well-established process of reviewing such arrangements and agreements, and the publicly available information that is filed within a lease notification/application outweigh any purported additional flexibility of alternatives and is necessary at this early stage of SCS development.

74. *Part 25 Application Procedures.* Satellite operators applying for SCS authorization should submit a modification application or an application for a new license that includes a comprehensive proposal for each space station.[232] The comprehensive proposal for each space station in the part 25 SCS application should include the frequencies requested for SCS use and relevant technical details, a plan for orbital debris mitigation, an ITU satellite network filing that covers the relevant provisions of ITU Radio Regulations and the ITU Rules and Procedures,[233] and the relevant part 1 lease arrangement or agreement ULS file number(s)[234] with a brief description of the coverage areas that will be

[228] *See generally Promoting Efficient Use of Spectrum Through Elimination of Barriers to the Development of Secondary Markets*, WT Docket No. 00-230, Report and Order and Further Notice of Proposed Rulemaking, 18 FCC Rcd 20604 (2003) (*First Secondary Markets Report and Order*). These rules have been further streamlined. *See generally Promoting Efficient Use of Spectrum Through Elimination of Barriers to the Development of Secondary Markets*, WT Docket No. 00-230, Second Report and Order, Order on Reconsideration, and Second Further Notice of Proposed Rulemaking, 19 FCC Rcd 17503 (2004) (*Second Secondary Markets Report and Order*).

[229] *First Secondary Markets Report and Order*, 18 FCC Rcd at 20610-13, paras. 12-14.

[230] T-Mobile Reply at 15; Verizon Reply at 10.

[231] *First Secondary Markets Report and Order*, 18 FCC Rcd at 20651-52, 20664, paras. 100-05, 135-37.

[232] *See* 47 CFR § 25.114. *See generally* Letter from Mindel De La Torre, Chief Regulatory and International Strategy Officer, Omnispace, LLC, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-65 et al., at 3-4 (filed Mar. 8, 2024) (Omnispace Mar. 7, 2024, *Ex Parte*) (expressing support for the Commission's decision that part 25 license requires the inclusion and review of a comprehensive proposal prior to authorization).

[233] *See, e.g.,* ITU Radio Regulation No. 4.4, ITU Rules of Procedure at Part A1, AR4, Page 1 (stating that, in No. 1.3, "administrations intending to authorize the use of spectrum under No. 4.4 still have the obligation, under Sections I and II of Article 9, Nos. 11.2 and 11.3, to notify to the Bureau 'any frequency assignment if its use is capable of causing harmful interference to any service of another administration" and ITU Rules of Procedure at Part A1, AR4, Page 2 (stating that, in No. 1.6, "administrations, prior to bringing into use any frequency assignment to a transmitting station operating under No. 4.4, shall determine: a) That the intended use of the frequency assignment to the station under No. 4.4 will not cause harmful interference into the stations of other administrations operating in conformity with the Radio Regulations; b) What measures it would need to take in order to comply with the requirement to immediately eliminate harmful interference pursuant to No. 8.5. When notifying the use of frequency assignments to be operated under No. 4.4, the notifying Administration shall provide a confirmation that it has determined that these frequency assignments meet the conditions referred to above in item a) and that it has identified measures to avoid harmful interference and to immediately eliminate such in case of a complaint").

[234] When the relevant lease ID(s) becomes available, part 25 operators should add the relevant lease ID(s) to the part 25 application file.

served, domestically and internationally. Once SB is satisfied that the application is acceptable for filing, SB will then place the part 25 application on public notice, together with applicable SCS "entry criteria" certifications, and interested parties will have an opportunity to file pleadings in response to the application.[235] SB, together with WTB, will review the part 25 application, associated part 1 lease arrangement(s), and all the pleadings filed in response to the application to determine if the applicant is qualified, if the proposed facilities and operations comply with all applicable rules, regulations, and policies, and if grant of the application will serve the public interest, convenience and necessity.[236] Further, OET will process the requisite equipment certification needed before the commencement of SCS, as needed.[237]

75. Commenters raise concerns about scaling SCS satellite systems under our part 25 license requirements.[238] We believe our current modification process allows license holders to build out their systems, and it remains the responsibility of the license holder to modify and update their licenses as appropriate as systems expand.[239] Likewise, if, during the course of operations, the relevant lease ID(s) change or the coverage areas change, domestically or internationally, satellite operators must file a supplement to their part 25 applications to update that information.

76. We also address our processing round and first-come, first-served rules in the SCS context. Upon review of the record, we conclude that our processing round rules and first-come, first-served procedures are not applicable to requested operations in the SCS Bands.[240] Commenters broadly agree with exempting SCS Bands from processing rounds.[241] For NGSO systems, processing round procedures are designed to allow the secondary market to determine the appropriate amount of spectrum for each NGSO-like system.[242] Because the SCS framework contemplates a relationship between a

[235] *See* 47 CFR §§ 25.151, 25.154; *Notice* at 21-22, para. 49.

[236] *See* 47 CFR § 25.156(a). Proposed facilities and operations must comply with all requirements discussed herein. *See infra* paras. 224-36; *see also* Omnispace Mar. 7, 2024, *Ex Parte* at 3-6.

[237] *See infra* paras. 213-23.

[238] *See* Lynk Comments at 5 (arguing that the Commission expressly "provide for the expansion of systems to provide additional or more comprehensive coverage over time"); Sirius XM Comments at 13-14 (arguing that "the SCS concept should be scalable to permit satellite operators that collaborate with terrestrial operators to expand the types of service they provide over the years as technology evolves"). In the event an applicant applies while an equipment certification for use of devices for the provision of SCS as required at *infra* paras. 213-23 is pending, certification of the equipment by the Commission under all relevant rule parts is required before an operator can provide SCS.

[239] *See* 47 CFR §§ 25.117(a), 25.160(a).

[240] Our current part 25 rules for authorizing new "NGSO-like" systems typically involve a processing round procedure where applicants for licenses or petitions for U.S. market access are considered in groups based on frequencies requested and filing date. *See* 47 CFR §§ 25.137, 25.157; *see also id.* § 25.157(a) (defining the term "NGSO-like satellite operation" as: "(1) Operation of any NGSO satellite system; and (2) Operation of a GSO [geostationary satellite orbit] MSS [mobile-satellite service] satellite to communicate with earth stations with non-directional antennas"). Likewise, license applications for "GSO-like" satellite operation are placed in a queue and considered in the order they are filed, under a first-come, first-served licensing process. *See id.* § 25.158(b); *see also id.* § 25.158(a)(1) (defining the term "GSO-like satellite operation" as "operation of a GSO satellite to communicate with earth stations with directional antennas, including operation of GSO satellites to provide MSS feeder links"). In addition, we note that although the Commission proposed to modify section 25.112(a)(3), 47 CFR § 25.112(a)(3), to permit the filing of applications notwithstanding the non-conformance, *see Notice* at 22, para. 50, this rule has been eliminated, and the proposal is no longer applicable. *See 2023 Satellite and Earth Station Processing Report and Order and Further Notice*, FCC 23-73, at 5-6, para. 11.

[241] AST Comments at 24; SpaceX Comments at 9-10; OneWeb Comments at 2.

[242] *Amendment of the Commission's Space Station Licensing Rules and Policies*, IB Docket No. 02-34, First Report and Order and Further Notice of Proposed Rulemaking, 18 FCC Rcd 10760, 10776, para. 29 (2003).

satellite operator(s) and terrestrial licensee(s) to jointly operate in the band for which the terrestrial licensee(s) holds an exclusive license, there is no need for a processing round. Given the terrestrial licensee's rights, no mutually exclusive applicants can seek to share the spectrum for SCS.[243] Under this framework, a processing round would be duplicative since the Commission has already made a determination regarding the exclusive use of the subject terrestrial bands. As such, requested operations in SCS Bands are exempt from our processing round procedures.

77. For the same reason that we find our processing round rules should not apply to NGSO satellites that provide SCS—the terrestrial licensee(s) will already hold exclusive rights to the spectrum being used to provide SCS pursuant to the part 1 lease arrangement or agreement—we similarly find that GSO operators applying under this framework will be exempt from our first-come, first-served rules.[244] Similarly, we clarify that SCS satellite applications should not be subject to competitive bidding because the terrestrial licensee previously gained exclusive use to licenses via competitive bidding or secondary market transactions, and will choose their satellite partner(s) based on contractual arrangements. Thus, no spectrum is being made available for competitive bidding.[245] Finally, frequency bands used for feeder link operations, or any other operations of the satellites in other frequency bands not identified for SCS at this time, may still be subject to processing round or first-come, first-served requirements.[246]

E. SCS: Earth Station Operations

78. In addition to authorizing space station operations, we must also consider a framework for authorizing terrestrial devices to communicate with a space station in the SCS context. In this *Report and Order*, we adopt an approach in which terrestrial devices may be licensed by rule in order to communicate with a satellite for the provision of SCS.

79. Under Article I of the ITU Radio Regulations and section 25.103 of the Commission's rules, an "earth station" is any station located on the earth intended for communications with a "space station."[247] The Commission's rules require that an applicant seek prior authorization before transmitting from an earth station in the United States to space stations.[248] Similar to the Commission's rules, the ITU Radio Regulations and the Communications Act require that the Commission license any transmitting station.[249] As such, the Commission must license terrestrial devices transmitting to or receiving from satellites for the purposes of SCS.

80. Under our existing rules, earth stations are licensed on either an individual or blanket-license basis pursuant to section 25.115 of our rules.[250] Under a blanket license, earth stations may be

[243] *See* SpaceX Comments at 9-10.

[244] 47 CFR § 25.158. Although in the *Notice* the Commission asked about the possibility of amending the first-come, first-served procedure rules for GSO operators seeking to provide SCS, no parties commented. *See Notice* at 22, para. 51 ("For example, should we amend Commission rule sections 25.156, 25.157, or 25.158, or other relevant rules, to reflect our proposed entry criteria, or should we adopt a new rule section?").

[245] *See Notice* at 25-26, para. 60; SpaceX Comments at 10.

[246] *Amendment of the Commission's Space Station Licensing Rules and Policies*, 18 FCC Rcd at 10812, para. 131.

[247] *See* ITU Radio Regulation No. 1.63 ("[E]arth station: A station located either on the Earth's surface or within the major portion of the Earth's atmosphere and intended for communication: with one or more space stations; or with one or more stations of the same kind by means of one or more reflecting satellites or other objects in space."); 47 CFR § 25.103 ("Earth station. A station located either on the Earth's surface or within the major portion of the Earth's atmosphere intended for communication: (1) With one or more space stations; or (2) With one or more stations of the same kind by means of one or more reflecting satellites or other objects in space.").

[248] *See* 47 CFR §§ 25.102(a), 25.115(a)(1)(i).

[249] *See* ITU Radio Regulation No. 18.1; 47 U.S.C. §§ 301, 303 (requiring the Commission to license any transmitting station).

[250] *See* 47 CFR § 25.115.

deployed anywhere within the geographic area specified in the license without site-specific coordination.[251] In light of these requirements, the Commission proposed in the *Notice* "to modify our part 25 rules to require a terrestrial licensee that has partnered with a satellite operator to seek a blanket earth station license for all of its subscribers' terrestrial devices that will operate with space stations, and are otherwise authorized under the terrestrial license."[252] The Commission sought comment on ways to streamline earth station licensing processes and forms for SCS blanket earth station applications with the goal of eliminating any potential burdens on applicants. It also sought comment on alternatives to blanket earth station licensing that would more efficiently and effectively authorize SCS communications from terrestrial devices, consistent with our international obligations and statutory mandates.[253] Commenters generally oppose the Commission's blanket licensing proposal.[254]

81. Some commenters argue that blanket licensing under part 25 is unnecessarily burdensome. For instance, SpaceX contends that blanket licensing of every terrestrial device as an earth station would require terrestrial providers to license all of their terrestrial devices twice, would require SB staff to process an endless stream of new earth station applications to keep pace with the incredibly rapid and innovative product lifecycle in the terrestrial device market, and would be inconsistent with the Commission's priority of streamlining and simplifying satellite earth station licensing.[255] Similarly, commenters argue that there should be no new earth station authorization for terrestrial devices because the terrestrial devices and network are already authorized by the Commission and there would be no modifications to the operating parameters for the devices to transmit to and receive from SCS satellites. For example, Verizon argues that there is no practical reason to impose blanket earth station licensing requirements on terrestrial devices.[256] Verizon further contends that wireless providers' off-the-shelf terrestrial devices were designed with a solely terrestrial-based network in mind, and already comply with applicable terrestrial requirements and equipment authorizations.[257] Further, AST notes that terrestrial devices, as earth stations, will not require any modification to transmit to and from satellites, and they are

[251] An application for transmitting earth station authority must be filed on FCC Form 312, Main Form and include a Schedule B. Earth station applicants must include any certifications, showings, or other information required by section 25.115. If the Commission finds a license application acceptable for filing, it will be placed on public notice. After review and consideration of any petitions or comments filed on an application, the Commission will grant the application if doing so will serve the public interest, convenience, and necessity.

[252] *Notice* at 27-28, para. 64.

[253] *Id.* at 24, 28, paras. 61, 66.

[254] *See, e.g.*, AT&T Comments at 19-20; OneWeb Comments at 3 *(*arguing that the Commission should "follow[] the model of how handsets are licensed in terrestrial area licensed systems," i.e., receive "Part 2 equipment approval and then . . . operate under the terrestrial licensee's authorization"); Verizon Comments at 14 (arguing that handsets were designed for terrestrial use, and they comply with terrestrial requirements, "so there is little risk that these devices would be in any way unregulated or cause harmful interference to other incumbent operations"); T-Mobile Comments at 8-9 (contending that handsets are very different from "what the Commission has historically regulated as earth stations"); SpaceX Comments at 13-14 (arguing that there is no need to require mobile carriers to obtain new satellite earth station authorizations for handsets); CTIA Reply at 11 (submitting that devices should be exempt from Part 25 requirements because "[n]othing about the maximum output power, transmit signal quality, radiofrequency spectrum emissions, receiver sensitivity, blocking characteristics, or any other user equipment performance specification will change due to the introduction of SCS into the mobile wireless ecosystem"); Letter from Steve B. Sharkey, Vice President, Government Affairs, Technology and Engineering Policy, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-65 (filed Jan. 18, 2024) (T-Mobile Jan. 18th, 2024, *Ex Parte*) (reiterating that blanket earth station licenses for handsets would serve no regulatory or practical purpose and be unnecessary and duplicative).

[255] SpaceX Comments at 13-14.

[256] Verizon Reply at 8.

[257] *Id.* at 8-9.

already licensed under parts 24 and 27 of the Commission's rules.[258]

82. T-Mobile and other commenters argue that the terrestrial devices communicating with satellites should not be treated as earth stations under the Commission's rules. T-Mobile argues that because there is little relationship between a terrestrial or IoT device and what the Commission has historically regulated as earth stations, the Commission should not require licensing of terrestrial devices that communicate with SCS satellites as earth stations.[259] In addition, T-Mobile contends that every terrestrial device that is also capable of accessing a satellite network would already be licensed to the terrestrial provider.[260] Further, AT&T contends that the Commission's premise that terrestrial devices communicating with space stations would be operating as earth stations in a space service is incorrect. In other words, AT&T contends that terrestrial devices are not earth stations because they are "intended" for communications with other terrestrial devices, and only periodically communicate with space stations.[261] Additional commenters take similar stances opposing the blanket licensing approach for terrestrial devices.[262]

83. Some commenters contend that, because SCS will be a supplemental service, the terrestrial devices are designed with the intent to communicate with terrestrial networks and only sporadically with satellites—but are not designed with the primary intent to do so—and, as such, do not require earth station licenses.[263] We disagree with this interpretation. If a provider designs a network to enable the ability for a given terrestrial device to communicate with a satellite and intends, even just for supplemental purposes, for the device to communicate with a satellite for a particular service, the device is intending to communicate with a satellite. Simply because a service or use by the device is secondary or supplemental does not make that service or use unintentional.[264] Because the terrestrial device will be both receiving from and transmitting to satellites, the Commission is required to license it as an earth station.

84. In striving to reach our goal of effectively authorizing SCS, we note that the Commission can choose the best and most efficient method of licensing the devices as earth stations under its rules, so long as the Commission "maintain[s] . . . control . . . over all the channels of radio transmission . . ." and acts in the public interest.[265] In the *Notice*, although the Commission proposed a blanket licensing framework, it also requested comment on alternative licensing processes that may be more efficient, but still consistent with our rules and obligations.[266] After review of the record, we agree with commenters that a blanket licensing framework in which licensees would need to submit applications to request blanket authority would be unnecessary and unduly burdensome. Instead, we adopt a "license by rule" approach for earth station licenses for terrestrial providers' subscriber devices[267] communicating with

[258] AST Comments at 24-26.

[259] T-Mobile Comments at 8-9.

[260] *Id.* at 9.

[261] AT&T Comments at 21-22.

[262] *See, e.g.*, OneWeb Comments at 3 (arguing that the Commission should "follow[] the model of how handsets are licensed in terrestrial area licensed systems"); SpaceX Comments at 13-14; Lynk Reply at 8-9; CTIA Reply at 11.

[263] AT&T Comments at 19-20; T-Mobile Comments at 8-9.

[264] Note, the Commission recognizes that there are times when a user will use a device outside of its manufacturer's or operator's intended purpose (i.e., in violation of an equipment authorization or terms of use). The intentional communication between a terrestrial device and satellite even just for supplemental coverage, would not be unintentional use under the rules we adopt here today or existing Commission interpretations.

[265] *See* 47 U.S.C. § 301.

[266] *Notice* at 28, para. 66.

[267] The rules we adopt today use the term "SCS earth stations" to refer to terrestrial operators' subscriber devices which connect to an SCS network. *See* Appx. B (amending 47 CFR § 25.103 to define "SCS earth stations").

space stations for the purpose of SCS.[268] We find that this approach will allow the Commission to effectively and efficiently authorize SCS communications from terrestrial devices acting as earth stations, consistent with our international obligations and statutory mandates.

85. All parties who comment on the downsides of the part 25 blanket licensing proposal support an efficient alternative to blanket licensing. As some commenters point out, devices are covered under the terrestrial wireless licensee's authorization and the technical parameters of devices are already part of the equipment authorization process administered by OET.[269] Commenters suggest that filing a second application that contains materially the same information in the licensee's equipment authorization would not result in any change to the spectrum or interference environment and would be unduly burdensome and unnecessary. Commenters also suggest that a part 25 blanket license would not serve the public interest or the Commission's goal of streamlining earth station and space station applications.[270] Similarly, as OneWeb points out, a method of license by rule for terrestrial devices already exists.[271]

86. The Commission recognizes that it is difficult for operators to predict the quantity or type of terrestrial devices that will be capable of SCS in the future when an initial earth station application is submitted.[272] In addition, we recognize that requiring blanket licensing may be a burden to both applicants and Commission staff if it required further action every time a modification or application is filed for earth stations.[273] And we are mindful that this could present roadblocks and ultimately slow down deployment of SCS.[274] Thus, based on the record before us, we will not require part 25 blanket licensing of terrestrial devices as earth stations for SCS.

87. Today, we adopt a license by rule approach for terrestrial devices as earth stations communicating with a satellite network for the purposes of SCS. Specifically, so long as the terrestrial devices connecting to the SCS network are doing so pursuant to an effective part 1 leasing arrangement or agreement and are operating within the existing technical parameters of their OET equipment authorization, the terrestrial licensee's license parameters, and applicable part 22, 24, or 27 rules, then those devices will be licensed as earth stations by rule without the need to file a part 25 earth station

[268] Because we adopt a license by rule approach, and therefore no specific entity will be applying or holding an earth station license for the purpose of SCS, we do not address at this time whether the terrestrial licensee or space station licensee should be the applicant and holder of such a license. However, this does not preclude us from revisiting this in future proceedings should specific and affirmative licensing of terrestrial devices as earth stations for the purpose of SCS be necessary.

[269] Apple Inc. Comments, GN Docket No. 23-65, at 8 (rec. May 14, 2023) (Apple Comments); T-Mobile Comments at 9-10; Verizon Reply at 8-9; SpaceX Comments at 13.

[270] T-Mobile Comments at 8-10; SpaceX Comments at 3; Verizon Reply at 8-9; AT&T Reply at 11; Letter from Jameson Dempsey, Principal, Satellite Policy, SpaceX, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-65 et al., at 2 (filed Mar. 8, 2023) (SpaceX Mar. 8, 2023, *Ex Parte*) (requiring a part 25 blanket license "would duplicate existing authority, add significant administrative burden on applicants and staff alike, needlessly complicate deployment of beneficial services, and require a continual stream of modifications to accommodate inevitable and ongoing innovation in the mobile handset market"); Letter from Steve B. Sharkey, Vice President, Government Affairs, Technology and Engineering Policy, T-Mobile, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-65 et al., at 4-5 (Jan. 11, 2024) (stating that requiring a part 25 blanket license "will serve no purpose" and would be "unnecessary and duplicative"). *See generally Expediting Initial Processing of Satellite and Earth Station Applications*, IB Docket Nos. 22-411, 22-271, Notice of Proposed Rulemaking, 37 FCC Rcd 15167, 15172-73, para. 16 (2022).

[271] OneWeb Comments at 3.

[272] T-Mobile Comments at 8 ("[M]any terrestrial licensees are not even aware of some of the mobile devices that are being used on their networks, such as bring-your-own devices, making it impossible to obtain a Part 25 authorization for those devices.").

[273] *See* AT&T Comments at 4.

[274] *See id.* at 4; SpaceX Comments at 13-14.

application for additional authority.[275] We adopt these rules as 47 CFR § 25.115(q) and 47 CFR § 25.125(e).[276]

F. Leasing

88. In the *Notice*, the Commission proposed to leverage the Commission's secondary markets rules to facilitate the provision of SCS on a terrestrial licensee's exclusively-licensed spectrum operating in a relevant GIA.[277] The Commission recognized that our proposed leasing framework may not squarely fit within the existing leasing regimes because we would be authorizing satellite operators, to enter into leasing arrangements.[278] It also noted that the intent of SCS is to supplement coverage to a terrestrial licensee's subscribers, and sought comment on whether our leasing rules require amendment to effectuate SCS.[279]

89. In this *Report and Order*, we authorize SCS based on a lease arrangement or agreement between one or more terrestrial licensees and one or more satellite operators. The fundamental basis of this SCS lease requirement is that a wireless license conveys to a licensee the right to operate on a given set of frequencies in a particular geographic license area. Based on our existing rules, those rights are limited to terrestrial transmissions. However, utilizing the framework we adopt today, we will permit terrestrial licensees to lease access to these frequencies to a satellite operator, enabling space-based transmissions for the purpose of filling in gaps in the terrestrial licensee's coverage of its license area. In order to enable these SCS deployments, today we adopt rules that will allow terrestrial licensees that independently or together hold all co-channel licenses on the relevant band in a GIA to enter into a leasing arrangement with a one or more satellite operators for the provision of SCS within that GIA.

90. Specifically, we adopt a two-pronged methodology by which a single or multiple co-channel terrestrial licensee(s) may enter into a leasing arrangement for the provision of SCS. Under the first leasing method, we enable a single terrestrial licensee who holds all co-channel licenses on the relevant band in a GIA to enter into either a spectrum manager or a *de facto* transfer leasing arrangement with one or more satellite operators. Under the second leasing method, we provide parties with additional flexibility in structuring spectrum leasing arrangements by permitting spectrum manager or *de facto* leases, subject to the procedures we adopt herein, where there are multiple co-channel licensees on the relevant band in a GIA working with a single satellite operator. Both methods, whether there is a single licensee or multiple co-channel licensees, will be subject to the rules and procedures that we adopt today.

91. We believe that the entry criteria we establish today, and the framework that we set forth, will aid in advancing the general goals set forth in the Commission's *Secondary Markets Policy Statement*: to significantly expand and enhance secondary markets in a manner that aligns with our public interest objectives in order to permit spectrum to flow more freely among users and uses in response to

---

[275] Licensees must operate within any associated conditions of the underlying terrestrial licensee authorization and/or equipment authorization. A satellite operator with SCS authorization via a market access grant will be able to avail themselves of the rules we adopt here today but, in addition to the above mentioned parameters, must also operate within any additional parameters included in its space station market access grant.

[276] All applicants must first satisfy relevant technical rules and be authorized for use as devices under part 25 of the Commission's rules. *See infra* paras. 213-23. To be clear, as described in this *Report and Order*, manufacturers must modify existing equipment authorizations for previously certified terrestrial devices to reflect those devices' approval to operate under a part 25 MSS allocation and service rules. *Id.* Applicants seeking new authorizations should include a request for part 25 on future certification applications for equipment that is capable of SCS operations.

[277] *Notice* at 28-29, para. 68.

[278] *Id.* at 28-30, paras. 68-71.

[279] *Id.* at 29-30, paras. 69-70.

economic demand.[280] We also believe that this approach will enable the public interest benefits of SCS—namely providing gap coverage where terrestrial networks do not reach and improving access for first responders and public safety entities to those in need of assistance in hard-to-connect areas—and we therefore find that allowing terrestrial licensees to enter into leasing arrangements with entities for the provision of SCS will not only enable the provision of new and diverse services and applications, but will also serve the public interest by permitting additional spectrum users to gain access to spectrum.

1. Authorizing SCS Operations by Part 1 Spectrum Leasing Arrangements

92. As a core component of our decision today to adopt a framework that authorizes SCS, we amend our part 1 leasing rules to permit terrestrial licensees to lease terrestrial spectrum rights to satellite operators for the purpose of providing SCS. We also adopt an alternative to the leasing structure that will enable FirstNet to utilize SCS by submitting proof of its contractual agreement(s). Finally, we decline to allow terrestrial licensees to utilize operating agreements in lieu of a leasing arrangement.

93. In the *Notice*, the Commission explained that a terrestrial licensee has the exclusive right to use its spectrum in its authorized geographic area, but the terrestrial licensee is not currently authorized under part 25 of the Commission's rules to operate a space station to close coverage gaps in its network.[281] Because of this, the Commission sought general comment on the extent to which our current leasing rules require amendment to effectuate SCS.[282] In particular, the *Notice* asked whether we should amend the definition of a spectrum lessee under section 1.9003 of the Commission's rules to specifically include in the definition of spectrum lessee a satellite operator that collaborates with a terrestrial licensee/lessor to provide SCS.[283] The Commission also sought comment on whether we should amend the definition of spectrum leasing arrangement to specifically include leases involving the provision of SCS.[284] No commenters addressed these questions. We do not believe that the definition of "spectrum lessee" or of "spectrum leasing arrangement" requires revision to enable SCS. We find that these two definitions, as currently written, are broad enough to encompass and authorize the SCS leasing framework that we adopt today.

94. In seeking comment on extending our part 1 leasing rules to the provision of SCS, the Commission also proposed to require licensees providing SCS to use the Commission's existing leasing regime, and sought comment on whether all aspects of the regime are appropriate in this novel context, or whether certain refinements are necessary.[285] Many commenters express support for this proposal, calling for the use of our current spectrum leasing framework to effectuate SCS partnerships.[286] Similarly, commenters agree that leasing arrangements are a crucial part of the entry requirements that we adopt today and agree that satellite operators must have a lease agreement prior to obtaining satellite

---

[280] *See generally Principles for Promoting Efficient Use of Spectrum by Encouraging the Development of Secondary Markets*, Policy Statement, 15 FCC Rcd 24178 (2000) (*Secondary Markets Policy Statement*).

[281] *Notice* at 28-30, paras. 68-71.

[282] *Id.* at 28-30, paras. 68-71.

[283] *Id.* at 29, para. 69. Section 1.9003 defines a "spectrum lessee" as "[a]ny third-party entity that leases, pursuant to the spectrum leasing rules set forth in this subpart, certain spectrum usage rights held by a licensee. This term includes reference to third-party entities that lease spectrum usage rights as spectrum sublessees under spectrum subleasing arrangements." 47 CFR § 1.9003.

[284] *Notice* at 29-30, para. 70. Section 1.9003 defines a "spectrum leasing arrangement" as "[a]n arrangement between a licensed entity and a third-party entity in which the licensee leases certain of its spectrum usage rights in the licensed spectrum to the third-party entity, the spectrum lessee." 47 CFR § 1.9003.

[285] *Notice* at 29-30, para. 70.

[286] *See generally* SpaceX Comments at 11-13; T-Mobile Comments at 12-13; Verizon Comments at 8-9; AST Comments at 26-28; AT&T Comments at 22-23; CTIA Comments at 12-13; DISH/EchoStar Comments at 5; T-Mobile Reply at 7-8.

authorization modifications.[287] Commenters believe that the current leasing framework extends requirements to lessees requiring them to refrain from and mitigate operations that create harmful interference, and makes the lessor responsible for compliance with the statutory demands and Commission rules.[288] Further, commenters support the use of our existing leasing rules because it will encourage secondary market transactions and provide the necessary flexibility to craft these new arrangements.[289] We agree, and think that the expansion of our leasing framework that we adopt today will promote administrative efficiency and enable the rapid provision of SCS on a terrestrial licensee's exclusive-use spectrum.

a. Single and Multiple Co-Channel Terrestrial Licensee Parameters

95. In order to effectuate the SCS leasing framework and to afford stakeholders with clarity regarding the process, we adopt a two-pronged approach by which a single terrestrial licensee or multiple co-channel terrestrial licensees may enter into one or more leasing agreements for the provision of SCS. Specifically, under the first leasing method, we enable a single terrestrial licensee who holds all co-channel licenses on the relevant band in a GIA to enter into either a spectrum manager or a *de facto* transfer leasing arrangement with one or more satellite operators which will then provide SCS on frequencies in a GIA for which the terrestrial licensee holds all of the licenses. Under the second leasing method, we provide parties with additional flexibility in structuring spectrum leasing arrangements by permitting spectrum manager or *de facto* transfer leases where there are multiple co-channel licensees on the relevant band in a GIA and all licensees holding co-channel licenses in the GIA are participating in the SCS partnership. Both methods, whether there are one or more co-channel licensees, will be subject to the rules and procedures that we adopt herein. In addition, the lessee and lessor should adequately describe the leasing arrangement as an attachment to the FCC Form 608, and include: (1) a certification that the parties are entering into the leasing arrangement for the purpose of fulfilling the part 25 entry criteria; (2) a description of which method, single or multiple terrestrial licensee, the parties are utilizing to meet the part 25 entry criteria; and (3) if the parties are utilizing the multiple terrestrial licensee

[287] CTIA Comments at 12-13; AT&T Comments at 10-11; DISH/EchoStar Comments at 4; CTIA Reply at 4-6; Verizon Reply at 9; Letter from Henry G. Hultquist, Vice President-Federal Regulatory, AT&T Services, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-65 et al., at 1-2 (filed Feb. 20, 2024) (AT&T Feb. 20, 2024, *Ex Parte*).

[288] SpaceX Comments at 12 (explaining that under the part 1 leasing rules, "the mobile carrier has the incentive to ensure that SCS complies with applicable service rules and the terms of the underlying license, providing a strong safeguard against harmful interference"); T-Mobile Comments at 12-13; Verizon Comments at 8-9; AST Comments at 26-28; CTIA Comments at 12-13 ("requiring a spectrum lease agreement to be in place will help mitigate the risk of harmful interference in a given terrestrial band, which will allow for a more streamlined authorization process for SCS operations"); AST Reply at 6-8; CTIA Reply at 5-6 (requiring a leasing arrangement "as a prerequisite for any SCS authorization will protect consumers' interest in interference-free mobile broadband and the terrestrial licensees' reasonable investment-backed expectations in a continued ability to serve the public").

[289] SpaceX Comments at 11-13 ("The Commission should preserve the flexibility inherent in its secondary markets rules . . ."); Verizon Comments at 8-9 ("The approach outlined [in Verizon's comments], is well-known, and will easily accommodate arrangements between terrestrial wireless licensees and satellite operators."); AST Comments at 26-28 ("AST SpaceMobile supports the licensing and leasing framework set forth by the Commission and agrees that partnerships between terrestrial licensees and satellite operators present the best opportunity to leverage the potential of SCS."); CTIA Comments at 12-13 ("As the Commission has found, existing secondary-market rules provide ample flexibility for leasing arrangements, and these rules can be used seamlessly for introducing new SCS operations."); AT&T Comments at 22-23 ("The Commission's proven secondary market policies play a crucial role in allowing providers 'to gain ready access to spectrum,' thereby 'enabl[ing] provision of new and diverse services and applications to help meet the ever-changing needs of the public.'"); DISH/EchoStar Comments at 5; CTIA Reply at 5-6 ("[T]he Commission's secondary-market rules provide ample flexibility for all manner of commercial agreements, including leasing arrangements, and the Commission can rely upon these provisions to accelerate the deployment of new SCS operations while protecting consumers of terrestrial mobile services against harm."); Verizon Reply at 9-10; T-Mobile Reply at 7-8.

method, the parties should: (a) describe the nature of the leasing arrangement(s); and (b) demonstrate how the entirety of the GIA is covered by the lease arrangement(s).

96. Under either method, we require that there are leases covering the entire area of the GIA in order to meet the part 25 entry criteria. Further, a terrestrial licensee's license gives it the right to serve a given geographic area using particular frequencies, as such SCS service would be limited to those frequencies and that area.[290] This means that the SCS leasing framework that we adopt today would not allow SCS operations outside the specific frequencies and license areas described in the underlying terrestrial licenses.[291] We believe this decision further alleviates the concerns raised by stakeholders regarding the potential for interference from geographically-adjacent, co-channel licensees.

97. *Single Terrestrial Licensee.* Under the first leasing method, we will allow licensees to enter into a spectrum manager or *de facto* transfer leasing arrangement with one or more satellite operators where the single terrestrial licensee holds all co-channel licenses on the relevant band in a GIA. This leasing method limits the provision of SCS to instances where a single terrestrial licensee holds all co-channel licenses in the relevant band throughout one of six GIAs. We expect that these SCS leasing arrangements would be largely the same as the leasing agreements that terrestrial wireless licensees/lessors use under our current rules. The limitations built into the framework we adopt today—with regard to the amount of spectrum and geographic area that may be leased—will ensure SCS can evolve in the environment most amenable to rapid success. We find that this method minimizes the risk of harmful interference between geographically adjacent markets and allows SCS to be provided without the presence in each GIA of co-channel licenses requiring interference protection.[292]

98. Terrestrial licensees that hold all co-channel licenses in the relevant band in a GIA are afforded the flexibility of entering into a spectrum manager or a *de facto* transfer leasing arrangement utilizing the existing leasing application/notification requirements. Moreover, in an effort to refrain from implementing more limitations, we will allow terrestrial licensees engaged in this first leasing method the opportunity to enter into leasing arrangements with more than one satellite operator to provide SCS over a GIA. We believe that allowing the terrestrial licensees to lease to more than one satellite operator will give terrestrial licensees more flexibility to respond to consumer demand for SCS services, and thus, will allow the marketplace to drive the spectrum to its most efficient use.[293] We encourage prospective SCS

---

[290] *Notice* at 30, para. 71.

[291] Given the unique licensing structure of the 800 MHz Cellular band, this results in some "unserved areas" being ineligible for SCS. *See generally Amendment of Parts 1 and 22 of the Commission's Rules with Regard to the Cellular Service, Including Changes in Licensing of Unserved Area; Amendment of the Commission's Rules with Regard to Relocation of Part 24 to Part 27 et al.*, WT Docket No. 12-40 *et al.*, Second Report and Order, Report and Order, and Second Further Notice of Proposed Rulemaking, 32 FCC Rcd 2518, 2520-21, paras. 1-4 (2017); *id.* at 2521, para. 4 n.10 (explaining that 800 MHz licensees have the opportunity to expand their service coverage without prior authorization). Lynk suggests that 800 MHz Cellular licensees should be permitted to expand their license area to provide purely SCS-based services in adjacent unserved areas despite the area not currently being covered by their license. Lynk Comments at 10. We believe this proposal increases the legal and technical concerns created by SCS and decline to adopt this proposal, though we note, as discussed above, that we may permit SCS in GIAs which have small unserved areas under certain circumstances. *See supra* note 171.

[292] *See Notice* at 20, para. 45; *see also First Secondary Markets Report and Order*, 18 FCC Rcd at 20609-10, para. 9 ("[L]icensees in the Wireless Radio Services covered herein may lease some or all of their spectrum usage rights to third parties, for any amount of spectrum and in any geographic area encompassed by the license, and for any period of time within the term of the license.").

[293] *See generally* SpaceX Comments at 11-13; AT&T Comments at 15-17; AST Comments at 11-12 ("[T]he Commission should permit SCS services in geographic regions with less than full-CONUS coverage when the satellite operator demonstrates that it will not interfere with adjacent users."); Aalyria Comments at 5-6 (stating that the Commission's initial proposal to limit the entry criteria to a single terrestrial licensee that holds all of the co-channel licenses in the band throughout the relevant GIA will constrain competition); Kepler Comments at 2-3;

(continued….)

lessees and licensees to review the specific policies and procedures that we adopt today as we further clarify the rights and responsibilities of terrestrial licensees and space station operators as they relate to the provision of SCS.

99. *Multiple Co-Channel Terrestrial Licensees.* Under the second leasing method, we will allow licensees to enter into a spectrum manager or *de facto* transfer leasing arrangement with a satellite operator where there are multiple co-channel terrestrial licensees who together hold all licenses on the relevant band in a GIA. We expect that expanding our SCS licensing framework from the original proposal to include not only single licensee arrangements, but multiple licensees that collectively hold all co-channel licenses in a particular band throughout one of six GIAs, will incentivize SCS collaborations and allow additional licensees to participate, while still minimizing the risk of harmful interference.

100. Under this second SCS leasing framework, we reiterate that this method only works for the purpose of meeting the part 25 entry criteria where there are leases covering *all* relevant co-channel licenses in the GIA. We further emphasize that the rights and responsibilities of terrestrial licensees and satellite operators are the same as in a single licensee context, except that, where multiple licensees hold co-channel licenses in the GIA, the entire GIA must be covered by one or more lease arrangements with the satellite operator.[294] The leasing arrangements under the multiple licensee method that we adopt today may only be entered into under Model 1 or Model 2, discussed below.

101. *Multiple Co-Channel Terrestrial Licensee Model 1.* One terrestrial licensee holding a license in a GIA may enter into a spectrum manager or *de facto* transfer leasing arrangement with each of the other co-channel licensees in that GIA. Once the terrestrial licensee has entered into a leasing arrangement with all of the co-channel licensees in that GIA, the terrestrial licensee may then sublet to a satellite operator for the purpose of meeting our part 25 entry criteria.

- Example 1: Where there are only two co-channel licensees (A and B) on the relevant channel in a GIA, Licensee A may enter into a lease arrangement with Licensee B to lease access to the relevant frequencies throughout all of Licensee B's licenses in that GIA. Licensee A then subleases those frequencies—along with leasing those under its own license—to the satellite operator.
- Example 2: Where there are more than two co-channel licensees (A, B, C, and D) on the relevant channel in a GIA, Licensee A may enter into separate leasing arrangements with each of the co-channel licensees. As relevant for this example, this means that Licensee A must enter into a distinct leasing arrangement with each of the co-channel licensees, such that Licensee A enters into a leasing arrangement with: (1) Licensee B to lease access to the relevant frequencies throughout all of Licensee B's licenses in that GIA; (2) Licensee C to lease access to the relevant frequencies throughout all of Licensee C's licenses in that GIA; and (3) Licensee D to lease access to the relevant frequencies throughout all of Licensee D's licenses in that GIA. Once Licensee A has entered into leasing arrangements with Licensee B, C, and D, Licensee A then subleases those frequencies—along with leasing those under its own license—to the satellite operator.
- Example 3: A third party, X, may enter into individual lease arrangements with all relevant co-channel licensees, and then sublease to the satellite operator. This parallels Example 2 above as Third Party X must still enter into leasing arrangements with all of the relevant co-channel licensees and must have leases that cover all of the relevant licenses in that GIA.

Lockheed Martin Comments at 10; OptimERA Reply at 4-5; Nsighttel Wireless, LLC d/b/a Cellcom Reply, GN Docket No. 23-65, at 7 (rec. June 12, 2023) (Cellcom Reply); CCA Reply at 9; Lynk Feb. 16, 2024, *Ex Parte*.

[294] We note that the rights as it pertains to terrestrial licensees and satellite operators also differs in certain instances as it pertains to the ability to sublet. *See infra* paras. 120-22.

102. *Multiple Co-Channel Terrestrial Licensee Model 2.* A satellite operator may enter into individual leasing arrangements with each co-channel licensee that holds a license on the relevant band in the GIA.

- Example 1: Where there are only two co-channel licensees (A and B) on the relevant channel in a GIA, the satellite operator may enter into a lease arrangement with Licensee A and then separately enter into a lease arrangement with Licensee B. The leases must cover all of the relevant licenses in that GIA.
- Example 2: Where there are more than two co-channel licensees (A, B, and C) on the relevant channel in a GIA, a satellite operator may enter into separate leasing arrangements with each of the co-channel licensees. As relevant for this example, this means that the satellite operator must enter into a distinct leasing arrangement with each of the co-channel licensees, such that the satellite operator enters into a leasing arrangement with: (1) Licensee A to lease access to the relevant frequencies throughout all of Licensee A's licenses in that GIA; (2) Licensee B to lease access to the relevant frequencies throughout all of Licensee B's licenses in that GIA; and (3) Licensee C to lease access to the relevant frequencies throughout all of Licensee C's licenses in that GIA. The satellite operator must enter into leasing arrangements with Licensee A, B, and C that covers all of the relevant licenses in that GIA.

103. We stress that, while single-licensee arrangements include the option for multiple satellite operators at the terrestrial licensee's discretion, where there are multiple licensees controlling the co-channel licenses in a GIA, they may not enter into lease arrangements with multiple satellite operators to provide SCS over the GIA. In other words, there may be *either* multiple terrestrial licensees or multiple satellite operators providing SCS in a given GIA on a given channel, but there may not be multiple of *both*. This requirement will ensure a single SCS network—maintained by a single controlling terrestrial licensee or satellite operator—in a given channel in a given GIA, rather than an arrangement whereby multiple licensees and multiple satellite operators could work to carve up a GIA into smaller areas, each with their own SCS networks operating simultaneously. As the marketplace for—and technology enabling—SCS develops, we can examine and revisit this requirement to determine if this level of complexity is sustainable.

104. We also again emphasize that if a terrestrial licensee chooses to utilize Model 1 or a satellite operator chooses to utilize Model 2, it must ensure that the leasing arrangements encompass all of the relevant licenses on the relevant band in that GIA. We caution prospective SCS lessors and lessees that meeting the part 25 entry criteria we adopt today is conditioned on a showing of leases that cover every license within the specific GIA where SCS will be offered. We continue to believe that this showing is necessary so that SCS can be provided without the need for additional complex protection requirements for geographically-adjacent co-channel licenses. We suggest that prospective SCS lessees and licensees should review the specific policies and procedures that we adopt today as we further clarify the rights and responsibilities of terrestrial licensees and satellite operators as it relates to the provision of SCS.

b. FirstNet SCS Authorization

105. In the *Notice*, the Commission sought comment on incorporating FirstNet's 700 MHz public safety spectrum (the 758-769/788-99 MHz band, sometimes referred to as "Band 14") into the SCS framework.[295] It also proposed to require licensees providing SCS to use the Commission's existing leasing regime, and sought comment on whether certain refinements to that regime are necessary, given

[295] *Notice* at 17, para. 35.

the novel nature of SCS.[296] In response, commenters expressed support for allowing FirstNet to take full advantage of SCS's potential.[297] FirstNet urged the Commission to authorize Band 14 for the provision of SCS noting that this would provide the "potential to 'create significant public safety benefits,' especially during emergency events and response."[298] Nextivity stated the public interest would be best served by "extending the opportunity to provide FirstNet coverage from space" especially since the "notion of an ever evolving network" is "built into the very establishment of FirstNet's enabling statute."[299] Similarly, AST encouraged the Commission to authorize SCS on Band 14 to "enhance the communication capabilities of first responders."[300]

106. We are authorizing SCS on FirstNet's licensed frequencies in the 700 MHz band for the purpose of providing broadband connectivity to first responders because we believe that allowing FirstNet to utilize SCS can serve a critical public safety need by improving access for first responders and public safety entities.[301] However, in doing so, we recognize that FirstNet's unique structure does not fit squarely within the part 25 entry criteria that we adopt today—requiring that a satellite operator have a part 1 lease notification/application on file.[302] In its comments, FirstNet explains that the SCS part 1 leasing framework "is not applicable in the Band 14 context."[303] Instead, FirstNet states that "any arrangement to utilize Band 14 for SCS would need to be through a contractual relationship" pursuant to the 2012 Act regulatory framework.[304]

107. We find that it is in the public interest to allow FirstNet to satisfy the leasing arrangement requirement by demonstrating to the Commission that it and its terrestrial partners have entered into contractual agreements which together authorize the relevant satellite operator to provide SCS on the frequencies licensed to FirstNet. We emphasize that we are authorizing FirstNet to utilize an alternative to our part 1 leasing requirement solely because FirstNet's license and operating structure is unique and not well-suited to a leasing requirement.[305] We also find that enabling SCS on FirstNet spectrum will provide significant public safety benefits which justify this alternate path, such as enhancing public safety

[296] *Id.* at 29-30, paras. 70-71 (proposing to require licensees providing SCS to use the Commission's existing leasing regime and seeking comment on whether certain refinements to that regime are necessary, given the novel nature of SCS).

[297] Nextivity Comments at 3-4; FirstNet Comments at 2-4; AT&T Reply at 12-13; BRETSA Comments at 7-8; AST Reply at 17-20; Lynk Reply at 3-6; CTIA Reply at 4 n.11.

[298] FirstNet Comments at 3-4.

[299] Nextivity Comments at 3-4 (stating that the public interest would be best served by "extending the opportunity to provide FirstNet coverage from space"); *id.* at 3-4 n.11 (citing Middle Class Tax Relief and Job Creation Act of 2012, Pub. L. No. 112-96, 126 Stat. 156, 206 (2012) (codified at 47 U.S.C. § 1422(b)) ("The nationwide public safety broadband network shall be based on a single, national network architecture that evolves with technological advancements . . .")).

[300] AST Reply at 17 ("Authorizing SCS in Band 14 also advances FirstNet's public safety objectives by enabling first responders nationwide to enjoy seamless communications in the immediate aftermath of disasters.").

[301] *See supra* paras. 35-37.

[302] *See supra* paras. 69-73.

[303] FirstNet Comments at 3-4 ("To meet its statutory mandate, the FirstNet program provides prioritized primary access to public safety users—with access to Band 14 for AT&T's non-public safety use on a secondary basis only, pursuant to contract—so that first responders and other public safety entities have access to and use of the FirstNet network when and where they need it without competing with commercial users."); AT&T Feb. 20, 2024, *Ex Parte* at 1 n.2.

[304] FirstNet Comments at 3-4.

[305] *See generally* 47 U.S.C. § 1428(a).

communications in rural and unserved areas, during emergency situations, or during national disasters.[306] Thus, to participate in this framework, FirstNet should make a filing associated with its license in ULS, explaining that it has entered into agreement(s) to provide for SCS and is seeking to enable that service.[307] This filing should: (1) describe the manner in which FirstNet has conveyed to its satellite partner an authorization to utilize the 758-769/788-799 MHz band or portions of the band; (2) identify and describe the geographic area(s) and nature of the proposed SCS operations; and (3) demonstrate how, under the agreement, the rights and responsibilities of the satellite operator are substantively the same as those of a part 1 lessee.[308]

108. In addition to the ULS filing, to participate in SCS, FirstNet's satellite operator partner must obtain a new part 25 license or modify an existing part 25 license, as set forth in the SCS entry criteria.[309] The FirstNet SCS part 25 application should refer to FirstNet's ULS filing for SCS. In the same manner as other SCS operations, the terrestrial devices used for FirstNet would qualify as "licensed by rule" earth stations under the new provisions of part 25. Similarly, the part 25 filing related to the provision of SCS on this spectrum would be exempt from processing round procedures.[310] We note that nothing in this FirstNet SCS construct precludes FirstNet's commercial partner(s) from using excess spectrum capacity for SCS on a commercial basis.[311]

109. The Commission delegates to WTB, SB, and Public Safety and Homeland Security Bureau (PSHSB) the authority to determine whether the demonstrations in the filings satisfy by rule both our part 1 leasing requirements and the part 25 SCS entry criteria. Pursuant to this delegation and the existing delegated authority to act on applications,[312] the bureaus should assess and act on the FirstNet filings requesting the provision of SCS operations.

c. Operating Agreements

110. As part of the SCS framework that we adopt today, we are requiring that a prospective SCS provider have a part 1 leasing notification or application on file with the Commission in order to meet our part 25 entry criteria. In the *Notice*, the Commission also sought comment, as an alternative

[306] *See* BRETSA Comments at 7-8 (explaining that for the "agencies the BRETSA-funded PSAPs support, and particularly the Boulder County Sheriff's Office with responsibility for responding to incidents in the unincorporated areas of Boulder County including the mountainous areas, the potential for SCS-extended FirstNet coverage is critical"); AST Reply at 17; AT&T Reply at 12-13 ("SCS offers the promise of supplemental connectivity, which may result in benefits to the public safety community."); FirstNet Comments at 3 ("[U]tilizing Band 14 to provide SCS for FirstNet users may present an opportunity to better support first responders and the communities they serve nationwide."); Nextivity Comments at 3-4 ("[T]he public interest would be served by extending the opportunity to provide FirstNet coverage from space in the vast geographies of our country that remain uncovered.").

[307] Specifically, FirstNet should file a FCC Form 601 application and attach the relevant showings to that application. *See* Call Sign WQQE234. This public filing would be retained in the official record for the license and would provide a mechanism for the Bureaus to take action on the filing.

[308] *See generally* 47 CFR §§ 1.9020 (spectrum manager leases), 1.9030 (long-term *de facto* transfer leases), 1.9035 (short-term *de facto* transfer leases). We note that FirstNet may request confidential treatment of information contained in this submission(s) consistent with section 0.459 of the Commission's rules. *See id.* § 0.459 (detailing procedures to request withholding materials from public inspection); *see also FCC Provides Instructions Regarding Submission of Confidential Materials*, Public Notice, 35 FCC Rcd 2973 (2020).

[309] *See supra* paras. 64-68.

[310] *See supra* paras. 74-77.

[311] Under the public-private arrangement established by the governing statute, Band 14 spectrum is used on a primary basis for public safety and FirstNet's commercial partner(s) can use excess capacity (i.e., capacity not being used by the public safety users). 47 U.S.C. § 1428(a)(2)(B)(i)-(ii).

[312] 47 CFR §§ 0.131(a), 0.51, 0.191(f).

proposal, on allowing the prospective SCS providers to enter into operating agreements with the terrestrial licensee(s) in lieu of a part 1 leasing arrangement.[313] The Commission noted that, while operating agreements are typical in the satellite context for use of spectrum allocated and licensed for space radiocommunication services, operating agreements are not used in place of filing a leasing arrangement on a FCC Form 608 under the Commission's part 1 leasing regime.[314] In response, AST and SpaceX express support for the use of operating agreements as an alternative to leasing arrangements, with AST stating that an operating agreement is a viable alternative and "such agreements are common in the satellite context."[315] In the alternative, CTIA argues that SCS should be driven by spectrum lease arrangements, with the related Form 608, so that exclusive use rights are protected.[316]

111. We find AST and SpaceX's reasoning to be unpersuasive. The common use of operating agreements (or shared use agreements) in the context of satellite licensing does not directly translate to terrestrial spectrum rights.[317] Under part 25 of the Commission's rules, satellite licenses for NGSO systems are generally granted in processing rounds with the understanding that the licensees are left to share and/or coordinate, in good faith, on their own by business arrangement.[318] In contrast, under part 1 of the Commission's rules, the licenses are granted at auction/via competitive bidding, or are acquired in secondary market transactions.[319] Terrestrial licensees may lease their spectrum through spectrum manager or *de facto* transfer leasing arrangements.[320] While both the Commission's part 25 and part 1 rules require satellite and terrestrial licensees to maintain control of the licensed spectrum, satellite licensees are afforded more flexibility when the satellite operator wants to share (or as it relates to terrestrial licensees, lease) its spectrum because the Commission does not always require documentation or notice of the satellite operator's shared use agreements.[321] We find that the differences in the part 25 and part 1 rules justify different treatment of spectrum sharing in the two contexts.

112. Moreover, we find that the part 1 secondary markets rules require the use of a spectrum manager or *de facto* transfer leasing arrangement for the purpose of providing SCS. In the *First*

---

[313] *Notice* at 23, paras. 53-54.

[314] *Id.* at 23, para. 54.

[315] AST Comments at 26 n.68 ("AST SpaceMobile also supports the FCC's proposal to allow for operating agreements as an alternative to leasing arrangements. As acknowledged, such agreements are common in the satellite context. Both leases and operating agreements are viable alternatives, provided the underlying parties comply with Section 310(d) of the Act."); *see also* SpaceX Comments at 12 ("The Commission should preserve the flexibility inherent in its secondary markets rules, including permitting operators to reach spectrum access arrangements—e.g., spectrum manager leases or operating agreements—without requiring prior Commission approval.").

[316] CTIA Comments at 12-14; *see also* AT&T Comments at 10-11; Verizon Comments at 4; DISH/EchoStar Comments at 5 (stating that it supports relying on secondary market leasing rules to facilitate SCS services); T-Mobile Comments at 12; T-Mobile Reply at 715 (disagreeing with Lynk, which would have the Commission approve the provision of SCS with no lease agreement in place); CTIA Reply at 4-5; Verizon Reply at 2, 9-10 (stating commenters generally share the view that the Commission's existing spectrum leasing framework is a sound approach for Commission oversight of an SCS arrangement).

[317] AST Comments at 26 n.68. We note that the term "operating agreements" in the satellite operator context could mean satellite capacity agreements, coordination agreements, etc.

[318] *See* 47 CFR §§ 25.119 (assignment or transfer of control of station authorization), 25.137 (requests for U.S. market access through non-U.S.-licensed space stations), 25.157 (consideration of application for NGSO-like satellite operations).

[319] *See id.* §§ 1.945 (license grants), 1.948 (assignment of authorization or transfer of control).

[320] *See id.* subpt. X (spectrum leasing).

[321] *Id.* § 25.137 (assignment or transfer of control of station authorization); *see also id.* § 1.9010 (*de facto* control standard for spectrum leasing arrangements).

Secondary Markets Order, the Commission noted that one of the reasons that it adopted the revised leasing arrangements rules was to create regulatory certainty.[322] The Commission noted that doing so would eliminate barriers, such as the licensee's fear of abandoning its future rights to the spectrum or risk of losing its licenses as unauthorized transfers of *de facto* control under Section 310(d) of the Act, that may have "prevented licensees from allowing a third party to gain access to" spectrum.[323] In keeping with this reasoning, we believe that allowing parties to enter into operating agreements without the Commission's knowledge or approval in lieu of filing a part 1 lease notification or application with the Commission could eliminate some of the certainty that we, and many commenters, believe was created by our secondary markets rules,[324] and which we believe are particularly important in the context of a novel offering like SCS. Spectrum leasing arrangements are an essential mechanism that allows parties to use spectrum without the necessity of acquiring a license,[325] and we agree with CTIA that they are also a necessary protection mechanism for the licensee's exclusive use rights.[326] Therefore, we find that a licensee/lessor may not enter into an operating agreement with a satellite operator in lieu of entering into a spectrum manager or *de facto* transfer leasing arrangement to satisfy the part 25 authorization entry criteria.

2. Specific Policies and Procedures Applicable to SCS Spectrum Leasing Arrangements

113. We are implementing an SCS framework by which one or more terrestrial licensees may enter into leasing arrangements with satellite operators for the purpose of providing SCS. Because of the novel nature surrounding this SCS framework, this section discusses the specific policies and procedures that will apply to SCS leasing arrangements. In particular, we: (1) extend our current leasing arrangement rules to the provision of SCS; (2) extend our subleasing rules to the provision of SCS; (3) revise our construction and performance attribution rules; (4) maintain the current spectrum manager and *de facto* transfer leasing terms; (5) decline to implement rules that would prevent either party from severing a part 1 leasing agreement; (6) adopt rules requiring subscriber notification of SCS leasing arrangements; (7) maintain our current interference-related leasing rules; (8) decline to extend ECIP eligibility to SCS leasing arrangements; and (9) decline to adopt new E911 obligations.

---

[322] *First Secondary Markets Report and Order*, 18 FCC Rcd at 20625-26, para. 44; *see also id.* at 20625, para. 44 n.95 (citing commenters' concerns that leasing spectrum could constitute an unauthorized transfer of control).

[323] *Id*. at 20625-26, para. 44; *see also* 47 U.S.C. § 310(d) ("No construction permit or station license, or any rights thereunder, shall be transferred, assigned, or disposed of in any manner, voluntarily or involuntarily, directly or indirectly, or by transfer of control of any corporation holding such permit or license, to any person except upon application to the Commission and upon finding by the Commission that the public interest, convenience, and necessity will be served thereby.").

[324] CTIA Comments at 12-14 ("[F]ocusing on SCS applications that are backed by a terrestrial licensee's voluntary agreement to use its spectrum for SCS will protect the spectrum usage rights that terrestrial licensees have invested heavily to acquire and make available for wireless services . . ."); AT&T Comments at 22-23 ("The Commission's proven secondary market policies play a crucial role in allowing providers 'to gain ready access to spectrum,' thereby 'enabl[ing] provision of new and diverse services and applications to help meet the ever-changing needs of the public.'"); Verizon Comments at 4; DISH/EchoStar Comments at 5 (stating that it supports relying on secondary market leasing rules to facilitate SCS services); T-Mobile Comments at 12; T-Mobile Reply at 7-9, 15; CTIA Reply at 4-5; Verizon Reply at 2, 9-10 (stating commenters generally share the view that the Commission's existing spectrum leasing framework is a sound approach for Commission oversight of an SCS arrangement). *See generally* SpaceX Comments at 12 ("Regardless of the type of arrangement that the SCS partners reach, the Commission should adopt the flexible approach it has pioneered for terrestrial licenses that avoids unduly restricting an operator's ability to reach commercial arrangements . . .").

[325] *First Secondary Markets Report and Order*, 18 FCC Rcd at 20624, paras. 41-42.

[326] CTIA Comments at 12-14.

a. *De Facto* Transfer and Spectrum Manager Leasing Arrangements

114. Under our existing secondary market rules, licensee lessors and their lessees have two spectrum leasing options that each provide different rights and responsibilities for the licensee and lessee: *de facto* transfer leasing arrangements; and spectrum manager leasing arrangements.[327] Under either leasing option, the lessor and the lessee may choose to enter into a long-term (more than one year) or short-term (one year or less) arrangement.[328] Spectrum manager leasing arrangements generally do not require prior Commission approval; rather, the licensee/lessor must notify the Commission in advance of commencing operations.[329] In contrast, *de facto* transfer spectrum leasing arrangements are typically subject to the Commission's general approval procedures, under which the Commission must grant the application prior to the parties putting the proposed spectrum leasing arrangement into effect.[330]

115. In the *Notice*, the Commission sought comment on whether it should allow all forms of leasing, including spectrum manager and *de facto* transfer (short- and long-term), in the SCS framework.[331] Commenters overwhelmingly support a framework that allows the flexibility and the freedom to reach spectrum access agreements that best serve the mobile carriers and subscribers.[332] SpaceX urges the Commission to "preserve the flexibility inherent in its secondary markets rules" in a manner that permits operators to "reach spectrum access arrangements . . . without requiring prior Commission approval."[333] In contrast, Verizon asks the Commission to limit leasing for SCS purposes to spectrum manager leases stating that the "assignment of responsibilities in the spectrum manager lease rules is most appropriate" especially since the "lessor enabling SCS remains 'directly and primarily responsible' for ensuring the" lessee's compliance with the Act and the Commission's rules.[334]

116. We agree with the overwhelming record support asking the Commission to create a leasing structure for SCS that allows parties to develop agreements and enter into leasing arrangements that best suit their commercial requirements. We believe that limiting the type of leasing arrangement, as suggested by Verizon, would also limit the freedom and flexibility of the lessor and the lessee which could ultimately hinder the prospective lessor's and lessees' ability to enter into an agreement. As

---

[327] 47 CFR §§ 1.9030(a), (e), 1.9035(a), (e). Though two spectrum leasing options generally exist, we note that another leasing option—available only to 3.5 GHz Priority Access Licensees and therefore outside the scope of this *Report and Order*—is light touch leasing, a process that builds upon and incorporates our traditional spectrum manager leasing approval process. *Id.* §§ 1.9046, 96.32(c), 96.66.

[328] *Id.* §§ 1.9030(a), 1.9035(a).

[329] *Id.* § 1.9020(e)(1)(ii) (requiring 21 days advance notice for spectrum manager leasing arrangements greater than one year in length, or 10 days advance notice for arrangements of one year or less in length). The Commission reviews the notifications to ensure that all necessary technical and other information is correctly submitted, but the subject spectrum leasing arrangement may be implemented without waiting for such review, unless the parties to the spectrum manager leasing arrangement have requested on the form that the arrangement become effective upon Commission acceptance of the notification. Spectrum manager leasing notifications require no prior public notice before the Commission may accept them.

[330] *Id.* §§ 1.9030(a), (e), 1.9035(a), (e). Both long-term and short-term *de facto* transfer spectrum leasing applications are subject to overnight processing under the Commission's immediate approval procedures if the filing meets certain conditions. *Id.* §§ 1.9030(e)(2) (immediate approval procedures), 1.9035(e) (certain conditions still must be met in order for a short-term *de facto* transfer lease to qualify for immediate processing).

[331] *Notice* at 29-30, para. 70.

[332] SpaceX Comments at 11-12; AST Comments at 26; CTIA Comments at 13; AT&T Comments at 22; DISH/EchoStar Comments at 5 (stating that the Commission should rely on its existing secondary market rules to facilitate SCS, which includes both *de facto* transfer and spectrum manager leases); AST Reply at 6-8; CCA Reply at 11; CTIA Reply at 7; T-Mobile Reply at 7-8.

[333] SpaceX Comments at 12.

[334] Verizon Comments at 8 (citing 47 CFR § 1.9020(b)(1)); Verizon Reply at 9-10.

Verizon also states in its comments, we want to "leave parties to SCS leasing arrangements free to negotiate the business terms of their arrangements,"[335] which we believe is made possible by giving parties the option of entering into both *de facto* transfer and spectrum manager lease agreements. Thus, we allow prospective lessors and lessees to enter into both *de facto* transfer and spectrum manager leasing arrangements in the SCS framework that we adopt today.

117. We likewise choose to utilize our existing application approval and notification processing procedures for both lease types.[336] The Commission's rules require that the parties to a *de facto* transfer spectrum leasing arrangement file an application for approval of the lease with the Commission.[337] Parties to a spectrum manager lease must file a notification of the spectrum leasing arrangement with the Commission and can commence operations without prior Commission approval after a short period.[338] The Commission's rules provide for expedited processing (by the next business day) of all categories of spectrum leasing applications and notifications.[339] To be accepted for processing, any application or notification must be "sufficiently complete," including information and certifications relating to a lessee's eligibility and qualification to hold spectrum, and lessee compliance with the Commission's foreign ownership rules.[340] *De facto* transfer spectrum leasing applications must also be accompanied by the requisite filing fee.[341]

118. Long-term *de facto* transfer spectrum leasing applications and spectrum manager leasing notifications must meet three additional criteria for immediate approval or processing.[342] First, the lease cannot involve spectrum that may be used to provide an interconnected mobile voice and/ or data service and that would result in a geographic overlap with licensed spectrum "in which the proposed spectrum lessee already holds a direct or indirect interest of 10 [percent] or more."[343] Second, the licensee cannot be "a designated entity or entrepreneur subject to unjust enrichment requirements and/or transfer restrictions under applicable Commission rules."[344] Finally, the spectrum leasing arrangement cannot

[335] Verizon Comments at 8-9.

[336] In the *Notice*, the Commission sought comment on whether it should require spectrum manager leases for such operations to obtain prior Commission approval, notwithstanding the procedures typically applicable to such leases. *Notice* at 29-30, para. 70.

[337] 47 CFR §§ 1.9030(a), (e), 1.9035(a), (e).

[338] *Id.* § 1.9020(e)(1). Under general notification procedures, spectrum manager leases for more than one year must be filed at least 21 days prior to the date of operation. *Id.* § 1.9020(e)(1)(ii). Spectrum manager leases of one year or less must be filed at least 10 days prior to the date of operation. *Id*. § 1.9020(e)(1)(ii). We note that under immediate approval processes, acceptance of the notification will be reflected in ULS on the next business day following the day the application is filed, and spectrum manager lessees may operate upon acceptance consistent with the terms of the leasing arrangement. *Id.* § 1.9020(e)(2)(ii).

[339] *Id.* §§ 1.9020(e)(2)(iii), 1.9030(e)(2)(iii), 1.9035(e)(2); *see also Second Secondary Market Report and Order*, 19 FCC Rcd at 17512, para. 14 n.42 ("[U]nder the immediate approval process, spectrum leasing parties must submit qualifying applications and include the requisite filing fees. The [Wireless Telecommunications] Bureau will then process the application overnight and . . . indicate in our Universal Licensing System (ULS) that the application has been approved."). Applications and notifications are filed on FCC Form 608, "FCC Application or Notification for Spectrum Leasing Arrangement." 47 CFR § 1.913(a)(5).

[340] 47 CFR §§ 1.9020(e)(1)(i), (e)(2)(i), 1.9030(e)(1)(i), (e)(2)(i), 1.9035(e)(1).

[341] *Id.* §§ 1.9030(e)(1)(i), (e)(2)(i), 1.9035(e)(1); *see also id.* § 1.9020(e)(1)(i).

[342] *Id.* §§ 1.9020(e)(2)(i)(A)-(D), 1.9030(e)(2)(i)(A)-(D). All short-term *de facto* transfer spectrum leasing applications are processed via immediate approval procedures. *See id.* § 1.9035(e).

[343] *Id.* §§ 1.9020(e)(2)(i)(A), 1.9030(e)(2)(i)(A).

[344] *Id.* §§ 1.9020(e)(2)(i)(B), 1.9030(e)(2)(i)(B).

"require a waiver of, or declaratory ruling pertaining to, any applicable Commission rules."[345]

119. We believe that our current application approval and notification processing procedures should apply to all SCS related leasing arrangements, where all of the processing criteria are met, because it will remove unnecessary delay by utilizing the procedures that are already in place.[346] While DISH contends that both spectrum manager leases and *de facto* transfer leases should be subject to long-form prior Commission approval based on the necessary interference and out-of-band emissions showings, we believe that our rules as currently written do not need to be revised for SCS.[347] We believe that the SCS framework that we adopt today ensures the licensee/lessor and the lessee must abide by our technical and service rules. For this reason, we believe that altering our processing rules to mandate that all leasing arrangement notifications/applications are subject to prior Commission approval would cause undue delay, which goes against the Commission's policy goals as it pertains to the facilitation of secondary markets.[348] Finally, we find that the public interest will continue to be protected by subjecting these arrangements, following approval, to public notice and possible additional review under the Commission's reconsideration procedures, where necessary.[349] We believe that our current procedures protect the public interest and will promote efficiency and regulatory certainty, and thus, apply our current application approval and notification processing procedures to leasing arrangements involving SCS.

b. Subleasing

120. Pursuant to sections 1.9020(l) and 1.9030(k), a spectrum lessee in a spectrum manager or long-term *de facto* transfer leasing arrangement may sublease its leased spectrum usage rights with the licensee's consent and through the licensee's establishment of privity with the spectrum sublessee.[350] In the *Notice*, the Commission explained that a satellite operator-lessee would be providing SCS coverage to the subscribers of the terrestrial licensee-lessor, and because of this, the ability to sublease to a third party may raise practical or technical issues regarding the continued provision of sufficient service quality to subscribers.[351] For this reason, it sought comment on whether subleasing is appropriate in the proposed framework, and asked whether subleasing could introduce unintended consequences, including adversely

[345] *Id.* §§ 1.9020(e)(2)(i)(C), 1.9030(e)(2)(i)(C). Short-term *de facto* lease applications must also meet this requirement. *Id.* § 1.9035(e)(1).

[346] AST Comments at 26-28 ("[T]he Commission need not require more information from SCS parties in their Form 608 submissions than is currently standard, limit the types of leases SCS participants may enter into, require FCC approval of SCS spectrum manager leases, or upset the traditional allocation of responsibilities as between lessor and lessee."); *see also* CTIA Reply at 6-7 (noting that existing secondary market rules should be applied to SCS partnerships with minimal changes and stating that they provide the necessary flexibility to craft these new arrangements).

[347] DISH/EchoStar Comments at 5.

[348] *Second Secondary Market Report and Order*, 19 FCC Rcd at 17512, para. 14 ("This action serves the Commission's policy goals of facilitating secondary markets in spectrum usage rights by enabling parties to implement spectrum leasing arrangements without undue delay.").

[349] Consistent with our rules and policies concerning standing, we remind all stakeholders that any interested party is entitled to file a petition for reconsideration of our approval of the spectrum leasing arrangement within 30 days of the public notice date. *See* 47 U.S.C. § 405; 47 CFR § 1.106(b). In addition, the Bureau is able to reconsider the grant on its own motion within 30 days of the public notice date, and the Commission could reconsider the grant on its own motion within 40 days of the public notice date. *See* 47 CFR §§ 1.108, 1.117.

[350] 47 CFR §§ 1.9020(l) (spectrum manager subleasing), 1.9030(k) (long-term *de facto* transfer subleasing). The licensee must submit a notification regarding the spectrum subleasing arrangement in accordance with the applicable notification procedures set forth in this section. *Id.* §§ 1.9020(l), 1.9030(k). Subleasing is not permitted under a short-term *de facto* transfer lease. *Id.* § 1.9035(m).

[351] *Notice* at 32, para. 77.

affecting supplemental coverage or increasing the potential for harmful interference.[352]

121. In response, Skylo asks the Commission to refrain from allowing subleasing in the SCS context.[353] Skylo states that the ability to sublease "may raise practical or technical issues that could adversely affect supplemental coverage," such as where a satellite operator attempts to sublease to offer direct-to-consumer services.[354] While we understand Skylo's concerns, we note that all subleases require the licensee's consent, require a submission to the FCC, and are subject to non-interference rules.[355] We believe that our current rules will adequately protect against any concerns of interference in this context. Moreover, we remind terrestrial licensees that they may seek to protect themselves from the risks associated with subleasing arrangements by including provisions in their leases that prohibit the spectrum lessee from entering into a sublease.[356] We do not intend to dictate how parties conduct their businesses, and our decision is meant to permit freely-negotiated business transactions, subject to continuing to ensure our ability to administer the spectrum leasing policies as reflected in our rules and adopted today.

122. We will allow SCS lessees to sublease their spectrum usage rights in accordance with our subleasing rules for each lease type, under certain conditions.[357] Specifically, the prospective SCS sublessee must be entering into the sublease for the purpose of providing SCS, and thus, must hold or apply for a requisite part 25 authorization or market access grant. In addition, we will not allow multiple satellite operators where there are multiple licensees controlling the co-channel licenses in a GIA; for this reason, we will not allow satellite operators to sublease where there are multiple terrestrial licensees jointly leasing their co-channel rights in a given GIA. Finally, all SCS lessees and sublessees must follow existing coordination rules, as outlined herein.[358] This will ensure that the licensee is aware of the sublease, the role of the new sublessee in operating on the frequencies covered by the license, and provide an additional guardrail against the risk of harmful interference.

c. Construction and Performance Requirements Attribution

123. In the SCS framework that we adopt today, we amend our rules regarding the attribution of an SCS lessee's service to the licensee lessor's construction and performance requirements. Specifically, we will not allow a licensee lessor, relying on the lessee's activities related to the provision

[352] *Id*.

[353] Skylo Comments at 11-12. No other commenters submitted support or opposition.

[354] Skylo Comments at 11-12 ("Preventing subleasing for SCS services would also help avoid situations in which a satellite operator may use the mobile terrestrial license to offer direct-to-consumer services. Because the terrestrial operator is the primary licensee, the SCS framework should not be inappropriately used as a mechanism for the provision of services to end-user customers by satellite operators.").

[355] 47 CFR §§ 1.9020(l) (spectrum manager subleasing) ("A spectrum lessee may sublease the leased spectrum usage rights subject to the licensee's consent and the licensee's establishment of privity with the spectrum sublessee."), 1.9030(k) (long-term *de facto* transfer subleasing) ("The application filed by parties to a spectrum subleasing arrangement must include written consent from the licensee to the proposed arrangement."); *see also id.* §§ 1.9010(b)(1)(ii), 1.9020(d)(1), 1.9030(d)(1), 1.9035(d).

[356] *First Secondary Markets Report and Order*, 18 FCC Rcd at 20652, para. 106.

[357] 47 CFR §§ 1.9020(l) (spectrum manager subleasing), 1.9030(k) (long-term *de facto* transfer subleasing).

[358] *See infra* paras. 224-36.

of SCS, to meet the licensee's construction[359] or discontinuance[360] obligations or to meet any safe harbor to the renewal requirement[361] applicable to the underlying license. In the *Notice*, the Commission explained that our current rules allow a lessor to attribute the build-out and performance activities of its lessee to the lessor's construction and performance requirements.[362] Under a spectrum manager leasing arrangement, the licensee/lessor remains responsible for compliance with any construction and performance requirements applicable to the leased spectrum, but may attribute to itself the build-out or performance activities of its spectrum lessee(s) for purposes of compliance with any such requirements.[363] Similarly, under a long-term *de facto* transfer spectrum leasing arrangement, the licensee/lessor may attribute to itself the buildout or performance activities of its spectrum lessee(s) for purposes of compliance with any such requirements.[364]

---

[359] *See generally* 47 CFR § 1.946 (construction and coverage requirements); *see also id.* § 1.946(a) ("For each of the Wireless Radio Services, requirements for construction and commencement of service or commencement of operations are set forth in the rule part governing the specific service. For purposes of this section, the period between the date of grant of an authorization and the date of required commencement of service or operations is referred to as the construction period.").

[360] *See generally id.* § 1.953(b) (180-day rule for geographic licenses) ("Permanent discontinuance of service or operations for Covered Geographic Licenses is defined as 180 consecutive days during which a licensee does not operate or, in the case of commercial mobile radio service providers, does not provide service to at least one subscriber that is not affiliated with, controlled by, or related to the licensee.").

[361] *See generally id.* § 1.949(d) (renewal standard) ("An applicant for renewal of an authorization of a Covered Site-based License or a Covered Geographic License must demonstrate that over the course of the license term, the licensee(s) provided and continue to provide service to the public, or operated and continue to operate the license to meet the licensee(s)' private, internal communications needs."). In a letter, T-Mobile asks the Commission "to allow terrestrial licensees to rely on the availability of SCS to meet the safe harbor renewal standard that otherwise requires licensees to represent that they continue to provide the same level of service as required by their final performance requirement." Letter from Steve B. Sharkey, Vice President, Government Affairs, T-Mobile USA, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-65 et al., at 2 (filed Mar. 5, 2024) (T-Mobile Mar. 5, 2024, *Ex Parte*) (citing 47 CFR § 1.949(e)(2)(i)). We do not believe that revising section 1.949(e)(2)(i) of the Commission's rules to include the provision of SCS as a safe harbor is appropriate at this time. Rather, this scenario—where a licensee has modified its service or operations to offer a novel service—was contemplated by the Commission when it adopted the safe harbor rules, and at that time the Commission determined that such a network modification by a licensee would warrant additional scrutiny before the Commission can determine whether license renewal is in the public interest. *See Amendment of Pts 1, 22, 24, 27, 74, 80, 90, 95, & 101 To Establish Uniform License Renewal, Discontinuance of Operation, and Geographic Partitioning and Spectrum Disaggregation Rules and Policies for Certain Wireless Radio Services*, WT Docket No. 10-112, Second Report & Order and Further Notice of Proposed Rulemaking, 32 FCC Rcd 8874, 8886-89, paras. 27-34 (2017) ("Examples of licensees that will not be able to meet a safe harbor, but for whom there nonetheless may be legitimate bases that warrant renewal, include a licensee that no longer provides service or no longer operates at the level required to meet its final performance requirement, or a licensee that has modified its service or operations since its final performance requirement to offer novel services or employ a unique system architecture."). Thus, in the event that a licensee is unable to meet the renewal standard by satisfying one of the safe harbor requirements pursuant to existing rules, it must file a renewal showing pursuant to section 1.949(f) of the Commission's rules. *See* 47 CFR § 1.949(f) (renewal showing).

[362] *Notice* at 30-31, paras. 72-73.

[363] 47 CFR § 1.9020(d)(5) (spectrum manager lease construction/performance requirements).

[364] However, such attribution is not available to a licensee/lessor under a short-term *de facto* transfer spectrum leasing arrangement. *See* 47 CFR §§ 1.9030(d)(5) (long-term *de facto* transfer lease construction/performance requirements), 1.9035(d)(3) (short-term *de facto* transfer lease construction/performance requirements); *see also First Secondary Markets Report and Order*, 18 FCC Rcd at 20676, para. 177 ("[S]hort-term leasing arrangements are expressly designed to be temporary in nature, and therefore cannot be counted to establish that the licensee is meeting the purposes and policies underlying our buildout rules, including the goal of ensuring establishment of service in rural areas.").

124. The Commission sought comment on whether it should permit a terrestrial licensee to rely on its satellite lessee partner's coverage to meet underlying terrestrial performance obligations, and if so, how this would work in relation to our current performance rules.[365] The Commission also asked whether it should revise our leasing rules in the alternative to permit terrestrial licensees to enter into lease arrangements with satellite partners to extend existing coverage only after the terrestrial licensee has first met all of its final performance obligations for each underlying license that is part of the GIA.[366] In response, the majority of commenters agree that the performance and build-out requirements should remain the terrestrial licensee's responsibility and maintain that the terrestrial licensee should not be allowed to attribute its satellite partner's coverage to meet its construction, renewal, and discontinuance requirements.[367] For example, Verizon argues that an "SCS partnership should not create an end-run around the terrestrial wireless licensee's buildout obligations" because SCS operations are more limited than the wireless services expected by consumers.[368] In contrast, Lynk argues that the Commission should allow the SCS lessee's infrastructure to satisfy the licensee's buildout requirements "where the satellite service satisfies the service and resiliency requirements in the relevant frequencies and geographic region."[369]

125. After review of the record, we find that we will revise our rules such that we will not allow licensees to rely on the service provided by their satellite operator partners/lessees for purposes of satisfying the construction and performance requirements that are conditions of the license authorization.[370] In making this decision, we lean heavily on the arguments presented by Verizon—that allowing attribution via SCS, at this time, "would run counter to the Commission's goal[s]" of providing

[365] *Notice* at 30-31, paras. 72-73. The Commission also asked whether such attribution rules should remain available to terrestrial licensees where SCS is intended to supplement existing terrestrial service to fill coverage gaps. *Id.*

[366] *Id*. The Commission recognized that our performance rules in most flexible-use terrestrial bands were created in parallel with the advent and subsequent implementation of competitive bidding for licenses which meant that market forces and incentives resulted in virtually all of the performance metrics in flexible-use bands (*e.g.*, coverage of a certain percentage of population) being met with the provision of evolving 4G and 5G technologies serving commercial handsets. *Id.*

[367] SpaceX Comments at 12 (stating there is need to impose minimum lease terms, requirements to meet final performance obligations, or termination rules); Skylo Comments at 11 ("[T]errestrial licensees should continue to be subject to coverage or other buildout obligations, regardless of any leasing arrangements with SCS operators, as the licensee remains the primary service provider, in addition to other reporting obligations, such as outage reports."); AT&T Comments at 23-24 ("[W]ith SCS still in its infancy, it is too soon to define what may be appropriately counted toward satisfying terrestrial spectrum buildout requirements."); Verizon Reply at 10-11 ("The Commission should avoid any ambiguity suggesting that SCS partners could shift the wireless provider's terrestrial construction requirements to the satellite operator where it is only providing a limited offering."); Lynk Comments at 11 ("[A]ll buildout requirements should remain the obligation of the terrestrial licensee . . ."); TechFreedom Comments at 16 ("The obligations to implement SCS operations should always remain separate from any buildout obligations a terrestrial licensee (or lessee) of the same frequency has."); Verizon Reply at 3; T-Mobile Reply at 13 ("[T]errestrial licensees should not, at least for initial performance obligations, be permitted to rely on SCS."); AT&T Reply at 5-6.

[368] Verizon Reply at 10-11 & n.34. We note that, in its comments, AT&T agreed with Verizon, arguing that allowing the satisfaction of build-out requirements through SCS "would run counter to the Commission's goal of maintaining the 'market incentives' to provide 'core coverage [in] licensed areas,' and it also would unfairly reward licensees that have for years allowed large swaths of spectrum to lie fallow." AT&T Comments at 23-24. However, in its February 20th *ex parte*, AT&T "clarifies [] that the FCC should not prohibit SCS service from satisfying wireless buildout requirements. Instead, as SCS solutions evolve, the Commission should apply a flexible approach that evaluates SCS service performance on a case-by-case basis." AT&T Feb. 20, 2024, *Ex Parte* at 2. For the reasons stated herein, we agree with AT&T's original position.

[369] Lynk Comments at 11.

[370] This revision extends to all of the licensee's build-out obligations where it is required to construct and operate one or more specific facilities, cover a certain percentage of geographic area, reach a certain percentage of population, or provide "substantial service."

"core coverage [in] licensed areas."[371] We likewise agree that since the provision of SCS is such a new service and, as the SCS acronym suggests, is intended to *supplement* existing terrestrial service to fill coverage gaps, it is too soon to allow SCS-based construction and performance activities to fulfill the terrestrial licensees' obligations.[372] We note in particular that, for the foreseeable future, SCS will not enable the kind of high-speed broadband data connectivity that characterizes modern commercial wireless networks. We believe that this is especially true given that the performance metrics, such as meeting substantial service or covering a certain percentage of population, in flexible-use bands were created based on market forces and incentives that were solely derived from the provision of terrestrial services.[373] Thus, allowing the attribution of SCS-based services could allow licensees to circumvent robust fulfillment of our existing performance rules.[374]

126. We believe that our decisions today will promote the public interest and further ensure that licensees are meeting their construction and performance obligations, as originally intended. We also believe that maintaining our current construction and performance requirements will promote the efficient use of spectrum by also ensuring that the warehousing of spectrum is prevented. Today, we revise our rules regarding the attribution of an SCS lessee's build-out or performance activities to the

[371] Verizon Comments at 10-11; Verizon Reply at 3, 10-11; *see also Notice* at 30-31, para. 73 (stating that "we do not intend for this new paradigm to alter market incentives in the provision of core coverage to licensed areas"). We also note that, despite its later filing, this position is the one advanced by AT&T in its initial comments. *See* AT&T Comments at 23-24; *see also* AT&T Feb. 20, 2024, *Ex Parte* at 2.

[372] *See Notice* at 30, para. 72; *see also* AT&T Comments at 23-24 ("The Commission rightly recognizes that 'SCS service options initially may be more limited than a terrestrial licensee's . . .'"); Verizon Reply at 2-3, 10-11 ("The Commission should avoid any ambiguity suggesting that SCS partners could shift the wireless provider's terrestrial construction requirements to the satellite operator where it is only providing a limited offering. As the record makes clear, SCS will supplement an underlying terrestrial wireless service . . ."); AT&T Reply at 5-6 ("SCS is not a 'substitute for fully functional terrestrial mobile service,' and thus a terrestrial licensee should not be able to utilize SCS to avoid any buildout obligations it might have."). In its comments, Lynk agrees that "the terrestrial spectrum at issue will remain, first and foremost, terrestrial spectrum, and SCS will be a complementary service that is not intended to replace terrestrial services offered in those bands." *See* Lynk Comments at 11. Similarly, TechFreedom "oppose[d] the notion that a terrestrial licensee could use SCS operations to avoid any buildout obligations it might have for its terrestrial licenses" and stated that "SCS operations should always be in addition to, not instead of, terrestrial deployment . . ." *See* TechFreedom Comments at 16. T-Mobile states that "it is appropriate for the Commission to require that terrestrial licensees rely on their own provision of service to meet initial performance requirements and to avoid discontinuing service." T-Mobile Mar. 5, 2024, *Ex Parte* at 2; *see also* Letter from Rachael Bender, Vice President and Associate General Counsel, Federal Regulatory and Legal Affairs, Verizon, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-65 et al., at 2-3 (filed Mar. 8, 2024) (Verizon Mar. 8, 2024, *Ex Parte*) ("At this time, supplemental coverage from space is a nascent offering that will not provide the same level of service as terrestrial networks.").

[373] *Notice* at 30-31, para. 73 ("[M]arket forces and incentives resulted in virtually all of the performance metrics in flexible-use bands (e.g., coverage of a certain percentage of population) being met with the provision of evolving 4G and 5G technologies serving commercial handsets."). In its letters, AT&T states that "[r]ather than drawing a bright line at this stage, the Commission should not prohibit SCS service from satisfying wireless buildout requirements, so long as the Commission evaluates SCS service performance on a case-by-case basis." Letter from Henry G. Hultquist, Vice President-Federal Regulatory, AT&T Services, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-65 et al. (filed Mar. 6, 2024) (AT&T Mar. 6, 2024, *Ex Parte*); AT&T Mar. 7, 2024, *Ex Parte*. We reiterate that we do not believe that it is appropriate to allow a terrestrial licensee to rely on SCS provided by its satellite operator partners/lessees to satisfy the terrestrial licensee's buildout or performance requirements at this time. *See* Verizon Mar. 8, 2024, *Ex Parte* at 2-3 (expressing support for the Commission's decision at this time).

[374] Verizon Comments at 10-11; Verizon Reply at 3, 10-11. We also agree with the point raised by AT&T, that our "performance requirements remain important tools 'to prevent spectrum warehousing' and to promote the rapid development and deployment of robust services. These tools are particularly critical here, where all agree that SCS cannot match the service of terrestrial wireless networks." AT&T Reply at 5-6.

licensee/lessor's construction and performance requirements.[375] We emphasize that these revisions only apply to the SCS framework that we adopt today, and we are not revising our rules as they relate to any other service offering. We also remind licensees that the applicable performance or buildout requirements remain a condition of the license, and failure to meet such requirements can lead to the automatic termination of the license(s).[376]

d. Lease Term and Lease Severability

127. *License Term of Part 25 License and Length of Lease.* Pursuant to section 1.9040(a)(2) of the Commission's rules, the term of a spectrum leasing arrangement may not be longer than the term of the underlying lessor's license.[377] A licensee and spectrum lessee may, contingent on the Commission's grant of the license renewal, extend the spectrum leasing arrangement into the term of the renewed licenses authorization.[378] As adopted later in this *Report and Order*, we continue to apply the current part 25 rule regarding license terms to satellite licensees seeking to provide SCS through license modification; such licensees would retain their current license term.[379] Since the part 25 license term is unlikely to consistently align with the license term (and concomitant lease term) of the underlying terrestrial license, in the *Notice*, the Commission sought comment on ways in which it should account for differences in the length of a part 25 space station authorization to transmit and receive signals and the length of the associated part 1 lease.[380] The Commission also asked commenters to discuss whether it should implement any requirements in the event that the terrestrial licensee loses some or all of the licenses that comprise the leased area, for example, as a result of automatic termination for failure to meet performance obligations, failure to receive a license renewal, license revocation, or assignment or transfer.[381]

128. In the SCS framework that we adopt today, we will not implement minimum or maximum lease terms beyond what is already required by rule. We do not agree with Skylo that a minimum 10-year lease term between terrestrial licensees and SCS lessees would offer stability to both "SCS operator[s] and their subscribers."[382] Rather, we agree with other commenters and find that implementing minimum lease terms could constrain the licensee lessor's ability to manage its spectrum.[383]

---

[375] *See* Appx. B (revising 47 CFR § 1.9047(g)).

[376] *See* 47 CFR § 1.946(c).

[377] *Id*. § 1.9040(a)(2). All spectrum leasing arrangements must provide that "[i]f the license is revoked, cancelled, terminated, or otherwise ceases to be in effect, the spectrum lessee has no continuing authority or right to use the leased spectrum unless otherwise authorized by the Commission." *Id.*

[378] *Id*. §§ 1.9020(m) (spectrum manager leases), 1.9030(l) (long-term *de facto* transfer leases), 1.9035(n) (short-term *de facto* transfer leases). The Commission must be notified of the renewal of the spectrum leasing arrangement at the same time that the licensee submits its application for license renewal. *See id.* § 1.949. In addition, the spectrum lessee may operate under the extended term, without further action by the Commission, until such time as the Commission shall make a final determination with respect to the renewal of the license authorization and the extension of the spectrum leasing arrangement into the term of the renewed license authorization.

[379] *See infra* paras. 143-44; *see also* 47 CFR § 25.121(a)-(b).

[380] *Notice* at 31, para. 74.

[381] *Id.*

[382] Skylo Comments at 14-15.

[383] AT&T Comments at 23 (stating that the Commission should not adopt any minimum lease terms or other policies that would constrain licensees' spectrum management); DISH/EchoStar Comments at 5 (stating the existing lease requirements are sufficient); T-Mobile Reply at 8-9 (citing AT&T Comments at 23; SpaceX Comments at 12) (advocating that the Commission should not impose any minimum lease terms or other conditions that are typically negotiated between parties to a lease, and stating that minimum lease terms would unnecessarily constrain licensees' spectrum and network management abilities).

We likewise do not want to impose any rules that may act as an unnecessary regulatory barrier to entry.[384]

129. Although we are not establishing any minimum or maximum lease terms, we remind stakeholders that they have the option to extend or renew a lease where the applicable license remains valid.[385] For spectrum manager leasing arrangements, the licensee must notify the Commission at least 21 days in advance of operating under the extended term.[386] For long-term *de facto* transfer leasing arrangements where the parties seek to extend the lease, the parties may extend if they file the lease extension prior to or on the date the lease terminates.[387] For long-term *de facto* transfer leasing arrangements where the underlying license requires renewal, the licensee and spectrum lessee must notify the Commission of the lease renewal at the same time that the licensee submits its application for renewal.[388] Finally, for short-term *de facto* transfer leasing arrangements, the parties may extend the short-term arrangement, so long as the initial term and extension(s), together, would not result in an arrangement exceeding 360 days, by notifying the Commission of the extension at least 10 days in advance of operating under the extended term.[389] We believe that our current lease renewal and extension rules provide enough certainty to prospective SCS lessees and ensures the adequate duration of spectrum leases and licenses, as negotiated and entered into by the prospective lessor(s) and lessee(s).[390]

130. By maintaining our current leasing rules pertaining to the length of the relevant lease, we also maintain our rules relating to a spectrum lessee's operating authority in the event that the licensee loses some or all of the licenses that comprise the leased area, for example, as a result of automatic termination for failure to meet performance obligations, failure to receive a license renewal, license revocation, or assignment or transfer.[391] In its comments, T-Mobile agrees that if the license authorization is terminated, the lease also will automatically terminate.[392] Lynk, however, states that satellite operators' SCS rights should not be terminated in the event a satellite operator-MNO relationship ends.[393] We will

---

[384] In the *First Secondary Markets Report and Order*, the Commission stated that one of its goals in adopting leasing policies and procedures was to remove unnecessary regulatory constraints. *First Secondary Markets Report and Order*, 18 FCC Rcd at 20625-26, para. 44.

[385] 47 CFR §§ 1.9020(h), (m) (spectrum manager leases), 1.9030(g), (l) (long-term *de facto* transfer leases), 1.9035(h), (n) (short-term *de facto* transfer leases); *see also* T-Mobile Comments at 12 (stating that if a lease terminates and the applicable license remains valid, that lease may be renewed).

[386] 47 CFR § 1.9020(h)(2) (noting this applies where general notification procedures are applicable).

[387] *Id*. § 1.9030(g)(2) ("A spectrum leasing arrangement may be extended beyond the initial term set forth in the spectrum leasing application pursuant to the applicable application procedures set forth in § 1.9030(e).").

[388] *Id*. § 1.9030(l) ("The spectrum lessee may operate under the extended term, without further action by the Commission, until such time as the Commission shall make a final determination with respect to the renewal of the license authorization and the extension of the spectrum leasing arrangement into the term of the renewed license authorization."); *see also id.* § 1.949.

[389] *Id*. § 1.9035(h)(2).

[390] We trust that our secondary market rules will ensure that parties are able to enter into agreements for the facilitation of SCS, and do not believe that the Commission should mandate the terms of those agreements. *See generally* Skylo Comments at 14-15 ("To facilitate the smooth and uninterrupted provision of SCS services, the Commission's rules should ensure adequate duration of spectrum leases and licenses.").

[391] 47 CFR §§ 1.9020(k) (spectrum manager leases), 1.9030(j) (long-term *de facto* transfer leases), 1.9035(l) (short-term *de facto* transfer leases).

[392] T-Mobile Comments at 12-13; Skylo Comments at 15 ("In the event that the terrestrial license is terminated, revoked, or fails to get a renewal, SCS operations in the respective bands ought to cease until such time that the SCS operator enters into a new lease with a compatible terrestrial spectrum licensee.").

[393] Lynk Comments at 7-8 ("The Commission should similarly reject its proposal to terminate SCS rights in the event that a satellite operator-MNO relationship ends, as new relationships may form with different MNOs to serve different markets.").

not implement any special requirements that would otherwise allow a lessee to continue to operate if the lessor no longer holds the relevant license as the lessee's authority to operate on the licensed spectrum is directly tied to the licensee's authorization.[394]

131. *Lease Severability.* As emphasized herein, a lease arrangement between a terrestrial licensee and an SCS lessee is an integral part of our SCS framework. In the *Notice*, the Commission sought comment on whether it should address the potential for severability of a lease agreement.[395] In particular, it asked if any limitations are necessary regarding the parties' ability to terminate the lease that forms a substantial basis of the SCS licensing structure.[396] In addition, the Commission asked whether it should implement minimum lease terms to ensure continued gap coverage and, if so, what is the appropriate period.[397] Finally, the Commission asked whether it should consider any provisions that could ensure gap service is achieved for a limited period in the event the underlying lease is terminated.[398]

132. After review of the record, we decline to adopt limitations on parties' ability to terminate the part 1 lease. We likewise refrain from mandating provisions that could ensure gap service is achieved in the event that the lease is terminated. A majority of commenters ask the Commission to refrain from making revisions to the current secondary markets rules that would otherwise unnecessarily constrain the parties ability to negotiate leasing terms or take away from the licensees' spectrum and network management abilities.[399] In contrast, Skylo proposes that if a lease is terminated early, "there should be a minimum one-year winding down period to ensure continued gap coverage."[400] We do not intend to dictate how parties conduct their businesses. Instead, in implementing the SCS framework, we strive to utilize a voluntary, market-driven system that gives stakeholders the flexibility to freely negotiate business transactions. We emphasize, however, that since we are not implementing termination requirements nor are we requiring any new wind down requirements, the licensee lessor and lessee could address any concerns surrounding termination and wind down through certain contractual protections.[401]

---

[394] *First Secondary Markets Report and Order*, 18 FCC Rcd at 20679, para. 187.

[395] *Notice* at 32, para. 76.

[396] *Id*. Specifically, the Commission asked whether a part 25 space station authorization for SCS should automatically terminate if the underlying lease is terminated or is it necessary to include a condition indicating that operations in the relevant frequencies must stop if the underlying lease is terminated. *See id.* The Commission also asked commenters to consider whether the associated part 25 space station and blanket earth station authorizations should terminate if the parties decide not to renew a lease. *See id.* And, alternatively, if the satellite operator's part 25 authorization is not renewed, or terminates for failure to meet applicable milestones, or is revoked, or if the terrestrial operator's earth station license is not renewed, should the associated lease terminate. *See id.*

[397] *Id.*

[398] *Id.*

[399] AT&T Comments at 23 ("[T]he Commission should not adopt any minimum lease terms or other policies that would unnecessarily constrain terrestrial licensees' ability to manage their spectrum portfolios . . ."); T-Mobile Reply at 8-9 (citing AT&T Comments at 23; SpaceX Comments at 12) (advocating that the Commission should not impose any minimum lease terms or other conditions that are typically negotiated between parties to a lease, and stating that minimum lease terms would unnecessarily constrain licensees' spectrum and network management abilities); SpaceX Comments at 11-13 (arguing for flexibility in parties' ability to enter and structure spectrum access agreements and stating that there is no need to impose minimum lease terms, requirements to meet final performance obligations, or termination rules); T-Mobile Comments at 11-12 (stating the license holder must retain "the ultimate ability to control the use of its spectrum," and there should be no minimum period for any SCS agreement); T-Mobile Comments at 12-13 (arguing that if a lease terminates and the applicable license remains valid, that lease may be renewed, and if the license or space station authorization is terminated, the lease is automatically also terminated).

[400] Skylo Comments at 15.

[401] *Id*. (noting that the SCS framework will "will require collaboration between a satellite operator and a terrestrial licensee that holds all relevant co-channel licenses within a specified area").

For example, these concerns could be addressed by entering into agreements that provide for the continuity and the lifespan of the service especially since the termination of the part 1 lease also terminates the satellite operator's right to operate on the relevant spectrum in the given GIA. Moreover, the licensee lessor, in entering into these contractual arrangements, may also take into consideration that the satellite operator loses its right to operate under the part 25 license if any one of the leases that allows for the use of specific terrestrial spectrum in the GIA for SCS terminates.

e. Interference-Related Leasing Rules

133. In the *Notice*, the Commission explained that the current leasing rules require all lessees to comply with rules requiring responsibility for ensuring non-interference with co-channel and adjacent channel licensees applicable to the lessor/licensee under the license authorization.[402] The primary responsibility for such compliance depends on the type of lease. With a spectrum manager lease, the lessor/licensee has "direct responsibility and accountability for ensuring that their spectrum lessees comply with [the interference-related service] rules, including responsibility for resolving all interference disputes."[403] In contrast, under a *de facto* transfer lease, the spectrum lessee has primary responsibility for ensuring compliance with the Commission's policies and rules, including interference rules applicable to the lessor/licensee.[404] Thus, in the event of an interference issue under a *de facto* transfer lease, the "Enforcement Bureau will first approach the authorized spectrum lessee, and the lessee will be expected to bring its operations into compliance with the Commission's requirements."[405]

134. Due to the novelty surrounding the SCS framework, the Commission sought comment on whether to retain the existing hierarchy of responsibility in the SCS context.[406] The Commission also sought comment on whether it is practical and appropriate for direct responsibility and accountability to apply to the lessor/licensee, or whether the lessee, given that it has been issued a separate part 25 authorization, should be responsible for interference resolution.[407] Verizon, in its comments, contends that the licensee as lessor enabling SCS should be directly and primarily responsible for ensuring the lessee's compliance with the Act and applicable Commission rules.[408] However, other commenters recommend that the Commission should refrain from altering the leasing rules pertaining to interference.[409] After review of the record, we find that retaining the existing hierarchy of responsibility in the SCS part 1 leasing context in conjunction with the interference rules that we adopt today will provide the appropriate safeguards against the risk of harmful interference.

135. We agree with commenters that the allocation of responsibilities between lessor and lessee, as it pertains to interference, should remain the same based on lease type.[410] We note that, in SCS arrangements, the licensee retains an interest in the efficient and responsible functioning of the network operating on the leased frequencies, and it is often the licensee's network which is most at risk of harmful interference. We also remind stakeholders that, although a licensee's responsibility in *de facto* transfer

---

[402] *Notice* at 31-32, para. 75; *see also First Secondary Markets Report and Order*, 18 FCC Rcd at 20665, para. 142; 47 CFR §§ 1.9010(b)(1)(ii), 1.9020(d)(1), 1.9030(d)(1), 1.9035(d).

[403] *Notice* at 31-32, para. 75; *First Secondary Markets Report and Order*, 18 FCC Rcd at 20653, para. 108.

[404] *Notice* at 32, para. 75; *First Secondary Markets Report and Order*, 18 FCC Rcd at 20664, 20675, paras. 137, 172-73.

[405] *Notice* at 32, para. 75; *First Secondary Markets Report and Order*, 18 FCC Rcd at 20664, para. 138.

[406] *Notice* at 32, para. 75.

[407] *Id.*

[408] Verizon Comments at 8.

[409] *See generally* SpaceX Comments at 5, 12; Verizon Comments at 8; CTIA Reply at 5-6.

[410] AST Comments at 26-28; SpaceX Comments at 12 (stating licensees are incentivized to ensure compliance with service rules, and that "provide[s] a strong safeguard against harmful interference").

leasing arrangements is more limited than the licensee's responsibilities in spectrum manager leasing arrangements, this does not mean that the licensee is relieved of all responsibility no matter the circumstance. As we stated in the *Second Secondary Markets Report and Order*, spectrum lessees are primarily and directly responsible for ensuring compliance with Commission policies and rules, and thus, we will first approach the lessee when we have questions about interference or other technical performance issues.[411] As a further safeguard, we also noted that the Commission has the direct authority to pursue remedies against lessees under Section 503(b) of the Act.[412] We also remind stakeholders that licensees that enter into a *de facto* transfer leasing arrangement continue to hold *de jure* control of the leased spectrum, as well as non-delegable duties regarding their license, and thus, could be held accountable, in certain limited circumstances, where the lessee does not abide by the Commission's rules and policies.[413] We believe that the current secondary markets safeguards that are in place today will adequately ensure that the risk of harmful interference is mitigated and decline to make any alterations to our secondary markets rules regarding interference at this time.

f. Eligibility for ECIP Participation

136. In the *Notice*, the Commission sought comment on whether SCS participants that seek to enter into leasing arrangements should be eligible for Enhanced Competitive Incentive Program (ECIP) benefits.[414] The Commission also explained that ECIP benefits provide, among other things, incentives for stakeholders to engage in qualifying transactions that make spectrum available in rural areas for advanced wireless services if the stakeholders meet certain requirements.[415] Because prospective ECIP applicants must meet certain threshold requirements prior to receiving the benefits, the Commission also sought comment on how prospective ECIP applicants that intend to provide satellite services primarily intended to fill-in terrestrial coverage gaps in select areas would meet the eligibility requirements and requisite Qualifying Geography thresholds.[416] In response, RWA argues that the FCC should not permit

[411] *Second Secondary Markets Report and Order*, 19 FCC Rcd at 17563-64, paras. 125-27.

[412] *Id.* at 17563-64, para. 126; 47 U.S.C. § 503(b) (Activities constituting violations authorizing imposition of forfeiture penalty; amount of penalty; procedures applicable; persons subject to penalty; liability exemption period).

[413] *Second Secondary Markets Report and Order*, 19 FCC Rcd at 17563-64, paras. 126-27. In the *Second Secondary Markets Report and Order* we indicated that "such potential residual accountability is quite circumscribed, and would only attach to ongoing violations or other egregious behavior by the spectrum lessees about which the licensee had knowledge or should have knowledge." *Id.* at 17564, para. 27. As an example, we noted that our rules require that "any agreement between a licensee and spectrum lessee must contain provisions that the spectrum lessee comply at all times with applicable Commission rules." *Id.*; *see also* 47 CFR § 1.9040(a)(i). Accordingly, we remind licensees that they will be held accountable to the extent that a licensee is found complicit with ongoing violations by the spectrum lessee about which the licensee is aware and does nothing to ensure compliance. While we hope that instances in which licensees that have entered into *de facto* transfer leases may be held accountable for ongoing or egregious acts of their lessees that provide SCS will be quite rare, we will not relieve these licensees altogether, in all cases no matter how egregious, for responsibility for any act of their spectrum lessees. *See Second Secondary Markets Report and Order*, 19 FCC Rcd at 17564, para. 127.

[414] *Notice* at 33, paras. 78-79; *see also Partitioning, Disaggregation, & Leasing of Spectrum*, WT Docket No. 19-38, Report and Order and Second Further Notice of Proposed Rulemaking, 37 FCC Rcd 8825, 8826, paras. 1-2 (2022) (*ECIP Report and Order*).

[415] *Notice* at 33, paras. 78-79. In the *Notice*, the Commission explained that under the rural transactions-focused prong of the ECIP program there are various requirements that must be met before a stakeholder can receive the program benefits and to prevent waste, fraud, and abuse. *Id.* at 33, para. 79 ("For example, leasing arrangements must be for a minimum of five years, a lessee is required to construct an area of between 300 and 15,000 square miles (Qualifying Geography), depending upon the size of the lessor's licensed area, within two years of the ECIP grant, and a lessee must maintain continuous operations in that entire Qualifying Geography area for three consecutive years.").

[416] *Id.* at 33, paras. 78-79; *see also ECIP Report and Order*, 37 FCC Rcd at 8826, 8845-46, 8872-73, paras. 1-2, 64-66, Appx. A; 47 CFR § 1.60004.

ECIP participation under the SCS framework because doing so would "contrast with the goals of the [ECIP] program."[417] We decline to extend ECIP benefits to stakeholders that intend to enter into a leasing arrangement for the provision of SCS at this time.

137. One of the Commission's goals in the *ECIP Report and Order* was to "facilitate new opportunities for small carriers and Tribal nations" with the intended result of "greater competition and expanded wireless deployment in rural areas."[418] The expansion of wireless deployments under the ECIP program was meant to incentivize transactions to facilitate terrestrial build-out through a terrestrial-based regulatory licensing paradigm.[419] Under the ECIP program, any covered geographic licensee that meets the qualification requirements: (1) may offer spectrum to an unaffiliated eligible entity through a partition and/or disaggregation; and/or (2) where it is eligible to lease in an "included service," may offer spectrum to an unaffiliated eligible entity through a long-term leasing arrangement.[420]

138. In contrast, through the SCS licensing framework that we adopt today, the terrestrial licensee is entering into the leasing arrangement(s) with a satellite operator with the ultimate intent of using satellites to expand the terrestrial licensee's current network coverage and to fill-in terrestrial coverage gaps in select areas.[421] At present, we find that the provision of SCS does not align with the goals or entry criteria of the ECIP program because the SCS leasing framework that we adopt today does not provide a path for satellite operators to meet the ECIP eligibility requirements and requisite ECIP Qualifying Geography thresholds. We recognize, though, that ECIP is a new program that was established by the Commission in July 2022,[422] and the SCS leasing rules that we adopt today are a part of a novel framework. We believe it is in the public interest to allow the SCS marketplace—and the ECIP program—time to develop before determining whether it is appropriate for these two new Commission efforts to support one another. Therefore, we decline to extend ECIP benefits to stakeholders that intend to enter into a leasing arrangement for the provision of SCS at this time.

g. 911-Related Leasing Rules

139. Pursuant to existing leasing rules, there are certain circumstances where a lessee is obligated to comply with Enhanced 911 (E911) requirements under section 9.10 of our rules depending on the lease type.[423] In the *Notice*, the Commission sought comment on whether it should impose 911

---

[417] RWA Comments at 2, 6 ("The distinct difference under this proposed [SCS] framework is that the larger providers would lease their spectrum to the satellite operators to further expand *their own network coverage* rather than leasing to a rural or Tribal carrier for the rural or Tribal carrier to make efficient use of the spectrum in their own networks. Thus, the nationwide, statewide, and territory-wide providers that lease their spectrum to the satellite operators would be able to enjoy the license benefits of the ECIP program while further expanding *their own coverage footprint*. There is no need for the FCC to incentivize these carriers to expand their networks in this manner.").

[418] *ECIP Report and Order*, 37 FCC Rcd at 8826, paras. 1-2.

[419] *Notice* at 33, para. 79.

[420] *ECIP Report and Order*, 37 FCC Rcd at 8830-31, para. 18. A "qualifying transaction" is defined as "[a] transaction between unaffiliated parties involving a partition and/or disaggregation, long-term leasing arrangement, or full assignment that meets the requirements of either the small carrier or Tribal Nation transaction prong pursuant to § 1.60003 or the rural-focused transaction prong pursuant to § 1.60004." 47 CFR § 1.60001; *see id.* §§ 1.60003 (small carrier or tribal nation transaction prong), 1.60004 (rural-focused transaction prong).

[421] *Notice* at 33, para. 79.

[422] We note that, on February 15, 2024, WTB announced that the ECIP rules were effective and began accepting assignment and lease applications to participate in the program. *See WTB Launces Enhanced Competition Incentive Program Beginning February 15, 2024*, WT Docket No. 19-38, Public Notice, DA 24-141 (WTB 2024).

[423] *See* 47 CFR §§ 1.9020(d)(8) (stating that under spectrum manager leases, "[i]f E911 obligations apply to the licensee (see § 9.10 of this chapter), the licensee retains the obligations with respect to leased spectrum."), 1.9030(d)(8) (stating that under long-term de facto transfer leases, "to the extent the licensee is required to meet

(continued….)

obligations on satellite operators seeking to provide SCS as part of their part 25 authorization, and if so, whether there would be any potential inconsistencies between the E911 requirements under the satellite operator's lease and any independent 911 obligation under the satellite operator's license.[424] As further discussed in the service rules section of this *Report and Order*, and based on record support, we adopt interim 911 call routing requirements for terrestrial licensees utilizing SCS, but decline to adopt any new 911 obligations as they independently pertain to satellite operators.[425] Because of this decision, we likewise decline to address any potential inconsistencies relating to E911 leasing rules at this time and seek further comment in the accompanying *Further Notice* on ways in which we can extend our 911 rules in the SCS context.

G. Service Rules

140. In order to enable SCS in a manner that reduces regulatory barriers and fosters rapid deployment, we adopt limited amendments to the service rules governing satellite and terrestrial licensees to enable the provision of SCS. In doing so, we note that the terrestrial licenses which underpin SCS may be issued under parts 22, 24, or 27, and that satellite operators are authorized under part 25. With regard to the terrestrial licenses, we recognize that they will primarily be issued under parts 22, 24, or 27, and we largely maintain the existing service rules in these parts that apply to terrestrial licensees in the SCS context. In addition to those rule parts, however, there are service rule obligations in part 90 that currently apply to FirstNet. As such, we find that applicable part 90 service rules will continue to apply to FirstNet as the terrestrial partner in an SCS arrangement, where relevant. The unique regulatory framework adopted today that enables SCS not only involves different kinds of service providers authorized under different rule parts, but also terrestrial, flexible-use spectrum that is newly allocated to permit mobile satellite services. In the *Notice*, the Commission proposed to apply certain existing service rule obligations to both satellite operators and terrestrial licensees and sought comment on the applicability of other rules in the SCS context.[426] In this section, we first address service rules applicable to the satellite operators authorized under part 25 of the Commission's rules to provide SCS, and then the service rules applicable to terrestrial licensees authorized to provide SCS in collaboration with their satellite operator partners.

1. Part 25 Licensing

141. In the *Notice*, the Commission proposed to largely maintain current part 25 service rules for satellite operators who will deploy SCS networks.[427] We adopt those proposals with regard to the regulatory status, license terms and renewals, bonds and milestones, automatic termination, and some obligations of operators.

142. *Regulatory Status.* In the *Notice*, the Commission proposed that the space station operator would retain its existing regulatory status when applying to modify its license to provide SCS.[428]

E911 obligations (*see* § 9.10 of this chapter), the spectrum lessee is required to meet those obligations with respect to the spectrum leased under the spectrum leasing arrangement insofar as the spectrum lessee's operations are encompassed within the E911 obligations."), 1.9035(d)(4) (stating that under short-term de facto transfer leases, "[i]f E911 obligations apply to the licensee (see § 9.10 of this chapter), the licensee retains the obligations with respect to leased spectrum. A spectrum lessee entering into a short-term de facto transfer leasing arrangement is not separately required to comply with any such obligations in relation to the leased spectrum.").

[424] *Notice* at 33-34, para. 80 (seeking comment on 911-related leasing rules); *see also id.* at 35-37, paras. 83-91 (seeking comment on 911 requirements).

[425] *See infra* paras. 174-83.

[426] *See Notice* at 34, para. 81.

[427] *Id.*

[428] *Id.* at 34-35, para. 82. Pursuant to the Commission's part 25 rules, a space station licensee must indicate its regulatory status—common carrier or non-common carrier—when it files an application for a space station

(continued….)

Commenters agree with this proposal and argue against automatic classification of space stations performing SCS as common carriers.[429] We agree with commenters and, consistent with our current rules, find that the space station licensee or prospective licensee has the opportunity to indicate its regulatory status as either a non-common carrier or common carrier when applying to provide SCS. For satellite operators with an existing part 25 license, this selection could include retaining a space station's current regulatory status as a non-common carrier, or if the operator is expanding the services it will offer to include those traditionally provided by a common carrier, the operator may choose to change its regulatory status to a common carrier. The satellite operator can indicate a change to its regulatory status in the FCC Form 312 submitted with the modification application in which the operator seeks authority to provide expanded services. A satellite operator is not necessarily providing a common carrier telecommunications service in the provision of SCS. Rather, the satellite operator is offering the mobile carrier an ability to leverage SCS capabilities, regardless of whether that capability is limited to text messaging or includes broader capabilities like IoT connectivity.[430] However, we acknowledge that SCS does ultimately result in end-user capabilities traditionally provided by a common carrier. Accordingly, satellite operators can choose their regulatory status as either common carrier or non-common carrier.

143. *License Term and Renewal.* In the *Notice*, the Commission also proposed to maintain our current rules for license terms and renewals, which commenters generally support.[431] Thus, consistent with our proposed framework, a part 25 space station license that is modified to add SCS would retain whatever license term remains under its existing license.[432] Similarly, a modification of an existing part 25 grant of market access to add SCS would not alter the license term of the satellite operations.[433] A new entrant would also be subject to our existing part 25 license term rules.

144. Relatedly, in the *Notice*, the Commission proposed to apply current part 25 renewal rules for satellite authorizations permitting SCS.[434] Commenters agree with the Commission's proposal.[435] We adopt the Commission's proposal and maintain the renewal rules for space stations, and find it continues to be the responsibility of space station operators to file for renewal of the part 25 license. Moreover, since the SCS earth stations, i.e., the terrestrial devices, used for SCS will be licensed by rule, the license terms and renewal rules of those SCS earth stations will be governed by our existing rules.

145. *Deployment Milestones for Part 25 Licensees.* In the *Notice*, the Commission proposed to retain the satellite spectrum milestones applicable to current part 25 satellite operators to provide SCS.[436] Commenters are divided as to whether we should retain milestones for satellite operators seeking

---

authorization. *See* 47 CFR § 25.114(c)(11). Satellite space station licenses typically have a non-common carrier status, while the vast majority of terrestrial wireless licensees in flexible-use bands are regulated as common carriers. *See* 47 U.S.C. § 332; 47 CFR pt. 20.

[429] AST Comments at 30-31, 35; SpaceX Comments at 15.

[430] SpaceX Comments at 15.

[431] *See Notice* at 39-40, para. 98. Under section 25.121(a), with some exceptions, licenses for facilities governed by part 25 are issued for a period of 15 years. 47 CFR § 25.121(a)(1); *see also* 47 CFR § 25.121(b). SpaceX contends that the Commission should retain 15-year license terms for SCS authorizations, and T-Mobile agrees that a satellite operator should retain whatever license term remains under its existing license. SpaceX Comments at 17; T-Mobile Comments at 15.

[432] *See Notice* at 39-40, para. 98.

[433] *Id.*

[434] *Id.* Pursuant to section 25.121 of the Commission's rules, an application for a space station system replacement authorization for NGSO satellites must "be filed no earlier than 90 days, and no later than 30 days, prior to the end of the twelfth year of the existing license term." 47 CFR § 25.121(e).

[435] T-Mobile Comments at 15; SpaceX Comments at 17.

[436] *See Notice* at 41, para. 102; 47 CFR § 25.164(a), (b)(1)-(2).

to provide SCS.[437] We agree with commenters who favor retaining the milestone requirements. Milestones prevent speculative systems from creating partnerships with terrestrial operators on which they cannot follow through and thereby depriving consumers of the benefits of SCS connectivity. Although we recognize that the milestone requirements pose constraints on operators when constructing and deploying their systems, we find the public interest weighs in favor of ensuring only viable SCS systems are licensed and deployed. As such, we encourage satellite operators to be prepared to implement their proposed SCS operations before applying for a part 25 license to ensure they have sufficient time after grant to meet the deployment milestones.

146. Similarly, the Commission proposed to apply the surety bond requirements applicable to current part 25 satellite operators to the satellite operators seeking to provide SCS.[438] Commenters are also divided on this proposal.[439] When the Commission adopted the bond requirement in 2003, it concluded that the bond requirement would prevent valuable spectrum resources from lying fallow when another party could put the resources into use.[440] The Commission further reasoned that requiring satellite licensees to make a financial commitment to construct and launch their satellites—a bond that would be called if milestones were not reached—would help deter speculative applications.[441] Our experience has shown that bonds provide a check on spectrum warehousing and discourage applications from entities without the financial stability needed to operate a satellite system. Therefore, we agree with commenters who support our proposal to retain the current bond requirements. In conjunction with our milestone rules, our current surety bond rules will prevent submission of speculative satellite applications or

[437] AST, SpaceX, DISH/EchoStar, and TechFreedom support retaining current milestone requirements. *See* AST Comments at 36-38; SpaceX Comments at 17; DISH/EchoStar Comments at 6; TechFreedom Comments at 16. SpaceX argues we should only require a single buildout "for a general SCS launch authorization, rather than separate bonds and milestones for each set of SCS frequencies on the antenna or within each SCS partnership." SpaceX Comments at 18. AST argues that "[t]he opportunity for a new use of space station licensees' systems afforded by SCS cannot serve as a basis for space station licensees to extend their milestones." AST Comments at 37. TechFreedom adds that "the obligations to implement SCS operations should always remain separate from any buildout obligations a terrestrial licensee (or lessee) of the same frequency has." TechFreedom Comments at 16. Lynk contends that new milestone requirements for SCS should not be adopted because an MNO can partner with multiple satellite operators to prevent a failure or delay in service being rolled out. Lynk Comments at 11-12. Lynk adds that a six-year milestone period is insufficient because part of that time is spent seeking SCS approval. Lynk Comments at 12. In contrast, Kepler argues that the current requirements create barriers to new entrants and that requiring operators to deploy in accordance with milestones would result in more, but less effective, satellites being launched, which goes against the Commission's interest in limiting orbital debris. Kepler Comments at 8.

[438] *See Notice* at 41, para. 103. Under section 25.165, space station licensees generally must post a surety bond within a certain time period after grant of the license, and failure to post a bond causes the license to be rendered automatically null and void. 47 CFR § 25.165. Should the licensee fail to meet the established milestone, the licensee will forfeit that bond. *Id*. § 25.165(c).

[439] DISH/EchoStar and SpaceX support retaining our bond requirements. *See* DISH/EchoStar Comments at 6; SpaceX Comments at 17; *see also* Lynk Comments at 11. SpaceX argues we should only require a single bond requirement for a general SCS launch authorization, rather than separate bonds and milestones for each set of SCS frequencies on the antenna or within each SCS partnership. SpaceX Comments at 18. Lynk opposes the adoption of any new bond requirements. *See* Lynk Comments at 11. Kepler posits that requiring the same bond requirements for operators seeking to provide SCS would result in "unnecessary barriers to new entrants." Kepler Comments at 7-8. Kepler adds that bonds are intended to prevent "spectrum warehousing and incentivize deployment," but there is low risk of this in the SCS context because terrestrial providers are likely to contract performance requirements, or switch to other providers in the event that an initial provider fails to perform. *Id.*

[440] *See Amendment of the Commission's Space Station Licensing Rules and Policies*, 18 FCC Rcd at 10824-25, paras. 166-67.

[441] *Id*.

creation of partnerships that will not result in SCS connectivity, and as such the public interest weighs in favor of retaining this requirement.[442]

147. We clarify that, for satellite operators seeking to modify an existing license to add SCS, the bond and milestone requirements indicated in the initial part 25 license will continue to apply.[443] In addition, for new entrants seeking a part 25 license that will include SCS, the licensees must submit a new bond and meet new milestones for those satellites. Ultimately, bonds and milestones will continue to be tied to the deployment and operation of the satellites.[444]

148. *Automatic Termination.* The Commission proposed to retain the current part 25 rules regarding automatic termination of station authorizations for satellite licensees seeking to provide SCS jointly with a terrestrial operator.[445] Specifically, for part 25 satellite operators, the Commission has adopted an automatic termination rule that describes the consequences for failing to meet applicable milestones.[446] Station authorizations also terminate for the removal or modification of the facilities, which renders the station not operational for more than 90 days.[447] In addition to proposing to retain this automatic termination rule, the Commission sought comment on whether a part 25 license for SCS should automatically terminate if the underlying lease is terminated and sought comment on whether any other rule amendments were required in the public interest.[448] T-Mobile concurs with the Commission's proposal to retain the current automatic termination rule, and no parties oppose.[449] We therefore adopt the Commission's proposal to retain current part 25 rules regarding automatic termination.[450] We also adopt a new provision to cover SCS and determine that the failure to provide SCS for more than 90 days on all or some of the authorized SCS frequencies automatically terminates the part 25 license for those frequencies where SCS operations have ceased.[451] We find a 90 day period for SCS in this regard is consistent with the existing automatic termination rule related to removal or modification of facilities and is consistent with the Commission's duty to promote efficient spectrum use.[452] We note that the termination provisions addressed in this rulemaking are only relevant to termination of the SCS authorization, and the remainder of the satellite operations are subject to the existing part 25 automatic termination provisions, which have

---

[442] *See* SpaceX Comments at 18.

[443] *See, e.g.*, SpaceX Gen2 SCS Modification Application, ICFS File No. SAT-MOD-20230207-00021.

[444] *See* 47 CFR § 25.164(a), (b)(1).

[445] *See Notice* at 42-43, para. 106. To promote spectrum efficiency, the Commission establishes performance requirements or deployment milestones, depending on the radio service, with attendant consequences for failing to timely meet the requirements. *See id.* at 42, para. 105.

[446] *See* 47 CFR § 25.161.

[447] *See id.* § 25.161(c).

[448] *See Notice* at 32, 42-43, paras. 76, 106.

[449] T-Mobile Comments at 15; *see also* Skylo Comments at 11 ("[I]n cases where the terrestrial licensee loses some or all spectrum licenses in an area leased to an SCS operator (for example, if the licensee fails to renew the license or the license is suspended or revoked), then the SCS operations should also cease until a new lease arrangement is established with the subsequent licensee.").

[450] 47 CFR § 25.161.

[451] We clarify that, if a part 25 authorization permits SCS in more than one GIA, the authority to operate in a particular GIA will terminate, but the part 25 authorization for SCS in the other GIA(s) will remain valid. Relatedly, SpaceX argues that the Commission should not terminate an international SCS launch authorization due to the termination of a domestic spectrum access agreement. SpaceX Comments at 12. We clarify that, if a satellite operator has received a satellite authorization from the Commission to perform SCS domestically and to deploy on frequency bands capable of providing SCS in other countries, that deployment authorization may continue if only the domestic lease and associated authorization terminates.

[452] Lynk Comments at 7-8.

not been altered. Similarly, automatic termination that is unrelated to loss of a part 1 lease arrangement or agreement will continue to be governed by existing part 25 rules, which provide for automatic termination of a station that is not operational for 90 days.[453]

149. Furthermore, the Commission sought comment on whether to include a condition indicating that operations in the relevant frequencies must stop if the underlying lease is terminated.[454] We remind satellite operators that they must cease SCS in the relevant frequencies if the underlying part 1 lease arrangement or agreement is terminated, and we find that it serves the public interest to adopt this as a condition to the part 25 license. Specifically, in an SCS partnership between a satellite operator and a single terrestrial licensee, SCS must cease throughout the affected GIA and frequencies if the lease that allows for the use of that terrestrial spectrum for SCS terminates or if the terrestrial operator's underlying license(s) no longer covers the entire relevant GIA. Likewise, in an SCS arrangement in which multiple terrestrial licensees have leases with a satellite operator, if any one of the leases that enables satisfaction of the GIA coverage requirement terminates, then SCS must cease throughout the affected GIA and frequencies.[455]

150. *Other Existing Obligations.* In the *Notice*, the Commission further sought comment on whether any other existing service rule obligations applicable to terrestrial providers offering commercial service in the SCS Bands need to be addressed in the Commission's proposed part 25 licensing framework.[456] The Commission invited parties to comment on matters such as orbital debris requirements, roaming rules, or application of part 25 rules that would be inconsistent with the proposed framework.[457]

151. Commenters raise issues with two additional part 25 rule sections in the context of SCS, and we agree with one commenter's proposal. First, section 25.289 of our rules provides for the protection of GSO systems by NGSO systems.[458] However, section 25.289 only applies to FSS and Broadcasting-Satellite Service (BSS) operations and does not apply to satellite operations in MSS bands given that the non-directional antennas involved in MSS make it difficult for NGSO and GSO systems to share the same spectrum.[459] As such, we clarify that we will continue to maintain section 25.289 as written and not apply it to SCS, as SCS also involves service to terrestrial devices with omnidirectional antennas.[460] Second, the Commission proposed adding section 25.204(g) to our rules to set power limits for earth stations involved in SCS.[461] The Commission proposed that SCS earth stations would be

[453] *See* 47 CFR § 25.161(c). While T-Mobile argues that the 90-day automatic termination period for space stations providing SCS should become effective from the time that commercial SCS begins, the license term for part 25 space station licenses typically begins on the date that the licensee notifies the Commission that operation of an initial space station(s) is compliant with the license terms and conditions and that the space station(s) has been placed in its authorized orbit and has begun operating. *See id.* § 25.121(d); T-Mobile Mar. 5, 2024, *Ex Parte* at 6.

[454] *See Notice* at 32, para. 76.

[455] For operations in the United States, we recognize that the complexity of SCS arrangements may result in situations where the underlying part 1 lease(s) becomes invalid and inadvertently causes a loss of rights for the satellite operator to operate throughout the GIA. We encourage parties to notify both WTB and SB of any such situation and note that parties may request waivers if the underlying part 1 lease rights temporarily lapse.

[456] *Notice* at 43, para. 108.

[457] *Id.*

[458] 47 CFR § 25.289.

[459] *Id.*; OneWeb Comments at 5 n.13.

[460] OneWeb Comments at 5 n.13.

[461] *See Notice* at Appx. A, 68, para. 13 ("Earth stations operating in conjunction with the provision of SCS pursuant to § 25.125 shall comply with the power requirements for the respective band of operation of the terrestrial partner for terrestrial transceivers in parts 22, 24, or 27 of this chapter (e.g., §§ 22.913, 24.232, 27.50).").

required to meet the power limits applicable to terrestrial devices and base stations.[462] As explained in the discussion of the technical rules later in this *Report and Order*, we adopt that proposal.[463]

152. Unless otherwise noted herein, we will continue to apply our part 25 rules to satellite operators that will provide SCS.[464] SpaceX argues generally that we should not impose the full set of part 25 rules upon operators providing SCS, while AST contends that we should not add any additional obligations.[465] However, we have not been persuaded to change any additional rules, and we see no reason to impose additional part 25 obligations not otherwise addressed. We agree with Viasat, which stated in its comments, "[w]hile the SCS framework is novel, the fundamental on-orbit activities that enable it are not, and there is no reason to exclude satellites providing SCS from these requirements without a clear justification that doing so would serve the public interest."[466] In particular, we will continue to apply space station orbital debris mitigation requirements to satellite operators.[467] Commenters favor retaining our orbital debris requirements for satellite operators providing SCS.[468] We clarify that "any modification to add SCS to an existing satellite authorization should include evaluation of the impact of the modification on the operator's existing orbital debris mitigation plan."[469] We recognize the importance of our orbital debris rules in the provision of SCS, given the use of often larger antennas, which in turn can create an increased risk of orbital debris.[470]

2. Terrestrial Wireless Licensing

153. *License Term and Renewal.* For the same reasons we adopt the proposal from the *Notice* to maintain our part 25 license term and renewal rules, we also decline to make any changes to existing license term or renewal rules for terrestrial wireless service providers partnering to provide SCS with satellite operators. As noted in the *Notice*, various Commission rule parts contain license term and renewal obligations for terrestrial wireless service licensees.[471] Section 1.949 explains the renewal standards and what type of showing is required to receive a grant of a renewal application.[472] The Commission sought comment on whether we should amend any of our terrestrial licensee renewal rules.[473] No party suggests that we should change our existing rules governing license term and renewal for terrestrial licensees. Therefore, we will maintain the current term and renewal requirements in section 1.949 for terrestrial licensees that are collaborating with satellite operators to provide SCS.[474]

154. *Automatic Termination.* In the *Notice*, the Commission described how its permanent discontinuance of service rules function together with construction and renewal requirements for

[462] *See id.* at 49, para. 127; Intelsat Comments at 2 n.5.

[463] *See infra* para. 208.

[464] *See* Viasat Comments at 4; DISH/EchoStar Comments at 6.

[465] SpaceX Comments at 17; AST Comments at 36-38.

[466] Viasat Comments at 4.

[467] 47 CFR § 25.114. We note that U.S. licensees and holders of U.S. market access authorization are subject to the same orbital debris requirements. *See* Lynk Comments at 4-5.

[468] TerreStar Comments at 4-5; Viasat Comments at 4.

[469] Viasat Comments at 4.

[470] *See id.* at 4-5.

[471] *See Notice* at 39-40, paras. 98-99.

[472] *See* 47 CFR § 1.949.

[473] *Notice* at 40, para. 99.

[474] *See* 47 CFR § 1.949.

terrestrial licensees to ensure spectrum efficiency and the provision of service in a timely manner.[475] Different services have different requirements that can lead to automatic license termination if there is a permanent discontinuance.[476] Specifically, section 1.953 defines permanent discontinuance of service.[477] The Commission sought comment on whether any part 1 rule revisions are necessary in the public interest to address the unique nature of SCS as a collaborative service involving both satellite operators and terrestrial service providers.[478] No party suggests that we make any changes to applicable discontinuance of service rules for terrestrial licensees that have arrangements with satellite operators to provide SCS and we have determined that SCS may not count towards our discontinuance rules.[479] For that reason, we will maintain the current discontinuance requirements for terrestrial licensees pursuant to section 1.953 of the Commission's rules.[480]

155. *Mobile Spectrum Holdings Policies.* In evaluating mobile spectrum holdings policies, including the potential competitive effects of spectrum aggregation in secondary market transactions from long-term spectrum leasing arrangements, the Commission uses a spectrum screen to help it identify, on a case-by-case basis, those local markets that may warrant further competitive analysis.[481] The spectrum screen trigger is approximately one-third of the total spectrum that the Commission has determined is suitable and available for mobile voice/mobile broadband use.[482] Further, below-1-GHz spectrum concentration is an enhanced factor in the Commission's review if, post-transaction, the acquiring entity would hold more than one-third of the currently available and suitable spectrum below 1 GHz.[483] Commission rules and policies specify how spectrum holdings are attributed to particular entities for purposes of spectrum aggregation review, including the attribution of spectrum holdings to both the lessor and lessee in a given long-term leasing arrangement.[484]

156. In the *Notice*, the Commission sought comment on spectrum aggregation and other potential competitive issues in the context of the leasing relationship between the terrestrial service provider and the satellite operator to enable the provision of SCS on spectrum licensed to the terrestrial

[475] *See Notice* at 42, para. 105.

[476] *Id.*

[477] *See* 47 CFR § 1.953.

[478] *Id.*

[479] *See supra* paras. 148-49.

[480] *See* 47 CFR § 1.953.

[481] *Policies Regarding Mobile Spectrum Holdings Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, WT Docket No. 12-269, GN Docket No. 12-268, Report and Order, 29 FCC Rcd 6133, 6221-22, 6228, paras. 225, 246 n.656 (2014) (*Mobile Spectrum Holdings Report and Order*); *see also 2022 Communications Marketplace Report*, GN Docket No. 22-203, Report, 37 FCC Rcd 15514, 15578, para. 83 (2022) (*2022 Communications Marketplace Report*).

[482] *2022 Communications Marketplace Report*, 37 FCC Rcd at 15578-79, para. 84 n.215, Fig. II.B.9. The Commission has included the following bands in the spectrum aggregation screen: 600 MHz, 700 MHz (except for 758-769/788-799 MHz licensed to FirstNet), Cellular, SMR, Broadband PCS, AWS-1, AWS-3, AWS-4, H Block, WCS A and B Blocks, BRS, EBS, 3.7 GHz, and 3.45 GHz. *Id.* at 66, Fig. II.B.9.

[483] *Mobile Spectrum Holdings Report and Order*, 29 FCC Rcd at 6238-40, paras. 282-88. With respect to 600 MHz licenses acquired in the Broadcast Incentive Auction, the Commission adopted rules prohibiting secondary market transactions within a specified time period. *Mobile Spectrum Holdings Report and Order*, 29 FCC Rcd at 6212, paras. 197-98; 47 CFR § 20.22(c).

[484] *Mobile Spectrum Holdings Report and Order*, 29 FCC Rcd at 6228, 6245, paras. 246 n.656, 301-02; 47 CFR § 20.22(b)(5). Section 20.22(b)(5)(i) of the Commission's rules provides that long-term *de facto* transfer leasing arrangements (as defined in section 1.9003) and long-term spectrum manager leasing arrangements (as identified in section 1.9020(e)(1)(ii)) that enable commercial use shall be attributable to lessees, lessors, sublessees, and sublessors for purposes of this section.

service provider.[485] Specifically, the Commission sought comment on whether to apply its existing secondary market policies on spectrum attribution and aggregation to the SCS leasing framework, or whether it should make any changes in the SCS context.[486]

157. In this proceeding, we seek to leverage our existing leasing framework and existing service rules and policies wherever possible in order to facilitate the rapid provision of SCS, while continuing to evaluate the complexity of this undertaking as a new and innovative use of spectrum. Consistent with this approach, and after consideration of the record, we find that it is in the public interest to maintain our existing mobile spectrum holdings policies and secondary market aggregation rules, and not to make any changes in the SCS context at this time.

158. As an initial matter, we note that this *Report and Order* establishes rules for SCS in the following SCS Bands: 600 MHz, 700 MHz, 800 MHz, Broadband PCS, and AWS-H Block Bands.[487] These bands already are included in our spectrum screen and enhanced factor review (where applicable), except for the 758-769/788-799 MHz band licensed to FirstNet. Entities holding licenses in the bands included in the screen already are attributed with the spectrum covered by their licenses for purposes of spectrum aggregation review, and the entity holding the 758-769/788-799 MHz band is not so attributed. In long-term leasing arrangements, spectrum included in the screen would be attributed to both lessor and lessee under the Commission's spectrum attribution rules, absent any changes to those rules in the SCS context.

159. In its comments, T-Mobile argues that a satellite operator lessee in the SCS context should be attributed with the spectrum it leases for purposes of spectrum aggregation policies, but that the Commission should evaluate whether the terrestrial licensee should continue to be attributed with that spectrum in areas where only SCS is provided.[488] In response, AT&T and Verizon urge the Commission not to adopt special spectrum aggregation policies for SCS,[489] and AT&T asserts that any such changes would be better addressed in a separate proceeding.[490] We agree with AT&T and Verizon and decline to change our spectrum attribution rules for leasing at this time.

160. We emphasize that the development of SCS is in a nascent stage, and we do not yet have evidence to support making a change in these rules. Accordingly, under section 20.22 of our rules, spectrum subject to long-term leasing arrangements, including for deployment of SCS, will continue to be attributed to both the lessor and the lessee, and these lease arrangements will be assessed by the Commission on a case-by-case basis for competitive review.[491] We note, however, that case-by-case review of leases for SCS deployment should take into account the public benefits that can be achieved by SCS arrangements, as articulated in this *Report and Order*.

161. In addition, we do not adopt an SCS-specific spectrum screen, as suggested by Fleet Space as a way to promote competition.[492] Until the SCS marketplace has had a chance to develop, it is

[485] *See Notice* at 38-39, paras. 94-96.

[486] *See id.* at 39, para. 96.

[487] *See supra* para. 28.

[488] T-Mobile Comments at 15.

[489] AT&T Reply at 5 n.18; Verizon Reply at 11.

[490] AT&T Reply at 5 n.18.

[491] We note that this rule and these policies apply both to a scenario involving one terrestrial operator that holds all co-channel licenses throughout an entire GIA and to a scenario involving a collaboration among multiple terrestrial service providers that together hold all licenses on the relevant channel in a GIA. In the latter scenario, the terrestrial licensees may each lease individually to the satellite operator, or one licensee may lease from each of the other co-channel licensees and then sublet to the satellite operator.

[492] Fleet Space Reply at 8.

premature to enact a spectrum screen mechanism solely applicable to spectrum that qualifies for SCS.

162. *SCS Operation Over Large Bodies of Water.* Under our current rules, terrestrial licensing areas cover markets that extend over bodies of water.[493] The Commission suggested in the *Notice* that it was not necessary to modify the existing market area boundary limits in parts 22, 24, and 27 of the Commission's rules in the SCS context.[494] Nevertheless, the Commission sought comment on whether any additional boundary limits should be placed at the margins of a GIA, for example, at international boundaries or at a boundary extending into water.[495] One commenter, Skylo, suggests that SCS should be available only where the terrestrial licensee's network is located, i.e., if there is no terrestrial service over large bodies of water, such as the Great Lakes or the Gulf of Mexico, then SCS operations should not be permitted.[496] In response, several commenters urge the Commission to reject this argument and permit SCS over large bodies of water. Verizon notes that the Commission's rules already address the scope of a terrestrial licensee's authority to operate over bodies of water "including the Atlantic and Pacific Oceans, the Gulf of Mexico, the Great Lakes, and more," and that these rules should extended to SCS operations.[497] Indeed, AST argues that, "[i]f a body of water lies within the boundaries of the underlying terrestrial license, there is no reason why a licensee should be required to forfeit its rights to extend its coverage area using SCS technology."[498] While T-Mobile does not believe that SCS should be used to expand a terrestrial licensee's coverage area, T-Mobile does agree that SCS should be available over bodies of water if those areas are considered part of the licensee's authorized service area.[499]

163. In line with these comments, we find that it is in the public interest to permit SCS operations over large bodies of water that are included within the relevant GIA where the terrestrial licensee's market boundary limit extends over that body of water. We emphasize that we are not implementing any new rules, but we are merely allowing terrestrial licensees to keep the current rights associated with their licenses as it pertains to SCS.[500] As the terrestrial licensee or licensees would hold all co-channel licenses covering the GIA, the licensees' authorized service area would include the bodies

---

[493] *See, e.g.*, *Cellular Service and Other Commercial Mobile Radio Services in the Gulf of Mexico*; *Amendment of Part 22 of the Commission's Rules for Filing and Processing of Applications for Unserved Areas in the Cellular Service and to Modify Other Cellular Rules*, WT Docket No. 97-112, CC Docket No. 90-6, Order, 17 FCC Rcd 1209, 1224, para. 46 n.75 (2002) ("For example, MTAs, BTAs, and EAs are all based on county boundaries. The distance that the boundaries of coastal counties extend over water varies by state. The county boundaries of Texas and Florida extend three marine leagues (nine nautical miles) out from the water line, the county boundary of Louisiana extends three imperial nautical miles (imperial nautical mile = 6080.2 feet) into the Gulf, and all other states' boundaries extend three nautical miles (approximately 3.3 statute miles) from the baseline into the Gulf.").

[494] *See Notice* at 45, para. 115; 47 CFR §§ 22.983, 24.236, 27.55.

[495] *Notice* at 45, para. 115.

[496] Skylo Comments at 10.

[497] Verizon Reply at 13 (citing *Facilitating Access to Spectrum for Offshore Uses and Operations*, WT Docket No. 22-204, Notice of Inquiry, 37 FCC Rcd 7178, 7179, para. 4 (2022) (*Offshore NOI*) ("The Commission uses ongoing, demand-driven licensing in the Gulf of Mexico and in other U.S. territorial waters in the Atlantic and Pacific Oceans, including areas adjacent to the Continental United States (CONUS), Alaska, Hawaii, Puerto Rico, the U.S. Virgin Islands, American Samoa, Guam, and the Northern Mariana Islands.").

[498] AST Reply at 8 ("[T]he very point of SCS operations is to supplement terrestrial services where the terrestrial network is out of reach."); *see also* Verizon Reply at 13 (stating the same rules should apply to SCS, which will be a supplement to an existing terrestrial licensee's service area).

[499] T-Mobile Reply at 19.

[500] We also note that there is an ongoing proceeding whereby the Commission sought comment on ways to facilitate the development of commercial and private wireless networks offshore. *See Offshore NOI*, 37 FCC Rcd 7178. This proceeding concerns extending licensing to unlicensed areas, and therefore, it is not relevant to our discussion here regarding SCS operations over large bodies of water. We decline to make any decisions in this *Report and Order* that could impact that proceeding.

of water within the GIA, and we see no reason not to permit SCS as a way to enable gap coverage over large bodies of water in the same way it will do so over unserved land areas. Indeed, we note the important public safety nature of emergency communications offshore and anticipate SCS over large bodies of water will provide important public interest benefits.

164. *SCS Restrictions.* In the *Notice*, the Commission asked whether any additional boundary limits should be placed at the margins of a GIA, for example, at international boundaries or at a boundary extending into water, in the SCS context.[501] Although we find that it is not in the public interest to adopt any additional restrictions on the operation of SCS beyond what is described herein pursuant to our regulatory framework, we take this opportunity to emphasize that SCS is only permitted within the boundaries of the relevant GIA. In other words, SCS is not permitted (1) in any other GIA not authorized under the satellite operator's part 25 authorization as described to the Commission, or (2) over international borders. As described in the international coordination section of this *Report and Order*, SCS must be conducted in accordance with international regulations and agreements with border countries.[502] In order to ensure compliance with our GIA restriction, we will require the satellite operators to demonstrate to the Commission in their part 25 application how they will ensure that terrestrial devices connecting to their SCS networks will only operate within the boundaries of the relevant GIA.

165. *Retaining Full GIA/Block.* In the *Notice*, the Commission sought comment on what limitations, if any, are necessary to impose on a satellite operator or terrestrial service provider's ability to assign or transfer its rights under its licenses.[503] Specifically, the Commission asked whether a terrestrial licensee should be prohibited, for example, from assigning, partitioning, or disaggregating any rights in any of the licenses that cover a part of the GIA.[504] These questions concerning license alienability are important given that our SCS framework requires a satellite operator to have lease arrangements with one or more terrestrial service providers that hold all co-channel licenses on the relevant band covering an entire GIA. Our initial framework is intended to avoid technical complexities that could arise if SCS is not limited to a GIA, made possible through a lease arrangement, and presents the most efficient path to rapidly enabling SCS.

166. As a general matter, in this proceeding, we are striving to maintain, as much as possible, our existing leasing framework and policies governing secondary market transactions in the SCS context. For example, we are not changing our secondary market or spectrum aggregation policies so that the market for SCS is given a chance to develop before we impose restrictions. Only where the benefits of imposing a restriction outweigh the costs of keeping our current rules and policies in place will we take action to adopt a restriction. Commenters here generally support applying existing rules and policies encouraging secondary market transactions to SCS collaborations, focusing primarily on the negotiation of lease terms.[505] Some commenters, for instance AT&T, argue more specifically that the Commission should not prohibit licensees from assigning, partitioning, or disaggregating rights in any of their licenses that cover part of a GIA.[506]

167. Although we are generally maintaining our current leasing framework for SCS in order to encourage the rapid development and implementation of SCS, our initial framework relies on entry criteria that minimizes the possibility for interference between geographically adjacent markets. Our entry criteria include limiting authorizations for SCS to instances where there are part 1 lease

[501] *See Notice* at 45, para. 115.

[502] *See infra* paras. 224-36.

[503] *See Notice* at 28, para. 67.

[504] *Id*.

[505] *See, e.g.*, AT&T Comments at 22-23; CTIA Comments at 3-4; SpaceX Comments at 11; T-Mobile Comments at 7-8; Verizon Comments at 8-9.

[506] *See, e.g.*, AT&T Comments at 22-23; AST Comments at 26.

arrangements on file to lease the spectrum throughout an entire GIA. We find it necessary in this instance to limit alienability to ensure that the SCS arrangement authorized by the Commission continues to qualify under our entry criteria. More specifically, we clarify that the terrestrial licensee or licensees involved in an SCS arrangement may not engage in any transaction—e.g., lease, assignment, transfer, partition, disaggregation—that would result in the arrangement no longer satisfying our entry criteria.[507] This restriction will be added as a condition to any Commission lease grant, whether a spectrum manager or *de facto* transfer lease. This condition will ensure that the goals which justified the GIA requirement in the first place—minimizing the risk of harmful interference to geographically-adjacent co-channel licensees—continue to be satisfied throughout the entirety of the SCS arrangement. Accordingly, we find it in the public interest to keep our entry criteria intact and make clear that the terrestrial licensee(s), participating in an SCS arrangement with a satellite operator, must continue to hold the underlying spectrum rights throughout the relevant GIA and frequencies as described in the satellite operator's part 25 authorization.

168. *Permissible Communications.* In the *Notice,* the Commission explained that there are rules in parts 22, 24, and 27 that lay out what communications are considered permissible on the applicable terrestrial spectrum for the terrestrial licensees.[508] The licensing framework adopted herein for the provision of SCS changes certain allocations to permit space station transmissions authorized under part 25 of the Commission's rules on previously terrestrial-only spectrum. The Commission tentatively concluded that it is unnecessary to revise the part 22, 24, and 27 rules related to permissible communications to enable the provision of SCS because the transmissions that will be supplementing existing terrestrial coverage are generated by the satellite operator and not the terrestrial service provider.[509] Given the lack of comment on this issue, we affirm our tentative conclusion and find that no rule changes are necessary in this regard.

169. *Other Existing Obligations.* Although we are maintaining—to the greatest extent possible—existing service rules currently applicable to both satellite operators and terrestrial licensees in an effort to expedite the provision of SCS, the Commission asked in the *Notice* whether there are public interest reasons that part 25 satellite operator lessees should be required to comply with any other service rules applicable to their terrestrial service partners.[510] For example, the Commission asked whether our roaming rules in part 20 should apply to satellite operators providing SCS under the regulatory framework adopted herein.[511] The Commission noted that SCS is not a standalone service, but rather a supplement to existing terrestrial service.[512] Based upon our consideration of the record, we decline to apply roaming requirements to SCS operations at this time.

170. Roaming arrangements between wireless service providers enable customers of one provider to receive services from another provider's network when they are in areas that their provider's network does not cover. The Commission's part 20 rules requiring voice and data roaming arrangements are intended to promote consumer access to mobile services nationwide and encourage facilities-based

[507] We note that these transactions would be permitted as long as they would result in the arrangement continuing to qualify. For example, where multiple licensees are jointly providing SCS, transactions between them which keep the underlying spectrum rights within the bounds of the arrangement are permitted. Similarly, a "sale-and-leaseback" arrangement may be permitted where an appropriate showing is made, under certain circumstances.

[508] *Notice* at 43, para. 107 (citing 47 CFR §§ 22.901, 24.3, 27.2(a)).

[509] *Id.* at 43, para. 107.

[510] *Id.* at 43, para. 108.

[511] *Id.*; 47 CFR § 20.12.

[512] *Notice* at 43, para. 108.

competition among multiple service providers.[513] Under the Commission's rules, facilities-based providers of mobile voice and data services must offer roaming to other facilities-based technologically compatible providers.[514]

171. Commenters express differing views regarding whether roaming requirements should apply in the SCS context. Some commenters recommend that the Commission apply its part 20 roaming rules to SCS, specifically suggesting that we modify section 20.12 to clarify that the roaming obligations of a CMRS provider extend to the portions of its coverage made up of SCS.[515] Verizon argues that the Commission should refrain from adopting additional regulatory requirements for SCS based on speculation about how SCS services will develop.[516] CCA, RWA, and Cellcom urge the Commission to preserve the roaming relationships among terrestrial wireless providers.[517] RWA suggests that the SCS framework should require the prioritization of the use of other terrestrial wireless networks where available.[518]

172. Upon careful consideration of the record, we conclude that, at this time, we will not apply the part 20 roaming rules to satellite operators providing SCS. We also decline requests in the record to clarify that the roaming obligations of a CMRS provider extend to the portions of its coverage made up of SCS operations and to establish requirements requiring the prioritization of other terrestrial networks for roaming. Our primary objective in this proceeding is to establish a framework that will facilitate the rapid provision of SCS while recognizing that SCS technologies are continuing to be developed. We decline to require roaming with respect to SCS at this time because we find that applying roaming requirements in the SCS context at this nascent stage is premature and may add complexity and additional technical considerations that could affect the development of SCS collaborations. We are not persuaded by comments urging us to adopt roaming prioritization requirements to safeguard existing terrestrial roaming arrangements and instead agree with other commenters that such requests are based on speculative assessments of how SCS will develop. In addition, the Commission does not typically intervene in interpreting contractual arrangements to affect the competitive position of providers, and we do not find that doing so in this case is necessary to serve the public interest.[519] We find that the public interest would be better served at this time by continuing to monitor whether or how roaming arrangements are affected as SCS collaborations are implemented going forward

---

[513] *See Data Roaming Order*, 26 FCC Rcd at 5415, para. 9; *Reexamination of Roaming Obligations of Commercial Mobile Radio Service Providers and Other Providers of Mobile Data Services*, WT Docket No. 05-265, Order on Reconsideration and Second Further Notice of Proposed Rulemaking, 25 FCC Rcd 4181, 4182, paras. 1-2 (2010).

[514] *See* 47 CFR § 20.12.

[515] *See* AT&T Comments at 18-19; AT&T Reply at 11-12; Intelsat Reply at 6.

[516] Verizon Comments at 15.

[517] *See* CCA Reply at 9-11 (highlighting the service and economic benefits of terrestrial roaming relationships to consumers); RWA Comments at 5-6 (describing the importance of terrestrial roaming partnerships with regard to robust service and competition); Cellcom Reply at 4 (emphasizing that current terrestrial roaming agreements are important for competition).

[518] *See* RWA Comments at 5-6. RWA states that "[u]nder such a mechanism, where both a satellite provider, through the leasing arrangement, and a rural or regional carrier are providing coverage in the same geographic area, the nationwide, statewide, or territory-wide carrier should be required to prioritize use of the rural or regional carriers' network to ensure that Americans are afforded the best and most reliable broadband coverage possible. Where such networks are unavailable, the customers devices should then, and only then, default to supplemental satellite coverage." *Id*.

[519] *See* Verizon Comments at 15. We note that this decision is limited to the context of our consideration of roaming requirements for SCS operations and is separate from our decisions with respect to prioritization requirements that should apply in connection with 911 and WEA requirements for SCS.

3. Ensuring Public Safety Communications

173. A primary goal of this proceeding is to promote public safety by expanding the availability of emergency communications to consumers, especially in remote, unserved, or underserved areas. Doing so strengthens terrestrial wireless service providers' ability to support critical public safety mechanisms such as 911 and Wireless Emergency Alerts (WEA) in such areas, increasing the geographic range where first responders can provide emergency services.[520] The Commission emphasized this goal in the *Notice*[521] and requested comment on how best to promote this goal and enhance consumers' access to our nation's emergency response system by using SCS provided via a collaboration between a terrestrial service provider and a satellite operator.[522] The parties' responsive comments generally support these goals and confirm our view that terrestrial providers should take steps to ensure their subscribers' access to the 911 system in areas where they use SCS arrangements to expand coverage to their end-users.

a. 911 Call Transmission Requirements

174. As discussed in detail below, we adopt interim 911 text and call routing requirements for terrestrial providers that use SCS arrangements to extend their coverage service areas, but do not apply these requirements to SCS satellite operators at this time.[523] In doing so, we recognize both the vital importance of 911 service to emergency response and disaster preparedness, and that nascent SCS operations and deployments require flexibility. As some terrestrial 911 requirements may not be feasible at this time, we establish interim 911 requirements that require terrestrial providers to transmit all SCS 911 voice calls and texts[524] to a Public Safety Answering Point (PSAP) using either an emergency call center or location-based routing. Terrestrial providers must also transmit location information and the user's phone number to facilitate dispatch and callback capabilities at the receiving PSAP. Under our approach, for purposes of delivering SCS 911 voice calls and SCS 911 text messages, terrestrial providers must either: (1) use information regarding the location of a device, including but not limited to device-based location information,[525] and transmit the phone number of the device used to send the SCS 911

---

[520] *Notice* at 2, para. 1 (explaining that SCS could "play a key role" in fulfilling FCC public interest goals, including "facilitating ubiquitous wireless coverage across the nation; expanding the availability of emergency communications to consumers and the geographic range of first responders to provide emergency services; and promoting competition in the provision of wireless services to consumers, among others").

[521] *Id.* at 35, para. 83 (emphasizing that "911 service is a vital part of our nation's emergency response and disaster preparedness system, and the Commission is committed to increasing public safety by encouraging and coordinating development of a nationwide, seamless communications system for emergency services that is regularly upgraded").

[522] *Id.* at 35-37, paras. 83-91.

[523] *See supra* Section III.F.2.g (declining to extend E911 requirements in the SCS context where a satellite operator enters into a part 1 leasing arrangement with a terrestrial licensee).

[524] For purposes of this proceeding, we use the phrase "SCS 911" voice calls to refer to 911 calls as defined in section 9.3 of the rules and initiated by terrestrial providers' end-user subscribers and carried over satellite facilities pursuant to an SCS arrangement between the terrestrial provider and the satellite operator. "911 call" refers to "[a]ny call initiated by an end user by dialing 911 for the purpose of accessing an emergency service provider." 47 CFR § 9.3. For wireless carriers, "all 911 calls" include those they are required to transmit pursuant to subpart C of part 9. *Id.* §§ 9.3, 9.10. Under section 9.10(b) "all wireless 911 calls" refers to "any call initiated by a wireless user dialing 911 on a phone using a compliant radio frequency protocol of the serving carrier." *Id.* § 9.10(b). A 911 text message refers to "a message, consisting of text characters, sent to the short code '911' and intended to be delivered to a PSAP by a covered text provider, regardless of the text messaging platform used." *Id.* § 9.10(q)(9).

[525] For purposes of this proceeding, we use the term "location-based routing" to mean the use of information regarding the location of a device, including but not limited to device-based location information, to route 911 communications to an appropriate PSAP. We note that this definition of location-based routing is functionally equivalent with the definition established for wireless 911 voice calls and 911 real-time text messages in the context of wireless 911 routing. *See id.* § 9.3. In the companion *Further Notice*, we seek further comment on defining "location-based routing" requirements for SCS 911 purposes.

voice call or SCS 911 text message and available information to an appropriate PSAP; or (2) use an emergency call center, at which emergency call center personnel must determine the emergency caller's phone number and location and then transfer or otherwise direct the SCS voice call or SCS text message to an appropriate PSAP. In addition, we require terrestrial providers that use SCS to (1) explain how their SCS deployments have supported 911 call/text routing to the geographically appropriate PSAP with sufficient location information in annual reports to the Commission; (2) submit a one-time privacy certification; and (3) provide consumer disclosures regarding the extent of SCS 911 connectivity.

175. In seeking comment on whether to extend wireless 911 requirements to the provision of SCS, the Commission recognized that SCS is a novel way of connecting consumers to emergency services that mixes terrestrial and space technology.[526] The Commission further acknowledged that it may not be feasible for the collaborators to comply with all existing 911 requirements when the satellite operator is supplementing the terrestrial provider's service.[527] The Commission sought detailed information on how to best support the availability of emergency 911 services and what, if any, rule changes are necessary to accommodate SCS.[528]

176. In this proceeding, the record reflects the importance of emergency communications via SCS where terrestrial communications infrastructure is limited or non-existent, as well as during natural disasters that disrupt terrestrial networks.[529] However, the record is divided over the technical feasibility

[526] *Notice* at 35, paras. 83-84.

[527] *Id.* at 35, para. 84 (seeking "comment on whether it is technically or otherwise feasible for terrestrial service providers to satisfy the requirements in section 9.10 when incorporating their satellite operator collaborator's supplemental service, and if not, which particular requirements are not feasible and why"); *id.* at 35, para. 85 (asking whether "all or some of the CMRS 911 and E911 rules [should] apply to both SCS partners, individually or together").

[528] *Notice* at 35, para. 86 (proposing to modify the "part 25 rules to require a terrestrial licensee that seeks to collaborate with a satellite operator to provide SCS, to apply for a blanket earth station license for all of its subscribers' terrestrial devices that are otherwise authorized under its terrestrial license, to operate using transmissions to and from the satellite operator's space stations"); *id.* at 36, para. 87 (seeking "detailed information on the process by which SCS is activated when a consumer attempts to access 911 services during emergencies, including when no cellular or Wi-Fi service is available"); *id.* at 36, para. 88 (asking "commenters to discuss how satellite providers would route 911 services, including voice and text-to-911"); *id.* at 36, para. 89 (seeking "comment on the feasibility, availability, and cost of provisioning consumer devices to support SCS for 911"); *id.* at 36, para. 90 (seeking comment on how the Commission should apply current MSS emergency call center and reporting obligations "in the context of an SCS offering in which the part 25 license or grant of market access holder modifies its existing part 25 authorization and leases exclusive-use spectrum, most likely from a CMRS wireless provider"); *id.* at 37, para. 91 (seeking "comment on the anticipated public safety impacts of supplemental voice and text satellite coverage in areas that have not previously received service or during emergencies when the CMRS network is otherwise unavailable"); *see also id.* at 39, para. 97 (asking about public interest concerns the Commission should consider that would weigh in favor of placing limits on the SCS collaboration, and observing that stakeholders have indicated that the initial provision of SCS is likely to focus on messaging-type services in areas that terrestrial networks have difficulty covering, but could evolve to include increased capacity with enhanced capabilities and functionality).

[529] For example, APCO notes that "[f]irst responders and members of the public could benefit from being able to communicate more reliably across a broader geographic area during emergencies, ultimately saving lives." APCO Comments at 1-2. Apple and SpaceX indicate that SCS can provide valuable coverage in emergency situations. *See, e.g.*, Apple Comments at 2-6 (describing "Apple's experience in planning, testing, and developing [its Emergency SOS via satellite] solution over many years [that] can offer valuable insights into the business and regulatory considerations associated with launching a satellite-to-device feature like Emergency SOS via satellite," including investments, hardware and software changes, enabling connectivity, and outreach to emergency responders); SpaceX Comments at 13 ("SpaceX has agreed to meet the Commission's MSS emergency 911 services rules as a part of its spectrum management agreement with T-Mobile. Because this technology is already available, the Commission can take the same approach by first applying 911 rules similar to those used for MSS to SCS. This (continued….)

of extending 911 requirements to SCS at this early stage in SCS deployments. For example, APCO states that wireless providers should be responsible for the consumer 911 experience whether the call is via terrestrial or satellite infrastructure, and it may be appropriate to extend "some or all" of section 9.10 requirements to satellite operators as well.[530] On the other hand, some commenters assert that the Commission should recognize the role of satellite operators and refrain from imposing terrestrial wireless 911 requirements on SCS satellite operators that may be infeasible at this time.[531] For example, AT&T suggests that the Commission should permit the use of location-based routing to automatically redirect SCS 911 voice calls to the appropriate PSAP and should permit the use of emergency call centers "as a back-up option if the necessary location information for location-based routing is not available from the handset."[532] Some commenters support a phased-in approach to SCS 911 rules.[533] Apple and AST note that SCS services could support lifesaving or emergency assistance communications, even if not 911 capable in the first instance.[534] Finally, some commenters suggest that the Commission seek additional comment by issuing a Further Notice of Proposed Rulemaking regarding the technical feasibility of

approach will immediately benefit consumers that otherwise would not have any emergency service, and also allow the Commission to build toward a more robust emergency calling environment as SCS technologies develop.") (footnote omitted).

[530] APCO Comments at 3 (urging the Commission to press satellite operators to prove that it is infeasible for them to comply); *id.* (arguing that uniform application of the 911 requirements will reduce consumer confusion and promote benefits of the service).

[531] For example, in response to APCO, T-Mobile urges the Commission to recognize the role of satellite operators in providing SCS and that "any obligation imposed on satellite operators related to SCS should take into consideration current obligations on satellite operators and technical capabilities of satellite systems." T-Mobile Reply at 17. T-Mobile points out that "the Commission cannot simply impose existing public safety obligations on SCS providers if it is not feasible to do so." *Id.* at 17. Rather, the Commission should phase in emergency communications over SCS as it becomes technically feasible. *Id.* at 17-18 (citing SpaceX Comments); *see also* Verizon Reply at 11-13.

[532] AT&T Comments at 25. AT&T "agrees that the Commission's wireless 911 requirements should extend to areas served through SCS deployments," but AT&T urges that the Commission's approach should be adjusted to reflect that SCS services will be deployed on satellites. *Id.* at 24-25. Intrado explains that current satellite technology affects 911 routing, so technical feasibility is important when considering whether to extend 911 requirements to SCS satellite operators. Intrado Life & Safety, Inc. (Intrado) Reply, GN Docket No. 23-65, at 2-4 (rec. June 12, 2023) (Intrado Reply) ("Because it takes time to attain a sufficiently accurate GPS fix (*e.g.*, within a mile) to route a 911 SCS call, this may require the handset to wait a short amount of time to acquire a GPS fix before placing the 911 call. If a GPS fix cannot be obtained within an acceptable time period, these 911 SCS calls should route to a national emergency call relay center (*i.e.*, an Emergency Call Center) that has the ability to retrieve location from the handset or query the user for location and nature of emergency, relay the call to the appropriate PSAP over native trunks, and transmit any available location information natively to the PSAP.").

[533] *See, e.g.*, AT&T Comments at 24 (adopting 911 or WEA rules "while SCS remains in its infancy would be premature"); SpaceX Comments at 13; T-Mobile Comments at 17-18; Apple Comments at 6-7; Intrado Reply Comments at 2. Some commenters encourage collaboration with industry and public safety stakeholders to phase in more robust emergency calling as SCS technologies mature. *See, e.g.*, Apple Comments at 2-7 (stating that the delivery of emergency communications services to end-user devices through satellite-based services requires, e.g., consideration of the differences between terrestrial and satellite communications; investing in infrastructure, software, and hardware to establish connectivity; designing user interfaces; and coordinating with PSAPs and other public safety organizations); SpaceX Comments at iii, 16 (stating that the Commission can establish a strong foundation for emergency calling by "adopting baseline requirements similar to existing mobile-satellite service rules for SCS, while working with the industry to phase in more robust rules as more capabilities come online").

[534] *See, e.g.*, Apple Comments at 5 ("To allow use of Emergency SOS via satellite in areas not yet supporting text-to-911, Apple established relay centers where trained agents receive messages from users and call PSAPs on their behalf."); AST Reply at 23 (noting that "SCS-based calling or texting services enable communications directed to friends and family when one is stuck in a remote area, or during a disaster that destroyed terrestrial infrastructure").

applying terrestrial 911 requirements to SCS.[535]

177. Section 9.10 of the Commission's rules lays out the 911 requirements applicable to terrestrial providers.[536] Additionally, we recently amended our part 9 rules to require CMRS (terrestrial) providers to implement location-based routing for wireless 911 voice calls and real-time text (RTT) communications[537] to 911 nationwide, but deferred a decision on whether to require covered text providers[538] to implement location-based routing for other types of texts to 911, such as SMS.[539] MSS providers are exempt from the wireless 911 requirements[540] but are required to support emergency call center service to the extent that they offer two-way interconnected voice service.[541]

178. Today, we establish interim requirements for terrestrial providers that use SCS arrangements to carry 911 calls and seek further comment in the *Further Notice* on appropriate long-term 911 requirements. We believe that adopting an interim approach at this time that recognizes the current state of technology will permit rapid deployment of innovative solutions in the dynamic satellite-terrestrial marketplace. At the same time, the *Further Notice* will serve to develop a robust record to consider policies and rules that will ultimately help to ensure that consumers receive an SCS 911 experience equal to terrestrial 911 service. We note that nothing in today's decision, including the rules we adopt today, authorizes the use of any non-U.S. satellite navigation system in conjunction with the 911 system. CMRS providers seeking to employ foreign satellite navigation systems for 911 should follow the existing approval process.[542]

179. Under our approach, terrestrial providers that utilize SCS arrangements to expand coverage areas to provide service to their end-user subscribers must either: (1) use information regarding the location of a device, including but not limited to device-based location information, to route SCS 911 voice calls and 911 text messages to an appropriate PSAP, and transmit the caller's phone number and available location information to the PSAP; or (2) use an emergency call center, at which emergency call

---

[535] *See, e.g.*, Lynk Comments at 12-13; AST Reply at 22-23; CCA Reply at 16. For example, Lynk observes that "[s]uch a proceeding will help alleviate and address concerns that many satellite networks have historically been unable to comply with certain rules adopted in the 9-1-1 . . . proceedings due to technical infeasibility." Lynk Reply at 5-6. *See, e.g.*, Verizon Reply at 11-12 & n.41 (citing *Revision of the Commission's Rules to Ensure Compatibility With Enhanced 911 Emergency Calling Systems; Amendment of Parts 2 and 25 to Implement the Global Mobile Personal Communications by Satellite (GMPCS) Memorandum of Understanding and Arrangements*, CC Docket No. 94-102, IB Docket No. 99-67, Report and Order and Second Further Notice of Proposed Rulemaking, 18 FCC Rcd 25340, 25348, para. 21 (2003)).

[536] Section 9.10 of the Commission's rules describes 911 requirements applicable to Commercial Mobile Radio Service providers, including requirements to support basic 911 and Enhanced 911 (E911), outdoor and indoor location accuracy, and text-to-911. 47 CFR § 9.10; *Notice* at 35, para 83.

[537] The Commission defines "real-time text" as "[t]ext communications that are transmitted over Internet Protocol (IP) networks immediately as they are created, *e.g.,* on a character-by-character basis." 47 CFR § 9.3; *see also id.* § 67.1(g).

[538] The Commission defines "covered text provider" as including "all CMRS providers as well as all providers of interconnected text messaging services that enable consumers to send text messages to and receive text messages from all or substantially all text-capable U.S. telephone numbers, including through the use of applications downloaded or otherwise installed on mobile phones." 47 CFR § 9.10(q)(1).

[539] *Location-Based Routing for Wireless 911 Calls*, PS Docket No. 18-64, Report and Order, FCC 24-4 (Jan. 26, 2024) (*LBR Report and Order*).

[540] 47 CFR § 9.10(a); *Notice* at 35, para. 83.

[541] 47 CFR § 9.18 (MSS 911 requirements); *Notice* at 35, para. 83.

[542] *See Wireless E911 Location Accuracy Requirements; AT&T Services, Inc. Request for Authorization and Waiver*, PS Docket No. 07-114, Order, 35 FCC Rcd 8805, 8808-09, para. 11 (PSHSB 2020); *Wireless E911 Location Accuracy Requirements*, PS Docket No. 07-144, Fourth Report and Order, 30 FCC Rcd 1259, 1272-73, para. 40 (2015).

center personnel must determine the emergency caller's phone number and location and then transfer or otherwise direct the SCS 911 voice call to an appropriate PSAP. In other words, terrestrial providers are required to either transmit SCS 911 voice calls and 911 text messages traversing their networks using automatic, location-based routing or, alternatively, use emergency call centers to route SCS 911 voice calls and 911 text messages.[543] We require providers that utilize SCS to explain how their SCS deployments support SCS 911 voice call and 911 text routing to the geographically appropriate PSAP with sufficient location information in annual reports to the Commission.[544]

180. The option for terrestrial providers that use SCS arrangements to route SCS 911 voice calls and 911 text messages using location-based routing is similar to the requirement for CMRS providers under section 9.10(s) of our rules.[545] However, unlike the wireless 911 voice call and real-time text communication location-based routing requirement for CMRS providers, which requires those providers to use location-based routing when location information meets certain thresholds for timeliness and accuracy, our approach permits terrestrial providers extending their coverage through SCS arrangements to route 911 calls through one of two options. In addition, we do not set specific accuracy or timeliness thresholds to determine when terrestrial providers must use location-based routing but seek comment on defining routing criteria in our companion *Further Notice*. Further, the option to use an emergency call center is similar to the emergency call center requirement applicable to MSS operators providing two-way service under section 9.18(a) of our rules.[546] As with existing MSS 911 rules, emergency call center personnel who receive an SCS emergency call must determine the caller's phone number and location and then transfer or otherwise redirect the 911 call to an appropriate PSAP.[547] However, unlike the MSS requirement, terrestrial providers have the option to use either location-based routing or the emergency call center to transmit SCS 911 voice calls and 911 text messages to an appropriate PSAP. While we provide two options for compliance, we encourage terrestrial providers in the interest of public safety to use a delivery methodology that results in the least delay in delivering the SCS 911 voice call or text to an appropriate PSAP. We currently consider that the delivery methodology that results in the least delay in delivering the SCS 911 voice call or text to an appropriate PSAP is likely to be location-based routing, and we seek further comment in the *Further Notice* on whether we should require location-based routing as a primary routing and delivery methodology for SCS 911 voice calls and texts.

181. Based on the record developed in response to the *Notice*, we believe that the SCS regulatory framework at this stage in SCS deployment requires a nuanced approach to 911 requirements that takes into account the fact that in SCS arrangements, the emergency calls will be carried over satellite infrastructure that is utilized to supplement the terrestrial service provider's coverage.[548] We recognize

---

[543] Under section 9.10(s), CMRS providers must use location-based routing for wireless 911 voice calls and RTT communications to 911 originating on their Internet-Protocol-based networks when the location information available to the CMRS provider's network at time of routing is ascertainable within a radius of 165 meters at a confidence level of at least 90%. In the absence of these conditions, CMRS providers must default to "best available" location information for routing wireless 911 voice calls and RTT communications to 911, which may include but is not limited to device-based or tower-based location information. *LBR Report and Order*, FCC 24-4 at 2-3, 62, para. 3, Appx. A.

[544] *See, e.g.*, Letter from Lauren Kravetz, Vice President, Government Affairs, Intrado, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-65 et al., at 4 (filed Jan. 7, 2024); *see also* Letter from Lauren Kravetz, Vice President, Government Affairs, Intrado, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-65 et al., at 1-2 (filed Feb. 23, 2024).

[545] In the companion *Further Notice*, we seek comment on whether to implement a requirement for terrestrial providers to deploy and use location-based routing more extensively on their networks. *See infra* paras. 241-45.

[546] 47 CFR § 9.18(a).

[547] *Id.*

[548] *See, e.g.*, Apple Comments at 7 (stating that "simply applying 911 or wireless emergency alert ("WEA") rules (continued….)

that even as we facilitate use of SCS arrangements to close coverage gaps and complement terrestrial service, we do not envision that SCS arrangements will circumvent existing wireless 911 service obligations or delay the development of other innovative solutions for improving wireless 911 location-based routing.[549] We note that some commenters suggest that the "current emergency call center requirements that apply to MSS providers recognize that applying the wireless 911 requirements to satellite service is more difficult than applying them to terrestrial services."[550] We also take into consideration that terrestrial wireless carriers will be providing the underlying telecommunications service to consumers.[551] Thus, we balance the benefits of facilitating initial SCS deployment with our goal of expeditiously improving the availability of emergency communications in remote areas and during disasters.[552]

182. Our interim approach presents the fewest practical and technical complexities and provides the most efficient path for enabling the public safety benefits of SCS service in the near-term during disasters and emergencies in remote areas. In adopting interim SCS 911 requirements today, we seek to balance concerns over prematurely extending terrestrial 911 requirements to satellite operators against our goal of ensuring that SCS end users have access to robust 911 services even during the initial stages of SCS deployment. At this stage, for SCS 911 voice calls and 911 text messages, we lack information on satellite data capacities, satellite link budget, and optimization schemes for the initial SCS deployments and the impact on device-to-satellite connectivity, including time for obtaining a location fix for automatic location-based routing of 911 calls. In discussing why applying terrestrial voice services requirements would not be appropriate, for example, Apple observes that "[t]he scopes of possible SCS and similar technologies are significant and could vary widely across available bandwidths, link budgets,

developed for terrestrial voice services would not be appropriate"); AT&T Comments at 24-25 (noting that the Commission's "approach should be tailored to reflect the fact that SCS services will be deployed on satellites"); Lynk Comments at 13 (noting that "it is critical to recognize that the technical parameters of [911 and WEA] services will necessarily need to be adapted to the SCS context"); SpaceX Comments at 13; TechFreedom Comments at 15 (supporting "extending 911 requirements to SCS operators to the extent possible given their network architecture"); T-Mobile Comments at 14-15 ("The terrestrial licensee should not be responsible for any failure by the satellite operator to provide that required service; the terrestrial licensee will have no control over the operational capabilities and the related ability to meet regulatory requirements of the space station operator."); Verizon Reply at 11-12 (stating that the Commission should consider applying to SCS "its existing mobile-satellite service ('MSS') 911 rules"); AST Reply at 21 & n.84 ("[I]t would be inappropriate to simply extend the current MSS emergency call center rules [to] SCS satellite operators that offer their services on a non-common carriage basis. Otherwise, the rollout of SCS would undoubtedly be delayed by regulatory and technical complexities."); CCA Reply at 16 (agreeing that it is important for the FCC to recognize that the technical parameters of 911 and WEA services will necessarily need to be adapted to the SCS context); T-Mobile Reply at 3 ("Even though SCS will be a supplement to services offered by terrestrial licensees, the Commission should recognize that transmissions from space will be generated from a space station operator").

[549] *See, e.g.*, Apple Comments at 6-9; Skylo Comments at 16 (stating that SCS operations "are complementary to—and not substitutes for—terrestrial services").

[550] AST Reply at 21.

[551] For example, in discussing why SCS is not presently able to ensure "the ubiquitous, seamless, consistently reliable, and fully functional mobile coverage provided by terrestrial networks," Apple observes that "SCS, per its name, supplements or adds to an existing mobile network, and technical parameters need to be carefully considered to optimize SCS for that supplementary role." Apple Comments at 8-9. Apple advises that "[t]he Commission should continue to actively reassess its regulatory framework as satellite-to-device functionality evolves, making changes as necessary as new satellite-to-device technologies become substitutes for, rather than supplements to, terrestrial mobile connectivity." *Id.* at 9.

[552] SpaceX Mar. 8, 2023, *Ex Parte*, GN Docket No. 23-65, at 2 ("The Commission should strike a careful balance in this initial proceeding to enable timely deployment while promoting public safety."); AST Reply at 21.

and power levels that will drive maximum data capacities."[553] The record would benefit from additional information regarding the technical feasibility of requiring satellite operators to comply with section 9.10 of the Commission's rules.[554]

183. Given the nascent nature of SCS as a supplement to terrestrial wireless coverage, and in recognition of SCS 911 voice calls and SCS 911 text messages traversing terrestrial and satellite networks, we believe that these factors militate against extending terrestrial 911 voice call routing requirements to SCS satellite operators at this time. Instead, the approach we adopt ensures that terrestrial wireless carriers have responsibility for the SCS 911 voice call and 911 text message experience. Our approach relies on elements of our current terrestrial and MSS 911 frameworks, recognizes the role of satellite facilities in terrestrial providers' services, promotes certainty, and lays the groundwork for considering further improvements for SCS and MSS 911 service rules, including seeking comment on our goal of requiring automatic location-based routing of 911 calls using SCS. We also encourage all stakeholders to collaborate on integrating 911 technologies to achieve automatic location-based routing for 911 SCS voice calls.[555]

184. *Reporting Requirements*. We also require terrestrial providers that utilize SCS arrangements to expand their coverage areas for providing service to disclose certain information to the Commission regarding SCS 911 voice calls and 911 text messages.[556] Such requirements are consistent with reporting requirements that apply to MSS providers under section 9.18(b) of our rules[557] and location-based routing reporting requirements that apply to terrestrial providers under section 9.10(s) of our rules.[558] Accordingly, we require that terrestrial providers that utilize SCS to extend coverage must maintain records of SCS 911 voice calls and 911 text messages received under their SCS arrangements and received at their emergency call centers. Following the compliance date of new section 9.10(t)(3) of the rules, terrestrial providers must submit reports annually regarding SCS 911 voice calls and 911 text messages in the Commission's Electronic Comment Filing System. We direct PSHSB to issue a Public Notice prior to the deadline for terrestrial providers to file SCS 911 reports and certifications. Such a

---

[553] Apple Comments at 7. Similarly, Verizon argues: "[A]ny assumption that wireless provider 911 and E911 capabilities can be readily transposed to SCS operations reads too much into mobile wireless service and SCS residing in the same customer end user device. Indeed, the SCS capabilities will vary between different frequency bands considering 'available bandwidths, link budgets, and power levels that will drive maximum data capacities.' Therefore, applying even existing terrestrial basic 911 requirements to SCS satellite offerings is problematic at this early stage of the SCS lifecycle." Verizon Reply at 12 (quoting Apple Comments at 7) (footnote omitted).

[554] *See, e g.*, Kepler Comments at 6-7; Lynk Comments at 13; SpaceX Comments at 16 ("To enable rapid deployment of life-saving technology in the near term while ensuring robust access to E911 service in the long term, the Commission should establish baseline requirements for SCS while working with industry to phase-in more robust 911 calling over time, consistent with technical feasibility."); AST Reply at 23 (arguing that "911 and WEA requirements should be phased in after the Commission issues a Further Notice of Proposed Rulemaking so that satellite operators and their terrestrial partners can deploy SCS coverage, industry stakeholders can better understand the capabilities and limitations of SCS services, and market participants can evaluate the requisite support and upgrades to 911 infrastructure that [are] outside the control of satellite operators and their carrier parties"); CCA Reply at 16 (urging "the FCC to seek additional comment on technical capabilities of SCS innovations to provide 911 and WEA and to permit modified provision of emergency capabilities as SCS technologies evolve").

[555] *See, e.g.*, Apple Comments at 7 ("[T]he public interest would be better served by fostering collaboration with PSAPs and first responders during the feature development process while encouraging more rapid adoption of capabilities such as text-to-911.").

[556] *See, e.g.*, *Notice* at 36, para. 90 (seeking comment on how the Commission should apply current MSS emergency call center and reporting "obligations in the context of an SCS offering in which the part 25 license or grant of market access holder modifies its existing part 25 authorization and leases exclusive-use spectrum, most likely from a CMRS wireless provider").

[557] 47 CFR § 9.18(b).

[558] *Id.* § 9.10(s); *LBR Report and Order*, FCC 24-4 at 62, Appx. A.

Public Notice will include necessary instructions for terrestrial providers to file reports and certifications in compliance with the requirements adopted in this *Report and Order*. For administrative convenience, we direct PSHSB to open a separate docket for the filing of SCS 911 reports and certifications. This new docket is only for SCS 911 reports and certifications. The instant rulemaking dockets remain open for other rulemaking-related matters. We require terrestrial providers to annually submit a report to the Commission by October 15th of each year regarding SCS 911 voice calls and 911 text messages, and emergency call center data, current as of September 30th of that year. These reports must include, at a minimum, the following:

(1) The name and address of the CMRS provider that uses SCS arrangements to provide service to its end-user customers, the address of that CMRS provider's emergency call center, and the contact information of the emergency call center;

(2) The aggregate number of SCS 911 voice calls and 911 text messages received by the network of the CMRS provider that provides SCS service to its end-user subscribers during each month during the relevant reporting period;

(3) The aggregate number of SCS 911 voice calls and 911 text messages received by the emergency call center each month during the relevant reporting period;

(4) The aggregate number of SCS 911 voice calls and 911 text messages received by the emergency call center each month during the relevant reporting period that required forwarding to a public safety answering point and how many did not require forwarding to a public safety answering point; [559]

(5) The aggregate number of SCS 911 voice calls and 911 text messages that were routed using location information that met the timeliness and accuracy thresholds defined in Section 9.10(s)(3)(i)(A) and (B) of the rules;[560]

(6) The aggregate number of SCS 911 voice calls and 911 text messages that were routed using location information that did not meet the timeliness and accuracy thresholds defined in Section 9.10(s)(3)(i)(A) and (B) of the rules;[561] and

(7) An explanation of how the SCS deployment, including network architecture, systems, and procedures, will support SCS 911 call and text routing to the geographically appropriate PSAP with sufficient location information in compliance with the SCS 911 requirements adopted in this *Report and Order*.

185. We conclude that extending and adapting the existing MSS 911 reporting requirements and location-based routing requirements for wireless 911 voice calls to terrestrial providers that utilize SCS to extend their coverage areas represents a minimally burdensome requirement. In addition, we believe that these reporting requirements will promote transparency and accountability in routing SCS 911 voice calls and 911 text messages, and that they will provide the public useful data for evaluating the interim SCS 911 requirements and identifying 911 technology developments and routing trends, particularly with regard to 911 text messages, which is especially relevant since initial SCS deployments may be focused on text messaging before evolving to voice.[562]

[559] 47 CFR § 9.18(b).

[560] *Id.* § 9.10(s)(3)(i)(A), (B); *LBR Report and Order*, FCC 24-4 at 62, Appx. A.

[561] 47 CFR § 9.10(s)(3)(i)(A), (B); *LBR Report and Order*, FCC 24-4 at 62, Appx. A.

[562] For example, Intrado urges us to "require all applicants/providers to explain in their applications to the Commission how their SCS deployments will support 911 call/text routing to the geographically appropriate Public Safety Answering Point (PSAP) with sufficient location information. Intrado Jan. 4, 2024, *Ex Parte* at 1 (explaining that "[b]ecause cell-sector routing is not possible with satellites and GPS information for SCS is sometimes unavailable at call setup, there will be certain SCS 911 calls/texts that will need to be routed to a nationwide 911

(continued….)

186. *Subscriber Disclosure Requirements*. Consistent with the goal of promoting consumer awareness of the extent to which SCS is used to provide connectivity to 911,[563] we adopt consumer disclosure requirements for terrestrial providers to inform their subscribers of the limitations when using SCS to contact 911. In the *Notice*, the Commission sought comment on the anticipated public safety impacts of supplemental voice and text satellite coverage in areas that have not previously received service or during emergencies when the terrestrial network is otherwise unavailable.[564] The Commission asked whether terrestrial partners engaged in or planned any outreach or coordination with public safety entities ahead of implementation, and whether "providers plan to alert subscribers in any way of any limitations on calling or texting 911 from a handset connected to satellite services[.]"[565] It also noted that "consumers using commercial wireless handsets typically have an expectation that they can connect to 911 operators" and sought comment on how best to inform consumers using SCS of the extent of their connectivity to 911.[566]

187. Consistent with some parties' comments in this proceeding,[567] we require each terrestrial provider that uses SCS arrangements to supplement its coverage to specifically advise every subscriber, both new and existing, prominently and in plain language, of the circumstances under which 911 service for calls or texts may not be available through SCS or may be in some way limited by comparison to traditional E911 service. Such circumstances may include, but are not limited to, potential delay in connecting the call or text to 911, potential inability of the service to determine the end-user's location and call-back number, the consequences of moving into or out of SCS/terrestrial coverage during a live call, and potential inability of the end-user's device to obtain a line of sight to the satellite. The disclosure requirement we adopt today is consistent with the disclosure requirement the Commission adopted for

---

relay call center (like the Intrado ECRC) that has the ability to retrieve location from the handset or verbally ask the user for location and nature of emergency, relay the call to the appropriate PSAP over native trunks, and transmit any available location information natively to the PSAP."). Consistent with our approach to this early stage in SCS deployments, however, we believe terrestrial providers should solely be responsible for explaining how SCS arrangements will support the 911 call and text experience for consumers.

[563] *See Notice* at 35, para. 84 ("Given that a key benefit of SCS is to provide connectivity to Americans in areas where they may have no other option for communications service, we seek comment on how best to facilitate access to our nation's emergency response system for consumers using SCS. In addition, because consumers using commercial wireless handsets typically have an expectation that they can connect to 911 operators, we seek comment on how best to inform consumers using SCS of the extent of their connectivity to 911.").

[564] *See id.* at 37, para. 91.

[565] *See id.*

[566] *See id.* at 35, para. 84. In addition, the Commission sought comment on whether it should "modify any of the Commission's part 9 rules, including those that apply to CMRS, MSS, or covered text providers, to accommodate increased use of this service and ensure reliable connectivity to 911." *See id.* at 37, para. 91.

[567] Apple Comments at 7-8; AST Reply at 23 ("Moreover, SCS operators and their terrestrial partners can communicate to users any limitations associated with their 911 calling capabilities through customer disclosures consistent with what the Commission's rules allow for other voice calling services."); Verizon Reply at 12. Apple, for example, states that to protect user privacy, "users also need transparency about how satellite-to-device offerings work, how they interact with other terrestrial mobile and satellite-enabled features, and how these solutions may use or share their personal data." Apple Comments at 7. Apple states that "[u]sers should have clear information about SCS/non-SCS functionality and interoperability, including any limitations that could prompt them to opt out of a particular offering, and that users should know how their personal data, including location, will be used and protected across the ecosystem." *Id.* To that end, Apple submits that "the Commission should require compliance with appropriate disclosure rules and regulatory guardrails as new satellite-to-device features are introduced into the marketplace." *Id.* at 7-8. Verizon asserts that "any SCS arrangement should account for consumer expectations when it comes to dialing or texting 911" and that "SCS partners should therefore pursue customer notification measures so that consumers are informed of the capabilities available when a 911 call or text goes through the satellite operator network." Verizon Reply at 12.

interconnected Voice Over Internet Protocol (VoIP) service providers.[568] In that context, the Commission reasoned that VoIP consumers in many cases may not understand that the "reasonable expectations" they have developed with respect to the availability of 911/E911 service via wireless and traditional wireline telephones may not be met when they use interconnected VoIP services.[569] We similarly conclude here that consumers may not be aware of the limitations on their ability to connect to 911 via SCS and that a disclosure requirement will provide vital information to these consumers.

188. *Privacy of Location Information*. We continue to stress the importance of the privacy requirements placed on telecommunications carriers and, particularly, the requirements found in section 222 of the Communications Act of 1934, as amended.[570] Significantly, except for limited circumstances, such as if required by law or with a subscriber's approval, section 222 requires CMRS providers to protect the confidentiality of customer proprietary network information, including location information, and prohibits such providers from using, disclosing, or permitting access to such information.[571] However, section 222 also provides for limited exceptions, including contacting 911.[572] This exception for contacting 911 provides that the location information obtained during such contact can be disclosed to a PSAP or other emergency service entity.[573] Because the rules we adopt will permit terrestrial providers to route SCS 911 voice calls to an appropriate PSAP via location-based routing, these providers will obtain and use customer location information.

189. We believe that it is imperative for terrestrial wireless providers to continue to ensure the privacy and security of customer proprietary network information, including location information obtained to enable location-based routing. In the *Notice*, the Commission sought comment regarding the "technical and operational challenges, costs, and public interest benefits of extending wireless 911 requirements to CMRS providers and satellite providers that offer SCS," the provision of 911 caller location information, and "consumer privacy concerns with SCS."[574] Apple emphasizes the importance of protecting the privacy of SCS user location data.[575] To that end, we require that, prior to use of SCS location information to meet the Commission's 911 rules, terrestrial providers must certify that neither they nor any third party they rely on to obtain SCS location information will use that information or associated data for any non-911 purpose, except with prior express consent or as otherwise permitted or required by law. The certification also must state that terrestrial providers and any third party they rely on to obtain SCS location information will implement measures sufficient to safeguard the privacy and security of the information. These obligations are consistent with our existing rules that apply to z-axis and dispatchable location data, as well as location information used for location-based routing.[576] Terrestrial providers must submit this one-time certification in the Commission's Electronic Comment Filing System on the due date of the first report made under new section 9.10(t)(3) of the rules.

---

[568] *IP-Enabled Services; E911 Requirements for IP-Enabled Service Providers*, WC Docket Nos. 04-36 and 05-196, First Report and Order and Notice of Proposed Rulemaking, 20 FCC Rcd 10245, 10272, para. 48 (2005) (*VoIP E911 Order*); *see also* 47 CFR § 9.11(b). The Commission's 911 rules include other consumer disclosure requirements. *See, e.g.*, *id.* § 9.10(o) (Licensees providing non-service initialized handsets must affix a label to each handset that notifies the user of limitations on the user's connectivity to 911, including "that the handset can only be used to dial 911" and "that the 911 operator will not be able to call the user back.").

[569] *See VoIP E911 Order*, 20 FCC Rcd at 10272, para. 48.

[570] 47 U.S.C. § 222.

[571] *Id.* § 222(a), (c)(1), (f).

[572] *Id.* § 222(d).

[573] *Id.* § 222(d)(4).

[574] *Notice* at 15-36, paras. 84-89.

[575] Apple Comments at 6-8.

[576] *See, e.g.*, 47 CFR § 9.10(i)(4)(iv), (v); *LBR Report and Order*, FCC 24-4 at 47, para. 101.

b. Wireless Emergency Alerts

190. *Wireless Emergency Alerts (WEA) Participation*. In the *Notice*, the Commission sought comment on a variety of issues related to how satellite operators' collaborations with terrestrial licensees could support WEA.[577] For example, the Commission asked about the impact of satellite operations that "supplement terrestrial wireless providers' coverage areas" on "WEA's availability and reliability in areas underserved by terrestrial wireless providers."[578] The Commission asked whether providers that elected to participate in WEA would need to update their election.[579] The Commission also sought comment on the technical aspects of satellite operators' ability to provide WEA.[580]

191. We agree with commenters that it is premature to determine how satellite operators who may provide SCS fit within the Commission's WEA regulatory framework. Commenters reference the nascent nature of SCS and tout the potential benefits of SCS,[581] but urge the Commission to be cautious about prematurely adopting WEA rules.[582] Many commenters describe the technical issues that need to be resolved prior to providing satellite-to-device WEA alert messages.[583] To this end, we note that the PSHSB recently announced that in the second quarter of 2024, it would start testing technologies that might be able to deliver WEA alert messages to mobile phones without using cell towers.[584] In doing so, it invited parties that are developing such technologies, including satellite operators, to participate in these tests.[585] Accordingly, we will defer consideration of the applicability of our WEA requirements to SCS pending the completion of this initiative, so that we might be informed by any relevant test results.[586]

c. Prioritization and Roaming

192. In the *Notice*, the Commission asked how a device with access to SCS would determine the Radio Access Network on which to transmit a 911 call, and how the order of priority, among satellite,

---

[577] *Notice* at 37-38, para. 92-93. At the time of the *Notice*, representatives from the T-Mobile-SpaceX and Apple-Globalstar partnerships stated that they intended to support WEA. *Id.* at 37, para. 92 n.208.

[578] *Notice* at 37, para. 92.

[579] *Id.*

[580] *Id.* at 37-38, para. 93.

[581] *See, e.g.*, AT&T Comments at 1 ("SCS is still nascent but has the potential to develop into a useful tool to help terrestrial mobile operators supplement their networks to serve customers in certain situations, including in areas where an emergency compromises terrestrial infrastructure or where deploying additional infrastructure is logistically difficult or cost prohibitive."); Lynk Comments at 12 ("SCS can provide near-instantaneous backup to terrestrial wireless networks that are exposed to natural and man-made disasters . . ."); SpaceX Comments at 17; Verizon Comments at 15; Lynk Reply at 2-4

[582] Regarding adopting WEA requirements, AT&T states that "adopting rules while SCS remains in its infancy would be premature." AT&T Comments at 24; Verizon Comments at 15 ("[T]he Commission should refrain from entertaining policy choices here based on any speculative assessments of how SCS will develop and the impact it may have in the marketplace."); AST Reply at 22.

[583] Lynk Comments at 13; SpaceX Comments at 17; AST Reply at 21-22.

[584] *See Public Safety and Homeland Security Bureau Seeks Partners to Test Expansion of Coverage for Wireless Emergency Alerts When Cell Sites Are Down, Including through the Use of Satellite*, PS Docket No. 22-160, Public Notice, DA 23-995, at 1 (PSHSB Oct. 19, 2023) (*PSHSB Testing WEA Without Cell Towers PN*). Thirteen entities responded to this Public Notice, including two whose solution included the use of satellites: Skylo Technologies, Inc., and Lynk Global, Inc. *See* Skylo Technologies, Inc. Comments, PS Docket No. 22-160, at 1 (rec. Dec. 18, 2023); Lynk Global, Inc. Comments, PS Docket No. 22-160, at 2, 6 (rec. Dec. 18, 2023).

[585] *PSHSB Testing WEA Without Cell Towers PN* at 1.

[586] *See id.* at 1. PSHSB indicated that the results of tests of technologies using high-altitude transmissions on terrestrial frequencies would be entered into the record of this present proceeding (GN Docket No. 23-65 and IB Docket No. 22-271). *Id.* at 2 n.8.

other CMRS networks, or Wi-Fi, would impact the availability of various 911 services such as voice calls to 911 or texts to 911 or the quality of 911 location data.[587] The Commission also asked whether it should consider any additional public interest concerns that would weigh in favor of placing limits on the SCS collaboration.[588] In this *Report and Order*, we adopt interim requirements for terrestrial providers to provide 911 service to end-user subscribers when using SCS arrangements and defer consideration of the applicability of our WEA requirements, recognizing that the record reflects division about the technical feasibility of extending 911 and WEA requirements to SCS at this early stage in SCS deployments. In light of the nascent state of SCS service, we recognize that terrestrial roaming arrangements, where available, may continue to be a better tool to promote access to E911 services and WEA message delivery at this time. Accordingly, we take measures to promote the safety of life and property by ensuring consumers receive the full benefit of E911 service and encourage terrestrial providers to prioritize the effective delivery of WEA messages.[589] Specifically, to the extent that SCS deployments are not technically capable of fully complying with our E911 requirements as they apply to wireless providers, or our existing WEA requirements, and where wireless service otherwise is available, including pursuant to a roaming agreement, we encourage terrestrial providers to prioritize connection to wireless networks over SCS arrangements for purposes of transmitting 911 calls and distributing WEA messages.[590]

H. Technical Issues

193. *Potential Satellite-to-Satellite Interference Issues*. Some commenters raise concerns about the potential for satellite-to-satellite interference from SCS to existing MSS operations in certain frequency bands.[591] Specifically, MSS operator Omnispace expresses interference concerns about potential SCS operations in bands where there is a conflict between the direction of the proposed operations, space-to-Earth (downlink), and the International Table, Earth-to-space (uplink). Omnispace urges the Commission to limit the potential of harmful interference to MSS satellite operators that operate outside the United States in accordance with the ITU Radio Regulations and that are internationally allocated to MSS in the Earth-to-space direction in the International Table.[592]

194. At this time, with the exception of our decision to exclude the WCS band from the SCS Bands, concerns about the possibility of potential interference, or requests for additional protections or studies prior to the adoption of the Commission's framework, do not convince us to *exclude* specific

[587] *Notice* at 36, para. 87.

[588] *Id.* at 39, para. 97. For example, the Commission noted that "stakeholders have indicated that the initial provision of SCS is likely to focus on messaging-type services in areas that terrestrial networks have difficulty covering, but could evolve to include increased capacity with enhanced capabilities and functionality." *Id.*

[589] *See* 47 CFR § 9.10(q)(7) (roaming-related requirements with text-to-911 service); *id.* § 10.470 ("When, pursuant to a roaming agreement . . . a subscriber receives services from a roamed-upon network of a Participating CMS Provider, the Participating CMS Provider must support WEA alerts to the roaming subscriber to the extent the subscriber's mobile device is configured for and technically capable of receiving WEA alerts.").

[590] As noted above, our decision to decline to apply the Commission's part 20 rules requiring voice and data roaming arrangements to SCS operations is separate from our discussion here with respect to prioritization in connection with 911 and WEA requirements for SCS operations. *See supra* paras. 169-72. In the companion *Further Notice*, and in recognition that SCS capabilities and functionality may evolve, we seek additional comment on prioritization and roaming.

[591] *See* Omnispace Comments at 4, 17-24, 27-28; DISH/EchoStar Comments at 1, 3-8; Globalstar Reply at 5 (agreeing with Omnispace and DISH/EchoStar that "the Commission should work to ensure that any new SCS operations do not cause harmful interference to existing satellite systems operating domestically or abroad").

[592] *See, e.g.*, Omnispace Comments at 33-35; Omnispace Reply at 30-34. Omnispace also raises some of these same interference concerns in response to SpaceX's application to provide SCS. Omnispace Opposition, GN Docket No. 23-135; *see also* SpaceX Gen2 SCS Modification Application, ICFS File No. SAT-MOD-20230207-00021, Technical Narrative, at 1. We will address Omnispace's specific arguments related to operations proposed by SpaceX in the context of the application proceeding, not in this *Report and Order*.

spectrum bands from our initial framework for SCS. But we offer additional information regarding such operations here to address the record concerns regarding interference and international coordination issues. As an initial matter, we are authorizing SCS only on a non-interference basis to both domestic and cross-border operations. In addition, the fact that a frequency band is available for SCS pursuant to the Commission's framework does not guarantee that the Commission will automatically authorize SCS in the requested frequency band. The Commission will conduct a rigorous analysis of all SCS applications—in particular the technical materials submitted—to ensure compliance with our entry criteria and any applicable rules and requirements. For example, as noted by Omnispace, the 1910-1915 MHz/1990-1995 MHz band presents a level of technical complexity for SCS.[593] In the context of the SpaceX SCS Modification Application, Omnispace has submitted extensive technical analyses in support of its interference concerns with SpaceX's proposal for SCS in this band.[594] Specifically, Omnispace claimed that SpaceX did not adequately model the complete dynamics of their constellation. As part of its review of the pending application, and in light of Omnispace's concerns, SB requested additional interference demonstrations from the SCS applicant, SpaceX.[595] SpaceX responded with a Monte Carlo analysis that simulated its 7500 satellite constellation, split into multiple operational planes with transmit power, antenna gains values from their link path profile, as well as PFDs as measured on the ground.[596] We anticipate WTB and SB conducting a similar detailed analysis to evaluate the potential for satellite-to-satellite interference for other proposed SCS on a case-by-case basis.[597] Further, as described in the international coordination section of this *Report and Order*, with respect to cross-border interference, insofar as SCS conflicts with the ITU Radio Regulations and the International Table, such operations must be on a non-harmful interference basis and any harmful interference must be immediately eliminated

[593] *See* Omnispace Comments at 30.

[594] *See* Omnispace Opposition, GN Docket No. 23-135; Omnispace, LLC Reply Comments to Responses, GN Docket No. 23-135, ICFS File No. SAT-MOD-20230207-00021 (filed June 5, 2023) (OmniSpace SpaceX Reply); Letter from Mindel De La Torre, Chief Regulatory and International Strategy Officer, Omnispace, LLC, to Marlene H. Dortch, Secretary, FCC, ICFS File No. SAT-MOD-20230207-00021 (filed Oct 20, 2023) (Omnispace Oct. 20, 2023, *Ex Parte*); Letter from Mindel De La Torre, Chief Regulatory and International Strategy Officer, Omnispace, LLC, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-135, ICFS File No. SAT-MOD-20230207-00021 (filed Aug. 18, 2023) (Omnispace Aug. 18, 2023, *Ex Parte*).

[595] *See* Letter from Kathyrn J. Medley, Acting Chief, Satellite Licensing Division to William Wiltshire, Counsel SpaceX, Docket No. GN 23-135, File No. ICFS SAT-MOD-20230207-00021 (filed Nov. 7, 2023) (Space Bureau Satellite Licensing Division, request that SpaceX provide an interference analysis, including link budgets, for operations in the 1990-1995 MHz (space-to-Earth) and 1910-1915 MHz (Earth-to-space) bands, calculating the difference in interference in clear sky and rain fade or cloud cover conditions. For satellite-to-satellite analysis, SB also requested SpaceX provide Monte-Carlo simulation results that produce time-based statistics for the level of interference expected to be seen by other satellite operators operating in the reverse-band mode of operations.). SpaceX and Omnispace have submitted numerous technical filings in support of their respective analyses. *See, e.g*. Omnispace Opposition, GN Docket No. 23-135; OmniSpace SpaceX Reply, GN Docket No. 23-135; Omnispace Oct. 20, 2023, *Ex Parte*, GN Docket No. 23-135; Omnispace Aug. 18, 2023, *Ex Parte*, GN Docket No. 23-135; Letter from David Goldman, Vice President of Satellite Policy, Space Exploration Technologies Corp., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-135, ICFS File No. SAT-MOD-20230207-00021 (filed Sept. 29, 2023); Letter from Jameson Dempsey, Principal, Satellite Policy, Space Exploration Technologies Corp., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-135, ICFS File No. SAT-MOD-20230207-00021 (filed Nov. 14, 2023) (SpaceX Nov. 14, 2023, *Ex Parte*); Letter from David Goldman, Vice President of Satellite Policy, Space Exploration Technologies Corp. to Marlene H. Dortch, Secretary, FCC GN Docket No. 23-135, ICFS File No. SAT-MOD-20230207-00021 (filed Nov. 24, 2023).

[596] *See, e.g*., SpaceX Nov. 14, 2023, *Ex Parte*, GN Docket No. 23-135, at A-3-A-7; Letter from Jameson Dempsey, Director, Satellite Policy, SpaceX, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-135, at A-4-A-5 (filed Nov. 30, 2023) (SpaceX Nov. 30, 2023, *Ex Parte*).

[597] *See* Omnispace Mar. 7, 2024, *Ex Parte* at 2-6.

pursuant to No. 4.4 of the ITU Radio Regulations.[598]

195. *Terrestrial Partners with Existing Lease Arrangements.* In the *Notice*, the Commission explained that terrestrial licensees with pre-existing part 1 lease arrangements would be expected to protect their lessees from any harmful interference that might arise from satellite partners' deployment of SCS within the licensees' markets.[599] Spectrum manager lease arrangements presently require licensees to ensure that their lessees comply with the Commission's rules that apply to the licensed spectrum, and licensees must resolve any interference issues involving their lessees. The Commission nevertheless sought comment as to whether we should rely upon licensees to protect their pre-existing lessees from harmful interference that could result from SCS deployment, or if we should modify our rules to offer more protections to those lessees.[600] The Commission also sought comment on whether we should prohibit future lease arrangements after terrestrial licensees have entered into leases with satellite operators for the provision of SCS, and if so, whether we should permit parties to establish protections by contract or if we should offer more protections in our rules. Commenters express consistent support for the application of existing rules to mitigate potential harmful interference upon SCS deployment.[601] We agree, and believe that our existing secondary market rules will adequately ensure that the risk of harmful interference is mitigated, and we therefore decline at this time to make any alterations to our secondary market rules relating to harmful interference.

196. *In-Market Downlink Power Flux Density (PFD) Limits.* The Commission proposed and sought comment on a framework in which satellite operators would enter into private contractual arrangements with their terrestrial partners to establish protections for any co-channel operations.[602] The Commission inquired whether we should implement in-market PFD limits for the bands under consideration for SCS, or if we should instead permit the satellite and terrestrial partners to negotiate those limits themselves.[603] The record indicates broad support for the Commission's proposal to allow parties to resolve protections for co-channel operations through private contractual agreements.[604] In support of private negotiation, one commenter contends that integration of SCS into a given market entails a "nuanced engineering and integration effort," that it would be impractical for the Commission to regulate these arrangements at the necessary level of detail, and that terrestrial licensees are best equipped to control their own frequencies.[605] Other commenters note that the Commission can protect current users by making sure that the existing service rules and technical limits in the bands under consideration are maintained, especially with assurances from SCS applicants that they will comply with those limits.[606] We adopt the Commission's proposal in light of the record, and we decline to impose in-market downlink PFD limits at this time.

---

[598] *See infra* paras. 224-36.

[599] *See Notice* at 44, para. 111.

[600] *Id.* at 44, para. 112.

[601] *See, e.g.*, Skylo Comments at 9-10; AT&T Comments at 7-9; CTIA Comments at 15-16; T-Mobile Comments at 6-8; Sirius XM Comments at 2.

[602] *See Notice* at 44-45, para. 113.

[603] *Id.* at 45, para. 114.

[604] *See, e.g.*, Skylo Comments at 9; AST Comments at 18-19; AT&T Comments at 7-8; CTIA Comments at 15-16; T-Mobile Comments at 6-8; Sirius XM Comments at 9.

[605] AST Comments at 18-19.

[606] *See, e.g.*, Skylo Comments at 9; *see also* AT&T Comments at 7-8 (contending that SCS applicants should comply with existing rules and provide a predictive model showing that they will do so, and co-channel operations should take precedence over SCS); CTIA Comments at 15-16 (supporting demonstration that prospective SCS will not disrupt co-channel or adjacent channel operations, in harmony with present leasing rules); Sirius XM Comments at 1-2, 13-14.

197. *Market Area Boundary Limits*. In the *Notice*, the Commission observed that it would likely be unnecessary to amend the existing market area boundary limits in parts 22, 24, and 27 of the Commission's rules.[607] As proposed, the SCS framework would not result in co-channel neighbor operators that compete with each other.[608] For this reason, SCS partners should be expected to coordinate regarding the technical parameters necessary to avoid co-channel interference with one another's operations. As one commenter observes, SCS "should overlay on top of a partnering mobile operator's network seamlessly, without requiring any revision to the relevant operator's authority."[609] We generally agree.

198. At the boundaries of a GIA, however, including at international borders or boundaries extending into water, certain limits might be necessary and applicable. Although the introduction of SCS into spectrum licensed for terrestrial networks should have no impact to other radio systems operating in the band within the same or nearby geographical areas, we adopt a rule to limit the signal levels from SCS at and beyond the terrestrial operator's licensed area to be the same as those defined for terrestrial operation in each respective band. More specifically, we maintain the existing market area boundary limits established in parts 22, 24, and 27 of the Commission's rules.[610] These limits have also been used and shown to be feasible for operations similar to SCS.[611] The limits, which should be aggregate signal from all beams, are 40 dBμV/m for the 600 MHz, 700 MHz,[612] and 800 MHz bands, and 47 dBμV/m for the AWS-H Block and Broadband PCS.[613]

199. Further, as the Commission explained in the *Notice*, the terrestrial bands eligible for SCS are not allocated for international MSS use.[614] SCS can therefore only be deployed on the condition that stations using these frequencies will not cause harmful interference to, or claim protection from harmful interference caused by, an international station operating in accordance with the provisions of the Constitution, the Convention, and the ITU Radio Regulations.[615]

200. We recognize that managing time varying signal levels from SCS space stations, which may be moving and utilizing multibeam transmissions, will require careful and dynamic management of power level and beams. Satellite operators must also account for multiple overlapping and changing

---

[607] *Notice* at 45, para. 115.

[608] *Id.*

[609] AST Comments at 19; *see also* Verizon Comments at 9-11 (noting the sufficiency of existing limits, provided that SCS applicants demonstrate that they will comply with those rules).

[610] *See* 47 CFR §§ 22.983, 24.236, 27.55.

[611] *See, e.g.*, SpaceX Gen2 SCS Modification Application, ICFS File No. SAT-MOD-20230207-00021, Technical Narrative, at 10-11.

[612] This limit applies to the 700 MHz band, but not to the 758-769/788-799 MHz frequencies licensed to FirstNet. *See Implementing Public Safety Broadband Provisions of the Middle Class Tax Relief and Job Creation Act of 2012; Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band; Service Rules for the 698-746, 747-762, and 777-792 MHz Bands*, PS Docket No. 12-94, Second Report and Order, 28 FCC Rcd 15174, 15183-84, paras. 27-30 (2013).

[613] 47 CFR §§ 22.983, 24.236, 27.55. We again note that, as a secondary service, SCS operations may not cause harmful interference to—and are not entitled to interference protection from—any primary terrestrial service. *Id.* § 2.105(c)(2).

[614] *See Notice* at 50, para. 131.

[615] *See* ITU Radio Regulation No. 4.4 (stating that "[a]dministrations of the Member States shall not assign to a station any frequency in derogation of either the Table of Frequency Allocations in this Chapter or the other provisions of these Regulations, except on the express condition that such a station, when using such a frequency assignment, shall not cause harmful interference to, and shall not claim protection from harmful interference caused by, a station operating in accordance with the provisions of the Constitution, the Convention and these Regulations"); *see also infra* paras. 224-36.

satellites or beams covering the same areas, as well as leakage and interference from side beams. Therefore, the power limit for interference protection at any given point or area should be applied to aggregation of power received across all visible beams and satellites at all times as they move over any given point or area.

201. In addition, and as shown by SpaceX and AST, to meet the power limits at service boundaries, operators may need to cease beam transmissions in zones to allow for signal degradation from the edge of SCS coverage.[616] Given that the size of such zones depends on target services, satellite and beamforming configuration, and power management solutions which may improve over time, we do not set a limit on the zone size as long as the receive power limits are met. We further note that the limits and coordination requirements that we adopt in this proceeding will be subject to current and future agreements reached with border countries.[617]

202. *Out of Band Emission (OOBE) Limits*. The Commission proposed in the *Notice* to apply OOBE limits consistent with those required for terrestrial operations in the particular bands proposed for SCS to protect adjacent band licensees from the risk of harmful interference.[618] The Commission sought comment on this proposal, specifically whether the current OOBE limits are sufficient to protect the range of adjacent band services if these limits are applied to the satellite downlink signals providing supplemental coverage, and whether further limits are needed to protect federal receivers in the band.[619] We also asked whether changes would be needed when applying the terrestrial limits to satellite emissions or if additional OOBE limits would be needed.[620] In light of the various views expressed in the record on this issue, as well as our preference for straightforward requirements, we adopt a uniform OOBE limit for SCS across the SCS Bands expressed as a terrestrial PFD limit.

203. According to SpaceX and AST, SCS satellites may use high power transmissions and large antenna gains to provide the high carrier-to-noise and interference ratios of 20 dB or higher needed to provide service to terrestrial devices.[621] These strong, wide area satellite transmissions may also produce large amounts of undesired signal energy into adjacent bands, potentially affecting many terrestrial networks' operations. To ensure those adjacent band devices are protected from the risk of harmful interference, we find that OOBE limits are warranted, and given the nature of SCS, we find that these limits should be measured and enforced on the ground. In setting these limits, we recognize that different factors may affect the potential for harmful interference due to the inherent difference in propagation effects when the signal is generated from a multibeam satellite constellation compared to when it is transmitted from a terrestrial base station. We therefore adopt limits that constitute a reasonable middle ground between existing terrestrial OOBE limits and satellite-based limits.

204. The existing OOBE limits for base stations vary across different radio services, and these services are governed by different parts of the Commission's rules (e.g., parts 22, 24, 27). Commenters express mixed views on which OOBE limits should be applied to SCS. Although different OOBE limits apply across individual SCS Bands, we believe adopting a uniform out-of-band PFD limit for supplemental satellite coverage across the various bands is reasonable and provides a simple requirement for satellite operator compliance. This approach also will help simplify how satellite operators implement power management across multiple satellites, satellite beams, and orbital altitudes. Some commenters support the Commission's initial proposal to apply existing OOBE limits for terrestrial base stations to

[616] *See, e.g.*, AST Comments, Exhibit A at 3-5; SpaceX Gen2 SCS Modification Application, ICFS File No. SAT-MOD-20230207-00021, Technical Narrative, at 6, 9-11.

[617] *See infra* paras. 224-36.

[618] *See Notice* at 45-46, paras. 117-18.

[619] *Id.* at 45-46, para. 117.

[620] *Id*.

[621] *See* AST Comments, Exhibit A, at 3-4; SpaceX Nov. 14, 2023, *Ex Parte*, GN Docket No. 23-135, at A-7-A-8.

satellites providing SCS.[622] Others contend that those limits would not protect certain operations from harmful interference and instead argue for more stringent OOBE limits on SCS.[623] Some commenters, including SpaceX, assert that the Commission should adopt the more relaxed OOBE limits applicable to satellite systems under part 25.[624] AT&T contends that the part 25 OOBE limits would not protect adjacent-band terrestrial wireless operations, supports applying relevant existing OOBE limits for each band, and contends that those limits should account for aggregate interference given transmissions from multiple beams and satellites in nearby areas.[625] Fairspectrum recommends that a metric be used which takes into account the aggregate interference to the protected entity, and, that a satellite operator should be able to design its network so that the aggregate interference limit is not exceeded.[626] SpaceX, while advocating for dynamic interference modeling which accounts for aggregation,[627] suggests that unrealistically conservative worst-case aggregate interference limits would be unnecessarily strict, would overstate the risk of harmful interference to any terrestrial user, and could harm the public interest by restricting new service.[628] We acknowledge the common principles in these views[629] and, accordingly, we

[622] AST Comments at 20; AT&T Comments at 8-9; Sirius XM Comments at 9; Verizon Comments at 11; Verizon Reply at 4-5.

[623] CORF Comments at 3, 12; NRAO Comments at 2-3.

[624] *See* SpaceX Nov. 14, 2023, *Ex Parte*, GN Docket No. 23-135, at A-7 ("SpaceX will not cause harmful out-of-band interference to terrestrial or satellite operators under either limit [terrestrial or Part 25], the Commission should apply the existing Part 25 emissions mask to SpaceX's operations rather applying terrestrial standards that are not necessary to protect other users or comply with ITU [Radio Regulations No.] 4.4.").

[625] *See* Letter from Michael P. Goggin, AT&T Services, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-65 et al., at 2-4 (filed Feb. 7, 2024) (AT&T Feb. 7, 2024, *Ex Parte*).

[626] *See* Fairspectrum Comments at 2.

[627] *See* Letter from David Goldman, Vice President of Satellite Policy, Space Exploration Technologies Corp., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-65 et al., at Attach. A, 2-4 (filed Feb. 13, 2024) (SpaceX Feb. 13, 2024, *Ex Parte*).

[628] *See id*. at 1-2; *see also* Letter from David Goldman, Vice President of Satellite Policy, Space Exploration Technologies Corp., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-65 et al., Attach. B (filed Feb. 20, 2024) (supporting the use of mobile service technical rules for SCS).

[629] SpaceX argues that the Commission does not have adequate notice or a sufficient record under the Administrative Procedure Act to adopt an aggregate OOBE because SpaceX asserts the Commission did not propose or seek comment on an aggregate OOBE interference methodology in the *Notice*. SpaceX Feb. 28, 2024, *Ex Parte* at 2; *see also* T-Mobile Mar. 5, 2024, *Ex Parte* at 3. We disagree. In the *Notice*, the Commission included a discussion of OOBE issues and asked a number of questions related to the protection of services in adjacent bands, including whether its existing limits would suffice, whether additional limits are required to protect the operations in adjacent bands, how to account for impacts from different types of technologies and use cases, and what other related technical requirements might be necessary for the Commission to adopt to address interference issues. *Notice* at 46-47, paras. 117-18, 120. Moreover, we note that aggregate OOBE issues are discussed in the record generally and as it relates to specific issues such as the WCS band and radio astronomy, and that several parties addressed or supported an aggregate OOBE limit in their comments and advocacy. *See, e.g.,* AFTRCC Comments at 7; CORF Comments at 6; SiriusXM Comments at 9; Verizon Comments at 11; AST Reply at 11-12; Fairspectrum Comments at 2 ("A metric, which takes into account the aggregate interference to the protected entity should be used."); Letter from E. Barlow Keener, Senior Counsel, Fairspectrum, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-65, IB Docket No. 22-271, at 4, 6 (filed Nov. 21, 2023) (Fairspectrum Nov. 21, 2023, *Ex Parte*); AT&T Feb. 7, 2024, *Ex Parte* at 2-4. In addition, we note that more recently, Verizon, AT&T, AFTRCC, and DISH rejected the notice and comment arguments made by SpaceX after public release of the draft *Report and Order*. Letter from Pantelis Michalopoulos et al., Counsel to DISH Network Corporation, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-65 et al., at 2-3 (filed Mar. 7, 2024) (DISH Mar. 7, 2024, *Ex Parte*) (noting the substantial record developed in this lengthy proceeding that supports the adoption of limits and arguing that the proposed limits must remain part of the regime); AFTRCC Mar. 7, 2024, *Ex Parte* at 4-5 (agreeing with the adoption of a uniform aggregate OOBE limit for the SCS Bands at this time in our initial framework); AT&T Mar. 7, 2024, *Ex Parte* at 3 (continued….)

adopt an aggregate interference limit applicable to all SCS Bands. In setting this aggregate PFD limit, we have utilized reasonable assumptions regarding state-of-the-art technology in currently deployed terrestrial networks and accordingly have not used any worst-case assumptions.[630] Therefore, we believe this aggregate OOBE limit rule is not unnecessarily strict and will enable flexibility in the deployment of SCS systems while protecting adjacent band operations from harmful interference.

205. As an initial matter, we note that, because the part 25 OOBE rule for satellites is expressed relative to a 4 kilohertz bandwidth compared to 100 or 1,000 kilohertz used in the SCS Bands,[631] the requirements for satellite systems to attenuate out-of-band signals are generally 14-24 dB less stringent than the requirements placed on terrestrial services. We also note that the existing OOBE spectral density (per MHz) limits decrease as frequencies increase from below 1 GHz to above 1 GHz, while the RF spatial flux density (per square meter) of signal power strength limits increases as frequencies increase from below 1 GHz to above 1 GHz.[632] Thus, to provide a uniform limit across the various SCS Bands, we consider some balancing of these effects for PFD limits that are normalized to both 'per MHz' and 'per square meter'; i.e., dBW/m^2/MHz. We considered receiver protection levels as evidenced by existing OOBE limits along with a range of receiver antenna gain values, receiver noise levels, bandwidths, and appropriate I/N interference thresholds, used for coexistence analyses, to derive the PFD levels that we are adopting. In consideration of the record, and in line with our goal to create a simple requirement, we adopt an aggregate out-of-band PFD limit of -120 dBW/m^2/MHz for the 600MHz, 700MHz, 800MHz, and PCS 1990-1995 MHz bands. We also specify that this PFD limit will apply at 1.5 meters above ground level, a height frequently associated with terrestrial device usage that has been used by the Commission when developing interference protection criteria for other wireless services.[633] We believe that this limit represents an equitable—and technologically feasible—middle ground between the positions expressed in the record and will effectively protect adjacent band operations across the SCS Bands.

206. We note some recent debate on the issue of OOBE limits in the record in this proceeding. Specifically, SpaceX and T-Mobile argue that an aggregate out-of-band PFD limit of -120 dBW/m²/MHz is too strict, and that a more relaxed figure should be used.[634] In opposition, AT&T, DISH, and Verizon support an aggregate limit of -120 dBW/m²/MHz, noting that variability in receiver gain and noise values in the same or different bands should be considered for interference protection.[635] AT&T in particular disagrees with SpaceX's figure for the appropriate noise floor.[636] Verizon also disagrees with SpaceX's use of "equivalent noise performance" of a "3GPP-compliant" equipment figure as suggested by

(noting its support for the aggregate OOBE limits as reasonable to protect terrestrial licensees from in-band and adjacent-band interference, stating that SpaceX's request to "punt" consideration of an aggregate limit "would vitiate the fundamental purpose of an SCS framework" and should be rejected, and contending that the *Notice* provided adequate notice to consider OOBE in the aggregate); Verizon Mar. 8, 2024, *Ex Parte* at 2 (arguing that the Commission provided the requisite notice that it would consider OOBE in the aggregate). We conclude that the Commission provided adequate notice that the Commission would consider an aggregate OOBE limit for SCS and that we have a sufficient record to adopt an aggregate OOBE limit for SCS.

[630] *See* SpaceX Feb. 28, 2024, *Ex Parte* at 2 (arguing against the use of "worst case" scenarios in protection calculations).

[631] *See, e.g.*, 47 CFR §§ 22.917(b), 24.238(b), 27.53(g).

[632] *Compare* 47 CFR § 27.53(c)(5) (43+10*LogP attenuation in 100 kHz resolution bandwidth below 1 GHz), *with* 47 CFR § 27.53(a)(5) (43+10*LogP attenuation resolution bandwidth of 1 MHz above 1 GHz), *and* 47 CFR § 27.55(a)(2) (40 dBμV/m below 1 GHz, *and* 47 CFR § 27.55(a)(1) and (a)(3) 47 dBμV/m above 1 GHz).

[633] *See, e.g.*, *id.* §§ 27.55(d)-(e), 96.41(d)(1).

[634] SpaceX Feb. 28, 2024, *Ex Parte* at 2; T-Mobile Mar. 5, 2024, *Ex Parte* at 3.

[635] AT&T Mar. 7, 2024, *Ex Parte* at 3; DISH Mar. 7, 2024, *Ex Parte* at 2-3; Verizon Mar. 8, 2024, *Ex Parte* at 2.

[636] AT&T Mar. 7, 2024, *Ex Parte* at 3.

SpaceX's calculations, emphasizes that 3GPP receiver compliance metrics are a form of minimum performance standards, not typical values, and notes that flagship devices do exceed the 3GPP minimum standards.[637] In light of these recent record developments, including concerns raised by AT&T, DISH, and Verizon about the potential for harmful interference to adjacent operations if we were to adopt a more relaxed PFD limit, we are not persuaded by SpaceX and T-Mobile's arguments that such a change would be appropriate in this context. We conclude that an aggregate out-of-band PFD limit of -120 dBW/m²/MHz strikes the appropriate balance and will provide clarity for stakeholders interested in enabling SCS while protecting adjacent terrestrial operations.

207. Given that we are breaking new ground in permitting satellite operations to not only operate in bands allocated for terrestrial systems, but permitting them to be fully integrated into those systems, we believe that it is in the public interest to require that those satellites protect terrestrial systems commensurate with the protections they are afforded from terrestrial-only systems. While the out-of-band PFD limits we adopt today may require more stringent attenuation than the emission limits specified in section 25.202(f) for satellite operation, we believe that these stricter limits are both necessary and technologically feasible for satellite operators providing SCS.[638] We note that terrestrial systems have been operating alongside each other for many years, and the current OOBE limits for those services have provided the necessary protection. Moreover, no evidence has been provided showing that signals emanating from a satellite under very different geometry would permit OOBE limits to be significantly relaxed and still provide protection from adjacent band harmful interference. The record also indicates that SpaceX, AST, and other prospective SCS satellite operators can tailor their signals such that the out-of-band emissions from the satellite signal could meet OOBE limits similar to what our rules require terrestrial operations to meet for the various rule parts within which they plan to provide SCS.[639] We believe that these same capabilities can be readily used to meet the balanced OOBE limits set forth in this *Report and Order*.

208. *Terrestrial Device Power and OOBE Limits.* In the *Notice*, the Commission proposed to maintain the transmit power and OOBE limits currently applicable in each band to a range of terrestrial devices that would also be licensed as earth stations under the SCS framework.[640] After reviewing the record, we adopt the Commission's proposal to amend section 25.204 (power and out-of-band emission limits for earth stations) to reflect that SCS earth stations will be required to meet the power limits applicable to terrestrial transceivers for the bands in which they seek to operate.[641] One commenter observes that the existing power limits under parts 22, 24, and 27 of the Commission's rules suffice to establish links between satellites and mobile devices.[642] Another notes that the present service rules and

[637] Verizon Mar. 8, 2024, *Ex Parte* at 2.

[638] *See id.* §§ 25.202(f), 24.238; *see also* SpaceX Gen2 SCS Modification Application, ICFS File No. SAT-MOD-20230207-00021, Technical Narrative, at 11; Letter from David Goldman, Vice President of Satellite Policy, Space Exploration Technologies Corp., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-65 et al., Attach. A at 3-4 (filed Feb. 13, 2024) (stating that "SpaceX anticipates that the aggregate interference from its full direct-to-cellular constellation in PCS G Block will be more than 10 dB below the noise floor of the idealized UE," which SpaceX characterizes in its ex parte as -107.5 dBW/m2/MHz.). We note that this aggregate interference figure of -117.5 dBW/m2/MHz —which SpaceX states its system will be below—is 2.5 dB above the -120 dBW/m2/MHz figure we adopt today.

[639] *See, e.g.*, SpaceX Nov. 30, 2023, *Ex Parte*, GN Docket No. 23-135, at A-6; SpaceX Nov. 14, 2023, *Ex Parte*, GN Docket No. 23-135, at 2-4, A-7; Consolidated Opposition to Petitions and Response to Comments of Space Exploration Holdings, Inc., GN Docket No. 23-135, ICFS File No. SAT-MOD-20230207-00021, at 19-21 (rec. May 30, 2023) (SpaceX May 30th Consolidated Opposition); SpaceX Gen2 SCS Modification Application, ICFS File No. SAT-MOD-20230207-00021, Technical Narrative, at 11-12; AST Comments at 20.

[640] *Notice* at 49, para. 127.

[641] *See* Appx. B (amending 47 CFR § 25.204(g)); *see also Notice* at 49, para. 127.

[642] AST Comments at 21-22.

technical limits have been calibrated to the specific bands to which they apply, and preserving them will protect existing spectrum users.[643] The user devices connected to SCS are expected to operate with the same transmitters and receivers used to connect within their terrestrial network. We clarify that parts 22, 24, and 27 of the Commission's rules as cited are relevant to SCS operations, which extend traditional terrestrial coverage. Therefore, we find that the existing rules, as cited in the proposed text for section 25.204(g), provide appropriate transmit power and OOBE limits for terrestrial devices that will access SCS.[644]

209. *Elevation Angle for Satellite Downlinks.* The Commission observed in the *Notice* that the NGSO satellites used to provide SCS will need to move their signal beams as they move across the sky, and these beams will hit the ground at varying elevation angles.[645] As we have explained, collaborating satellite and terrestrial partners must coordinate to minimize the risk of harmful interference. The Commission nevertheless sought comment on whether we should establish a minimum satellite elevation angle in order to minimize focused signal energy into terrestrial base station antennas.[646] Comments on this issue were limited, but AST notes that, while it does not necessarily object to a minimum angle requirement, satellite operators will self-regulate to meet the field strength requirements at license area boundaries, and more study might be needed to ascertain whether a minimum angle requirement is necessary.[647] We find that satellite elevation angles will be system-dependent, and that we need not, at this time, establish a minimum requirement in order to minimize the risk of harmful interference but will review special circumstances. We further note that, since we will not require minimum satellite elevation angle information, there may be cases where we will not receive minimum satellite elevation angle information.

210. *Protection of Radio Astronomy and Space Sciences.* In the *Notice*, the Commission sought comment on whether existing rules addressing the protection of radio astronomy and other space science services would be adequate in the context of the provision of SCS or whether the Commission should consider other approaches.[648] Some commenters express concerns that the application of existing non-interference protections will be insufficient to safeguard radio astronomy and other such operations, and argue that the Commission should study the issue further.[649] AST submits that concerned commenters misapprehend the size of the satellite beams' footprints, and states that its own satellites will deploy narrow beams capable of avoiding radio astronomy sites.[650] In addition, on February 16, 2024, NTIA filed a white paper in the record on this proceeding describing anticipated impacts from SCS on current and planned radio astronomy and other space science operations.[651] CORF also expresses concerns about potential interference into radio astronomy sites from SCS downlinks, but notes that bilateral efforts between an RAS observatory and a satellite operator can develop practical limits to avoid

[643] Skylo Comments at 9; *see also* SpaceX Comments at 18.

[644] Intelsat notes that, with some exceptions, the power limit rules cited in the proposed new rule are intended for terrestrial base stations, rather than terrestrial devices, and recommends revising the proposed new rule to align with limits applicable to end user devices operating under the respective terrestrial rule parts. *See* Intelsat Comments at 2 n.5. However, as set forth in this paragraph, we do not believe it is necessary to modify the rule language.

[645] *Notice* at 46-47, para. 119.

[646] *Id.*

[647] AST Comments at 20-21.

[648] *See Notice* at 47, para. 123.

[649] *See* Caltech Comments at 2; CORF Comments at 9-11; NRAO Comments at 2; Letter from Harvey S. Liszt, Spectrum Manger, National Radio Astronomy Observatory, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-65 et al., at 1-2 (filed Feb. 24, 2024) (NRAO Feb. 24, 2024, *Ex Parte*).

[650] AST Reply at 12-13.

[651] *See generally NSF White Paper*.

harmful interference to astronomical observations.[652]

211. Under the SCS licensing framework that we adopt today, satellite operators and terrestrial licensees providing SCS will be required to comply with existing satellite and terrestrial rules to avoid harmful interference into radio astronomy and related services. In addition, as discussed herein, space stations proposing to use SCS frequencies must obtain an FCC license under our part 25 rules prior to full-scale operation. We emphasize that the Commission's part 25 licensing process will provide an opportunity for addressing concerns from federal and non-federal stakeholders related to the protection of radio astronomy and other space science services in the context of the specific proposed SCS systems. Applications will be placed on public notice to provide interested parties the opportunity to comment, including on concerns regarding the potential effects of these proposed systems on radio astronomy and other space science services. We note that the licensing process can also include consideration of classified communications on national security issues, as needed. We expect that addressing federal and other stakeholders' concerns with respect to radio astronomy in the licensing context would serve the public interest by allowing us to strike a reasonable balance among competing public interest benefits and narrowly tailor any remedies that may be appropriate on a case-by-case basis, taking into account the specific operational parameters before us.

212. Such an approach is also consistent with the Commission's previous approaches to protecting radio astronomy and other space science services where appropriate in the context of space and earth station licensing and operations.[653] Assessment of the potential for harmful interference and its mitigation is a fact-specific analysis that requires consideration of the particular characteristics of each system. We, therefore, decline to adopt any new rules specific to SCS with respect to protection of radio astronomy and other space science services at this time, and will consider such concerns in the context of the Commission's review of SCS license applications. We also strongly encourage applicants to conduct outreach and work with appropriate federal agency contacts in advance of submission of license applications to the Commission, including conducting Monte Carlo analyses of potential impacts to radio astronomy systems using their specific configurations, as appropriate.[654] We note that such advance engagement will help facilitate later review and consideration of a part 25 SCS license application by

[652] CORF specifically notes that "spatial avoidance" is among the most effective means of protecting the scientific effectiveness and return on investment of RAS facilities. CORF Comments at 13. CORF states that development of such measures might start with initial trial avoidance parameters, which would be refined iteratively by the SCS provider and RAS observatory, a process which would likely involve sharing of satellite ephemeris and activity data to facilitate attribution of harmful interference, followed by negotiation. *Id.* at 8, 12-14.

[653] We note that current part 25 rules include requirements to coordinate with radio astronomy in various bands. *See, e.g.*, 47 CFR § 25.203(f). The Commission also conditions space station operations in certain frequencies to ensure that all practicable steps shall be taken to protect the radio astronomy service from harmful interference where appropriate. *See, e.g., SpaceX Gen2 Order*, 37 FCC Rcd at 14913-14, para 51. On a case-by-case basis, the Commission also imposes various license conditions to protect other science and astronomy missions. For example, in the Gen2 Starlink Order, the Commission conditioned the space station authorization in question to require SpaceX to continue to coordinate and collaborate with NASA to promote a mutually beneficial space environment that would minimize impacts to NASA's science missions involving astronomy and to require SpaceX to coordinate with NSF to achieve a mutually acceptable coordination agreement to mitigate the impact of its satellites on optical ground-based astronomy. *Id.* at 14931, para. 98. The Commission also required SpaceX to submit an annual report to the Commission, by January 1st each year, covering the preceding year and containing the following information: (1) whether it has reached a coordination agreement with NSF addressing optical astronomy; and (2) any steps SpaceX has taken to reduce the impact of its satellites on optical astronomy, including but not limited to darkening, deflecting light away from the Earth, attitude maneuvering, and provision of orbital information to astronomers for scheduling observations around satellites' locations. *Id.*

[654] *See NSF White Paper* at 40 (noting that Monte Carlo approaches will allow satellite network operators to evaluate potential impacts to radio astronomy sites in a comprehensive manner, and noting that where possible, these analyses should incorporate actual proposed system design characteristics); NRAO Feb. 24, 2024, *Ex Parte* at 2.

federal agencies. Applicants should contact NSF for up to date information about radio astronomy facilities, including potentially relevant radio astronomy locations.[655]

213. *Equipment Authorization for SCS.* In the *Notice*, the Commission noted that our terrestrial (parts 22, 24, and 27) and satellite (part 25) service rules require all transmitting devices to meet the relevant technical rules and obtain equipment authorization.[656] Additionally, we note that an equipment authorization grant through the certification process under our part 2 rules[657] reflects the particular rule parts under which any approved device can operate, and that operation in any other manner or pursuant to radio services or allocations not specifically noted on the grant of certification is not permitted. Thus, the Commission proposed that for new devices certified after the effective date of any rules adopted in this proceeding, we would require that the equipment certification applicant specifically seek certification under part 25 as well as the relevant terrestrial rule part(s) for all intended uses of the device.[658] The Commission also proposed not to require that devices already certified for terrestrial operation be re-certified to add part 25 SCS authorizations to existing equipment certifications, so long as the provision of service to such existing devices would not require technical modifications.[659] The Commission also asked if we should instead consider other approaches such as requiring grantees to seek permissive changes to their equipment authorization for existing devices to add part 25 usage to existing equipment.[660]

214. In its comments, Apple opines that user uptake could occur more quickly if existing terrestrial devices that are able to accommodate SCS functionality are permitted to be authorized using the Commission's part 2 permissive change process.[661] SpaceX states that so long as the Commission retains existing terrestrial device rules, there is no need to require that new devices obtain a part 25 certification as it would only complicate the process, be inefficient if bands are authorized serially, and would not provide any benefit for consumers or spectrum users.[662] TechFreedom similarly states that, so long as the technical rules do not require changes to existing consumer equipment, the existing part 2 equipment authorization process should be sufficient to ensure that terrestrial devices communicating with satellites do not disrupt or otherwise interfere with terrestrial networks.[663] Likewise, T-Mobile, in the context of whether a blanket earth station license is needed, states that only required equipment approvals should be necessary to permit users to operate terrestrial devices when connected to a satellite.[664]

215. Upon consideration of the tradeoffs regarding whether we should require existing as well as new terrestrial devices to obtain equipment certification that includes part 25 in addition to terrestrial rule parts, we believe there is benefit to requiring equipment authorizations to reflect that certain terrestrial devices are recognized by the Commission to communicate with a satellite in addition to

---

[655] NSF has provided the following contact email: esm@nsf.gov.

[656] *Notice* at 49, para. 128.

[657] Radio frequency devices are required to be properly authorized under part 2 of the Commission's rules prior to being marketed or imported into the United States. 47 CFR pt. 2. The Commission has two different approval procedures for equipment authorization—certification and Supplier's Declaration of Conformity. *Id.* § 2.901 *et seq*. The required procedure depends on the type of equipment being authorized as specified in the applicable rule part.

[658] *Notice* at 49, para. 129.

[659] *Id.*

[660] *Id.* at 49-50, para. 129.

[661] Apple Comments at 8; *see also* CTIA Reply at 12 (stating its agreement with this approach).

[662] SpaceX Comments at 20-21.

[663] TechFreedom Comments at 14.

[664] T-Mobile Comments at 9-10.

terrestrial base stations. Given that the Commission is not modifying any terrestrial device-related technical rules for SCS, commenters addressing this issue generally agree that recognizing that terrestrial devices include part 25 certifications can suffice in lieu of a blanket earth station license to ensure that such terrestrial devices do not increase the potential for causing harmful interference to other spectrum users.[665] This decision is consistent with existing Commission rules which require portable earth-station transceivers subject to regulation under part 25 to be authorized under equipment certification procedures.[666]

216. We disagree with SpaceX regarding its position that requiring each terrestrial device's equipment authorization to reflect its approval to operate under part 25 would not provide any benefit to consumers or spectrum users.[667] On the contrary, requiring a part 25 designation on the equipment certification provides several benefits. First, there is benefit to consumers and the Commission from having a searchable database of terrestrial devices specifically authorized to provide SCS. The most apparent benefit to consumers is that they would have access to a publicly available, authoritative source regarding whether their terrestrial device has SCS capability or could be provisioned for such operations. This is important when considering that SCS could be offered as a premium capability and only available for certain terrestrial devices. Moreover, having terrestrial devices designated for SCS listed in our Equipment Authorization System (EAS) provides tracking and accountability for devices capable of SCS, which could prove beneficial in the event that there are harmful interference incidents and we need to consider enforcement action.

217. For the foregoing reasons, we require terrestrial device equipment authorization grantees to modify existing, or obtain new, equipment authorizations for previously certified terrestrial devices to reflect those devices' approval to operate under a part 25 MSS allocation and applicable SCS rules. Additionally, we note that new applicants should include a request for part 25 on future certification applications for equipment that is capable of operation in an SCS mode.

218. We are cognizant that this requirement does present some administrative burden for equipment authorization grantees and applicants, especially as it relates to already certified equipment. The Commission's existing procedures through the permissive change process which enable electrical or mechanical changes to certified equipment when those changes do not affect the characteristics required to be reported to the Commission[668] do not apply here where the only change being made to the certification is adding authorization for part 25. Under our existing rules, "a change other than a permissive change" requires a grantee to file a new application for certification accompanied by the information specified in part 2 of our rules.[669] We find there is good reason to provide grantees a way to effectuate the necessary changes to their equipment authorization grants under our rules that also minimizes the administrative burdens associated with a new equipment certification application. We therefore waive relevant rule provisions to provide a simplified process for existing grantees to modify their certifications to reflect part 25 authorization for SCS.

219. In the specific instance of adding the part 25 designation to the equipment certification, strict adherence to the requirement to submit a new certification application would yield little more than the resubmission and analysis of information that was already provided to the Commission and found to be sufficient for certification. A repeat of this process would therefore be overly burdensome both for the grantee and the Commission. We note that terrestrial device equipment authorization grantees that update existing authorizations to include part 25 operation, like other administrative changes to existing authorizations, must comply with the Commission's rules implementing the prohibition on authorization

[665] *See e.g.*, TechFreedom Comments at 14; T-Mobile Comments at 8-9.

[666] 47 CFR § 25.125(e).

[667] *See* SpaceX Comments at 20-21.

[668] 47 CFR § 2.1043.

[669] *Id.* § 2.1043(c).

of communications equipment that has been determined to pose an unacceptable risk to the national security of the United States and the security and safety of United States persons, as identified on the Commission's Covered List ("covered" equipment)—published pursuant to the Secure and Trusted Communications Networks Act of 2019.[670] Our existing administrative process associated with either amending an existing equipment authorization or obtaining a new authorization ensures that we do not provide expanded operating privileges to "covered" equipment.[671]

220. We find that the intent of our rules regarding changes in certified equipment, so long as the only change is adding part 25 SCS authority to an existing certification, will be met by grantees submitting a statement describing that addition, along with required certifications and designations regarding covered equipment and U.S. agent for service of process. To effectuate this modified procedure, to amend the certification to include a part 25 SCS authorization under the terms of this *Report and Order*, the Commission, by its own motion pursuant to section 1.3 of its rules, waives certain of its rules.[672]

221. Specifically, for any authorized device for which the grantee wishes to add part 25 for the sole purpose of indicating the device is authorized to provide SCS, we waive the section 2.1043(c) requirement to file a new application for certification accompanied by all of the required information as specified in part 2 of our rules.[673] We also waive the provision that prohibits marketing the modified device until the grant of certification has been issued, insofar as that marketing remains consistent with the current certification and does not indicate the part 25 SCS capability.[674] All other requirements of section 2.1043(c) remain in effect.[675] We also waive the requirements of section 2.911(c) and (e);[676] but

[670] *See generally Protecting Against National Security Threats to the Communications Supply Chain through the Equipment Authorization Program*; *Protecting Against National Security Threats to the Communications Supply Chain through the Equipment Authorization Program*, ET Docket No. 21-232, EA Docket 21-233, Report and Order and Further Notice of Proposed Rulemaking, 37 FCC Rcd 13493, 13509-98, paras. 32-263 (2022) (*EA Security Report and Order* and *EA Security FNPRM*, respectively). Pursuant to section 2(a) and (d) of the Secure and Trusted Communications Networks Act of 2019 and sections 1.50002 and 1.50003 of the Commission's rules, the Commission's PSHSB publishes a list ("Covered List") of communications equipment and services that have been determined by one of the sources specified in that statute to pose an unacceptable risk to the national security of the United States or the security and safety of United States persons ("covered" equipment). Secure and Trusted Communications Networks Act of 2019, Pub. L. No. 116-124, 133 Stat. 158 (2020) (codified as amended at 47 U.S.C. §§ 1601-1609) (Secure Networks Act); 47 CFR §§ 1.50002, 1.50003. In March 2021, PSHSB first published this Covered List, which is periodically updated and includes identification of "covered" equipment that the Commission now prohibits from obtaining an equipment authorization, as discussed in the *EA Security Report and Order*. *EA Security Report and Order*, 37 FCC Rcd at 13509, para. 32.

[671] Under the rules adopted in the *EA Security Report and Order*, the Commission did not adopt any rules providing for review or revocation of any equipment authorization granted prior to adoption of the order. *See EA Security Report and Order*, 37 FCC Rcd at 13541, para. 107. The Commission did, however, adopt rules that prohibit authorization of "covered" equipment including through class II and III permissive change modifications of existing equipment certifications. *See id.* at 13526, para. 66; 47 CFR § 2.932(e).

[672] *See* 47 CFR § 1.3.

[673] *Id.* § 2.1043(c).

[674] *Id.*

[675] *Id.*

[676] *Id.* § 2.911(c), (e). Section 2.911 requires all applications for equipment certification to be submitted in writing to a Telecommunication Certification Body (TCB) and details the required content for those applications. *Id.* § 2.911(a).

the requirements of section 2.911(d)[677] and (f)[678] will remain in effect. Under this process, these filings will be accepted consistent with the existing procedures for permissive changes. Taking such administrative action is warranted because it would be overly burdensome in this instance to require all of the technical information needed for a new equipment authorization application and such requirement would provide no tangible benefits given that no technical application review is necessary to effectuate the relevant change.

222. The waiver of certain requirements of section 2.1043(c), and of sections 2.911(c) and 2.911(e) of the Commission's rules, as described in this *Report and Order*, is granted only for the purpose of adding a part 25 SCS designation to equipment certifications granted on or before the 60th day after a summary of this *Report and Order* is published in the Federal Register. Thus, a streamlined process will be available for adding this designation to certifications that have already been granted and to those that will be granted within 30 days after the effective date of this *Report and Order* (i.e., applications that are likely already in process). We believe that this period of time is sufficient to permit grantees whose equipment is already undergoing testing and review for certification to easily amend their grants should they not be able to update their application with the test lab or TCB prior to grant. This waiver is effective immediately and extends for six months following the date that the last rules adopted herein become effective We believe this time period is reasonable and sufficient for grantees to understand their obligations and to prepare and submit the minimal information required.[679] We authorize OET to extend the six-month period for which the waiver is in effect for up to an additional six months for good cause. Beyond these time limitations, grantees may still request a modification to their equipment authorization but they must do so by their own motion pursuant to the Commission's waiver request rules. New applicants for equipment certification should request part 25 authorization as part of their initial application.

223. In providing this limited waiver to our rules, we aim to minimize the burden on equipment certification holders, while ensuring tracking and accountability for devices capable of SCS, and compliance with our prohibition on the authorization of covered equipment. Similarly, for new equipment authorizations, terrestrial devices need only show compliance with the terrestrial technical rules for the rule parts under which they will operate; no additional tests are needed for part 25 SCS capability. Thus, seeking to have the part 25 SCS designation on the equipment certification only requires the applicant to request such a designation pursuant to the SCS rules.[680]

I. International Coordination

224. As noted previously, under the SCS framework we adopt today, SCS will be authorized pursuant to a secondary MSS allocation in the U.S. Table.[681] Although the operations will be consistent with the U.S. Table, these operations will not conform with the International Table, and resolution of cross-border interference will be governed by ITU Radio Regulation No. 4.4. This provision states that, "Administrations of the Member States shall not assign to a station any frequency in derogation of either the Table of Frequency Allocations in this Chapter or the other provisions of these Regulations, except on the express condition that such a station, when using such a frequency assignment, shall not cause harmful interference to, and shall not claim protection from harmful interference caused by, a station

[677] *Id.* § 2.911(d). Section 2.911(d) requires information that must be submitted with an equipment authorization application including a statement as to whether the applicant is identified on the Covered List. *Id.*

[678] *Id.* § 2.911(f) (specifying signature requirements).

[679] *See* T-Mobile Mar. 5, 2024, *Ex Parte* at 4.

[680] Devices capable of SCS operation shall be authorized pursuant to the equipment certification procedure in part 2, subpart J of this chapter for importation, sale or lease in the United States, or offer, shipment, or distribution for sale or lease in the United States for portable earth-station transceivers subject to regulation under part 25. 47 CFR pt. 2, subpt. J; *id.* at pt. 25.

[681] *See supra* paras. 46-52.

operating in accordance with the provisions of the Constitution, the Convention and these Regulations."[682]

225. 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.

226. As previously noted, in making any frequency assignment for operations of a space station, we require that the appropriate materials be submitted to the ITU.[683] Under the framework we adopt for SCS, as part of an application for a part 25 authorization, SCS applicants seeking to use spectrum on an non-conforming basis with respect to the International Table will be required to provide detailed interference analyses and associated link budgets showing that requested operations will not cause harmful interference to stations operating in accordance with the ITU Radio Regulations. These analyses will also be used as supporting documentation along with the ITU registration materials to support the Commission's representation—as the notifying administration to the ITU—that any such operations will not cause harmful interference.[684] In addition, as discussed in more detail below, to the extent that any part 25 applicants plan to communicate with areas outside the United States, pursuant to a market access authorization issued by another jurisdiction, they must describe the measures that they will take to immediately eliminate any harmful interference issues. Also as discussed further below, any operations that would occur between the satellites and locations outside the United States are subject to further authorization by the relevant administration.

227. With respect to what we would expect in terms of interference analyses, in the *Notice*, the Commission sought comment on the appropriate procedures to be used.[685] Lockheed Martin submits that, with regard to the appropriate procedures for interference analyses, co-channel interference "should be studied and specified in a similar manner to unlicensed services."[686] Fairspectrum notes ITU regulations ITU-R M.2292 and ITU-R BS.2340 are relevant to our questions regarding shared bands between

---

[682] ITU Radio Regulation No. 4.4.

[683] 47 CFR § 25.111(b); *see also* ITU Rules of Procedure at Part A1, AR4, Page 1 (stating that, in No. 1.3, "administrations intending to authorize the use of spectrum under No. 4.4 still have the obligation, under Sections I and II of Article 9, Nos. 11.2 and 11.3, to notify to the Bureau 'any frequency assignment if its use is capable of causing harmful interference to any service of another administration'").

[684] ITU Rules of Procedure at Part A1, AR4, Page 2 (stating that, in No. 1.6, "administrations, prior to bringing into use any frequency assignment to a transmitting station operating under No. 4.4, shall determine: a) That the intended use of the frequency assignment to the station under No. 4.4 will not cause harmful interference into the stations of other administrations operating in conformity with the Radio Regulations; b) What measures it would need to take in order to comply with the requirement to immediately eliminate harmful interference pursuant to No. 8.5. When notifying the use of frequency assignments to be operated under No. 4.4, the notifying Administration shall provide a confirmation that it has determined that these frequency assignments meet the conditions referred to above in item a) and that it has identified measures to avoid harmful interference and to immediately eliminate such in case of a complaint").

[685] *Notice* at 51, para. 133.

[686] Lockheed Martin Comments at 10.

terrestrial mobile and SCS operations.[687] We note that SCS will be subject to more stringent licensing restrictions than unlicensed services and that we are treating the SCS operations as if they were part of the terrestrial network. Although Omnispace argues that operators applying for SCS authorization should be subject to a much more rigorous interference analysis that shows "no interference" into existing services,[688] in this context, we seek to prevent *harmful* interference—rather than *no* interference—and require that satellite operators cease operations causing harmful interference if it should nonetheless occur. Given that the ITU studies in advance of the WRC-27 are just beginning, we will follow those closely and will work with other ITU administrations to develop methodologies to study coexistence of SCS with other services.

228. To ensure that we are meeting all our obligations as a notifying administration, consistent with the ITU Radio Regulations, our framework for SCS applicants will involve consideration of both potential harmful interference to U.S. neighboring countries from operations of the satellites with authorized earth stations in the United States, as well as consideration of how potential provision of SCS by U.S.-licensed satellites, permitted to operate in another country by the relevant administration outside the United States, will avoid causing harmful interference to other stations in other countries in conformity with the ITU Radio Regulations. We note that provision of any SCS outside the United States must be duly authorized by the relevant administrations and will be subject to laws, regulations, and requirements applicable to such operations in the territories of the authorizing administrations.

229. We continue to emphasize the importance of international harmonization, particularly with Canada and Mexico.[689] In the *Notice*, the Commission proposed to apply existing signal level limits and coordination requirements in the SCS Bands, subject to current and future agreements with border countries.[690] Some commenters argue that we should maintain our existing limits at international borders, consistent with our international and bilateral agreements.[691] Commenters point to our limitation of SCS to the specific geographies where the terrestrial operator holds exclusive-use co-channel spectrum rights[692] and SCS operators maintain the ability to meet field strength limits at relevant borders as protection against cross-border interference.[693] Other commenters suggest that the Commission adopt additional rules or procedures to address cross-border interference and facilitate coordination among operators.[694] As the Commission noted in the *Notice*, all band restrictions we adopt herein are subject to bilateral agreements that ensure terrestrial licensees meet a particular signal level limit at the relevant international border (e.g., field strength limit or PFD), unless the relevant administrations agree to alternative limits along with, in some cases, a coordination requirement for stations placed within a

[687] Fairspectrum Comments at 3.

[688] Letter from Mindel De La Torre, Chief Regulatory and International Strategy Officer, Omnispace, LLC, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-65 et al., Attach. at 20 (filed June 1, 2023).

[689] TerreStar Comments at 3; DISH/EchoStar Comments at 7.

[690] *See Notice* at 50, para. 131; *see, e.g.*, 47 CFR §§ 22.169, 22.983(c), 24.236, 27.55, 27.57.

[691] Verizon Comments at 11; T-Mobile Comments at 16; *see also* DISH/EchoStar Comments at 7 (arguing that "use of terrestrial spectrum for SCS should be subject to the bi-lateral coordination process with both Mexico and Canada").

[692] Skylo Comments at 18; T-Mobile Comments at 16-17.

[693] AST Reply at 17.

[694] Letter from E. Barlow Keener, Counsel, Fairspectrum Oy, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-65 et al., at 2 (filed June 6, 2023) (Fairspectrum *Ex Parte*); Kepler Comments at 6-7. Sirius XM purports that we modify existing cross-border agreements so that SCS operations are feasible. Sirius XM Comments at 14-15. Since the WCS band is not included in the initial SCS framework, we will not address Sirius XM's comments related to the WCS band.

certain distance of the border.[695]

230. The Commission also sought comment in the *Notice* on the viability of coordination between satellite operators providing service in the United States and terrestrial operators in bordering countries.[696] T-Mobile argues that we should permit satellite and terrestrial partners to negotiate technical details that do not conform with established parameters.[697] T-Mobile further argues that we either "permit parties to submit a technical showing that satisfies those adjacent-channel and adjacent-area criteria" or "allow satellite operators to demonstrate to the Commission that they have obtained concurrence from all impacted licensees."[698]

231. SCS shall not cause harmful interference to other countries' operations and our licensees must address and eliminate any harmful interference cases immediately. Our licensees must respect all existing rules and limits in the SCS Bands to protect incumbent users. The cross-border coordination and any negotiated technical parameters must be mutually acceptable to all involved, including our counterpart agencies who oversee or regulate spectrum use in other countries. As is the case with any new spectrum-based service, we will continue to refine protection limits and address any cross-border issues that may arise through bilateral and multilateral efforts and negotiations. In addition, we will continue to work closely with our counterparts in Canada and Mexico to develop mutually agreeable interference protection measures along our borders to ensure that provision of SCS serves the public interest for all.[699]

232. Although our SCS framework will authorize services in the United States only, a U.S. satellite license includes all operations of that U.S.-licensed space station—including authorization of transmission or reception at the space station facility to/from stations located outside the United States. However, such communications are subject to the laws, regulations, and requirements of any country in connection with communications with that country, including but not limited to, authorization to communicate with earth stations in that jurisdiction. FCC licensing is an important aspect of ensuring that the United States satisfies the treaty obligation for authorization and continuing supervision of the space activities of non-governmental entities.[700]

233. The detailed licensing and regulatory framework we adopt in this order is intended to address SCS operations with earth stations in the United States and its territories. However, we must consider that satellite systems are global in nature, and therefore we expect SCS operators to design systems with the capability of operating outside of the United States.[701] Therefore, in authorizing a space station for operations as a U.S.-licensed space station, we will take into consideration all operations of that satellite facility, which will include all frequencies utilized for transmission and reception on the satellite, including where such frequencies will ultimately be used to communicate with earth stations outside of the United States, subject to additional approvals of the relevant countries where such earth stations will be located.

234. For SCS, this will include steps that the Commission will take to ensure that, in making a

---

[695] *See Notice* at 50-51, para. 132 & n.281, n.282.

[696] *See id.* at 51-52, para. 134.

[697] T-Mobile Comments at 17.

[698] *Id.*

[699] *See* ITU Rules of Procedure at Part A1, AR4, Page 2; *see also* 47 CFR §§ 22.169, 22.983(c), 24.236, 27.55, 27.57.

[700] *See* Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, art. 6, Oct. 10, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205; *see also* 47 U.S.C. § 301.

[701] *See, e.g.*, SpaceX Gen2 SCS Modification Application, ICFS File No. SAT-MOD-20230207-00021, Technical Narrative at 1-2.

frequency assignment to a satellite operator, all of our obligations pursuant to No. 4.4 of the ITU Radio Regulations are satisfied, as follows:

(1) In order to be authorized to deploy a satellite or system with the capability to operate outside the United States, an applicant must first obtain a U.S. space station license that covers all of the frequencies on the satellite, including those that they propose to operate on with U.S. earth stations, as well as those to be used internationally. This is an existing requirement that applies to all satellite license applications under part 25, not just those proposing to use SCS frequencies.

(2) Then, prior to conducting any communications with earth stations outside the United States, the space station licensee must ensure that all of its operations are duly authorized by the country in which such communications will occur, and that it will satisfy all terms and conditions of any foreign license or authorization, including but not limited to any transmit power, out of band emission, geographic, or other limits. This requirement also is an existing requirement and applies to all U.S.-licensed satellites, not just those planning to use approved frequencies for SCS.

235. Additionally, recognizing that SCS that may occur in bands not allocated for such services in the International Table must be consistent with ITU Radio Regulation No. 4.4, we find that it would serve the public interest to include express conditions in the SCS licenses to ensure that our obligations are met as the ITU notifying administration for U.S.-licensed space station operations.[702] In these cases, we will require additional assurances from SCS licensees that while operating outside of the United States, pursuant to an authorization from another country, the satellite operations will not cause harmful interference into a nearby country. Therefore, we will include requirements as part of license conditions on a case-by case basis to ensure that:

(3) Prior to conducting any communications with earth stations outside the United States, a satellite operator licensed to provide SCS, or applicant for a license to provide SCS, must certify to SB and the Office of International Affairs (OIA) that it has obtained all necessary authorizations from the relevant country prior to initiation of communications with earth stations in that country. The certification must include steps that were taken to address harmful interference concerns and that provision of SCS will not result in harmful interference to operations that are in conformity with the ITU Radio Regulations[703] in neighboring or nearby countries.[704] The certification must also be accompanied by a demonstration specifying the measures that the U.S. licensee or applicant will take to eliminate any harmful interference immediately, in the event that it is notified of harmful interference resulting from such SCS operations. SB and OIA will review such certification and demonstration, and will jointly notify the licensee or applicant if such documentation is

[702] *See* Chair, Committee 5, WRC-23, Fifth Report from Committee 5 to Plenary, Agenda Item 9.3, at 8 (2023).

[703] *See* ITU Rules of Procedure at Part A1, AR4, Page 2 (stating that "an administration intending to use a frequency assignment to a transmitting station under No. 4.4 has to notify to the" ITU Radio Bureau "this frequency assignment, pursuant to Article 11, if possible prior to bringing it into use"); *see also* ITU Rules of Procedure at Part A1, AR4, Page 2 (stating that "administrations, prior to bringing into use any frequency assignment to a transmitting station operating under No. 4.4, shall determine: a) That the intended use of the frequency assignment to the station under No. 4.4 will not cause harmful interference into the stations of other administrations operating in conformity with the Radio Regulations; b) What measures it would need to take in order to comply with the requirement to immediately eliminate harmful interference pursuant to No. 8.5").

[704] In the *Notice*, the Commission sought comment on the appropriate protections in instances where countries do not have a common land border, but are adjacent over nominal water distances. *See Notice* at 52, para. 135; Fairspectrum Comments at 3. Depending on the specific case, we would expect this rulemaking to address situations where there may not be a common land border, but stations in another country could still be potentially affected, such as over a nominal water distance.

acceptable or if additional documentation is required.

236. In connection with the above-requirements for part 25 SCS applicants and licensees, we also note that there may also be additional conditions or limitations placed on the operations on a case-by-case basis, including conditions necessary to ensure ongoing supervision of the space station communications, as circumstances require. The Commission staff will also continue to participate in all international SCS sharing studies,[705] as we work closely with other international partners on matters related to SCS to ensure the most efficient and effective use of the spectrum without causing harmful interference to incumbent services.[706] We intend that any changes to our rules as a result of these international efforts will be applicable to all existing and future part 25 SCS licensees. In the meantime, we emphasize that the U.S.-licensed space stations intending to provide SCS outside the United States must inform the Commission that they have obtained all necessary authorizations from the relevant countries and demonstrate that such operations will not cause harmful interference to operations in conformity with the ITU Radio Regulations before the initiation of service in those countries. We note that we will keep the ITU informed on any SCS applications and deployments to help with information sharing and transparency.

J. Space-Based Coverage to Consumer Devices in Spectrum Already Allocated for Mobile-Satellite Service Communications

237. In the *Notice*, we limited our proposed SCS framework to operations that will be performed in bands allocated to terrestrial operations.[707] There are MSS systems in which satellites are communicating with terrestrial devices and operating within bands already allocated to MSS.[708] In contrast, SCS will be integrated with the terrestrial carrier's standard network using terrestrial spectrum.[709] We clarify that the SCS framework adopted herein is limited to operations performed in the bands designated in this *Report and Order* for SCS and remains separate from the existing service rule framework for MSS systems.[710] The provision of MSS to terrestrial devices in MSS-allocated spectrum does not raise the same novel legal and technical complexities as does SCS in terrestrial spectrum.[711] Likewise, MSS direct-to-device systems have already been successfully performing operations within an existing regulatory framework.[712] As such, the rules we establish here for SCS do not impact our service

[705] *See* WRC-23 Provisional Final Acts. Studies on possible new allocation to the MSS for direct connectivity between space stations and IMT user equipment to complement terrestrial IMT network coverage, Res Com 6/9 (WRC-23), WRC-23 Provisional Final Act, at 567-569, https://www.itu.int/dms_pub/itu-r/opb/act/R-ACT-WRC.15-2023-PDF-E.pdf.

[706] *See* TerreStar Comments at 3. Commenters are divided as to whether the Commission should establish a domestic framework before studies are done internationally. *See, e.g.*, ITU-R study groups in the context of WRC-27; *see also* AST Reply at 15-17; Omnispace Comments at 8-10; TerreStar Comments at 3; Kepler Comments at 6; T-Mobile Reply at 4-5. Caltech and NRAO also argue that SCS should be on the WRC-27 agenda. Caltech Comments at 3; NRAO Comments at 4. Other commenters argue as to whether we should incorporate 3GPP recommendations into our rules. *See* T-Mobile Comments at 17; AST Reply at 15-16; Iridium Comments at 8; Omnispace Comments at 6, 8; *see also* Fairspectrum *Ex Parte*, Attach. B at 15 (requesting that the Commission "directly communicate[] the content of this NPRM in 3GPP").

[707] *See Notice* at 12-13, para. 24.

[708] *See* Globalstar Comments at 4.

[709] *See generally Notice*; *see also* Iridium Comments at 1.

[710] We note that our allocation of SCS as MSS in the U.S. Table is separate from decisions made here regarding service rules for MSS.

[711] *See Notice* at 56-57, para. 150.

[712] *See* Globalstar Comments at 4; Iridium Comments at 2, 5; Apple Comments at 2; Ligado Comments at 3, 4, 6; T-Mobile Comments at 19-20; DISH/EchoStar Comments at 8.

rules for MSS operators or in any way change the terms of authorization for existing MSS systems.[713] We note that it is outside the scope of this proceeding to adopt any measures for service rules for MSS or related earth stations.[714]

238. By establishing an SCS regulatory framework that is distinct from the MSS regulatory framework, satellite operators intending to provide SCS will have the flexibility to determine which spectrum bands and framework will best suit the needs of their business and of their developing technologies.[715] Some MSS operators emphasize the importance of ensuring that MSS operators are able to freely compete on a level playing field with SCS operators.[716] We agree that a competitive marketplace is important. And we believe that it would serve the public interest to continue to maintain separate regulatory frameworks for SCS and MSS and to employ the interference protection measures for SCS adopted herein to ensure that these new rules promote competition.[717]

IV. FURTHER NOTICE OF PROPOSED RULEMAKING

239. In the accompanying *Report and Order*, we adopt rules to facilitate ubiquitous connectivity by allowing partnerships between terrestrial network operators and satellite operators using terrestrial spectrum to fill coverage gaps that will enable communications with existing and future wireless devices without the need for hardware changes. We recognize that the framework we adopt today is a first step, focusing on particular SCS implementations which present less complex legal and technical challenges in order to foster the rapid deployment and development of these exciting networks. As we noted throughout the *Report and Order*, we will continue to consider waiver applications for SCS implementations that do not fit perfectly within our framework. And as the marketplace for—and technologies underpinning—this new offering evolves, we will continue to reassess our rules to find additional ways we can increase flexibility for terrestrial licensees and satellite operators.

240. Nevertheless, we seek to further develop the record in this *Further Notice* on how to improve 911 service for SCS connections and protect radio astronomy. Given the primary importance of emergency communications over SCS networks in the short term, we first seek comment on a number of ways we can propel industry toward truly ubiquitous automatic location-based routing of all 911 calls to accelerate connections between first responders and those who need help, regardless of their location. Next, in recognition of the importance of safeguarding radio astronomy, we seek further comment on ways to improve the coordination process between federal and non-federal stakeholders in the SCS context and on whether additional rule changes or policies are necessary to avoid harmful interference to radio astronomy and related services beyond the part 25 SCS licensing process we adopt today.

A. Improving Public Safety Communications Over SCS

241. *Improvements in Location-Based Routing*. We seek comment on how and whether we should modify requirements for routing SCS 911 voice calls and 911 text messages, including whether we should require the use of location-based routing to route 911 SCS voice calls directly to an appropriate PSAP, if technically feasible. In the initial *Notice*, the Commission sought comment on a number of technical issues relating to extending E911 rules to SCS, and we expand upon those questions in this *Further Notice*.

---

[713] *See* SpaceX Reply at 14-15. These include the E911 and WEA obligations for MSS, as well as the blanket earth station licensing regime for MSS. *See* Iridium Comments at 6. *But see* Letter from Joseph A. Godles, Attorney for Iridium Communications, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-65 et al., Attach. at 2 (filed Nov. 30, 2023).

[714] *But see* Iridium Comments at 9-10.

[715] *See id.* at 4-8; *see also* SpaceX Reply at 13-14.

[716] Globalstar Comments at 6; Apple Comments at 6, 9.

[717] *See id.*

242. In light of our existing requirement that CMRS providers deploy and use location-based routing for wireless 911 voice calls and RTT communications to 911 when available location information meets certain requirements for accuracy and timeliness,[718] how would such a requirement impact the availability of location-based routing for terrestrial wireless providers that use SCS to extend their coverage areas? We seek updated responses to the questions raised in the *Notice* in light of the new requirements for CMRS providers to deploy and use location-based routing in certain situations.[719]

243. In the *Report and Order*, we establish on an interim basis that terrestrial providers must route all SCS 911 voice calls to a PSAP using either location-based routing or an emergency call center. We take this interim step in order to balance the need for SCS 911 voice calls and text messages to be routed to an appropriate PSAP with the need for terrestrial providers to have flexibility in implementation of SCS. In light of the ongoing deployment and continued innovation of SCS, we seek any new and updated information regarding technological or other developments in routing SCS 911 voice calls since the last round of filings.

244. We also seek comment on improvements to the 911 rules that apply to such terrestrial providers when using SCS to extend their coverage. Should we require terrestrial providers to use location-based routing for SCS 911 voice calls when information about the location of the device is available to the CMRS provider's network at time of routing? In the alternative, should we require terrestrial providers to use location-based routing for SCS 911 voice calls only when location information meets certain thresholds for accuracy and timeliness? For example, as in the wireless location-based routing rules, should we only require terrestrial providers to use location-based routing for SCS 911 voice calls when location information meets an accuracy threshold of 165 meters at a confidence level of at least 90% and is available to the network at the time of routing the call?[720] Would a 165-meter accuracy threshold be appropriate for SCS 911 voice calls, or should an accuracy threshold be larger or smaller? We recognize that the technology likely used to identify the precise location of the device may be different when a terrestrial provider uses SCS to extend its coverage, as opposed to when it is using only terrestrial networks, and seek comment on any such technological differences.

245. Are there other threshold requirements that the Commission should consider when requiring location-based routing, beyond accuracy and timeliness of available location information? We recognize that, given the nature of SCS to extend coverage, cell tower information is unlikely to be available as a fallback when location-based routing does not meet whatever threshold requirements should be in place for using location-based routing. Should we require terrestrial providers to default to emergency call center service when threshold conditions for location-based routing are not met? Or should we require terrestrial providers to default to either "best available" location information for routing SCS 911 voice calls or emergency call center service when threshold conditions for location-based routing are not met?[721] We seek comment on the availability, reliability, and accuracy of the location information that terrestrial providers currently have access to when using location-based routing for SCS 911 voice calls. For what percentage of calls is such location information available? What factors (technical, operational, cost) impact this location's availability, and which factors are within the control of the terrestrial provider? Is such location information available in a timely fashion to allow for call set up and call routing? Are there any potential solutions to improve SCS location information? In addition, we seek comment on how we should address any potential inconsistencies between the 911 call routing

[718] *LBR Report and Order*, FCC 24-4 at 62, Appx. A.

[719] *Notice* at 35-37, paras. 83-91.

[720] *LBR Report and Order*, FCC 24-4 at 3, para. 3.

[721] *Id*. at 37, para. 72.

requirements of terrestrial providers and satellite operators as SCS evolves.[722]

246. *Device-to-Satellite Connectivity*. In the context of how SCS can function as an extension of a terrestrial network, we observe that a satellite can be considered as a bi-directional "bent pipe," receiving and forwarding signaling and user payload to and from a user's device to a terrestrial network (e.g., 5G base station (gNB), 5G core network (5GC), and other terrestrial network elements). A satellite can also play a more active role in the network, connecting directly to the 5GC on the ground. In other words, the gNB and 5GC can belong to and be operated by either the terrestrial provider or the satellite operator. Regardless of deployment model, the SCS satellite should be able to send and receive the 5G signaling information needed for placing an emergency call between the user equipment (UE) and 5G network along with the caller location information needed for call routing and dispatch. Given that 911 calls and texts would typically be placed outdoors with the user device having view of the GPS satellites in the sky, and given that user devices typically have GPS receivers, user devices should be able to determine their location, and for Assisted GPS (A-GPS), SCS should be able to provide the needed assistance information.

247. We seek comment on this tentative analysis. How accurate would the location provided by A-GPS be in this scenario? Since the calls most likely would be Session Initiation Protocol (SIP) calls, we believe that user device location information could be carried in the existing SIP header. Is this a correct assumption? In addition, we ask commenters to explain whether existing standards for terrestrial provider 911 calls are sufficient for SCS 911 calls. Would any new standards have to be developed for 911 calling? If so, what standards would be needed, who should develop them, and what would be the expected timeline for such development? Should the existing rules be modified to help ensure that 911 calls through SCS provide the same level of service as 911 calls made through terrestrial networks? If so, what specific modifications would be needed and under what timelines? Should we require that gNB and 5GC services be offered by the terrestrial network service provider with the same level of 911 service as terrestrial service providers provide for the terrestrial 911 calls? If gNB and 5GC services are offered by the satellite operator, should the Commission require the satellite operator to offer the same level of 911 service as the terrestrial network provider or should the satellite service provider be considered a roaming service provider?

248. *Interconnectivity Between Terrestrial Providers and Satellite Operators*. We seek comment on establishing rules around interconnectivity between terrestrial providers and satellite operators in the context of SCS 911 connections. Due to the unique qualities of the diverse spectrum bands that could accommodate satellite-to-device technologies, Apple notes that "planning will be critical to ensure a single network future with smooth handoff between SCS and non-SCS features."[723] "Setting final rules will require more details about how carriers and satellite operators will achieve seamless interconnectivity, including plans to rely on industry standards and support legacy devices."[724] What standards are currently in place related to this topic? What future standards work is anticipated, or required, to enable disparate networks and systems to interconnect for the purpose of enabling SCS 911 connectivity? What are plans for support of legacy devices? What details can be provided as to how interconnectivity between terrestrial providers and satellite operators works today to inform discussions of future advances to SCS 911 connections? Are changes to those operational models already in the planning stage? If so, we seek comment on what those changes will be. We also seek information on satellite data capacities, satellite link budget, and optimization schemes for the initial SCS deployments and the impact on device-to-satellite connectivity as they relate to SCS 911 connectivity and

[722] *Notice* at 33-34, para. 80. In the *Notice*, the Commission observed that stakeholders have indicated that the initial provision of SCS is likely to focus on messaging-type services in areas that terrestrial networks have difficulty covering but could evolve to include increased capacity with enhanced capabilities and functionality. *Id.* at 39, para. 97.

[723] Apple Comments at 7.

[724] *Id.*

functionality, including time for obtaining a location fix for automatic location-based routing of 911 calls. Regarding privacy and security, should there be an explicit requirement for satellite operators to protect customer proprietary network information of terrestrial provider subscribers when customers make 911 calls and texts, and disclose security breaches?

249. *Network Selection and Roaming.* Given that typically a 911 caller would abandon the 911 call if it is not connected within a certain time period, how long should the network selection take before a 911 call is eventually attempted via SCS? What are the trade-offs in setting this value? Should this value be established as a standard value for all SCS networks? Also, given the possibility that a 911 caller may be mobile and moving in and out of terrestrial network and SCS coverage, how should handoff between these networks be handled to guarantee seamless call continuity and successful callback? How do terrestrial providers plan to select networks for use with SCS 911 voice calls and 911 text messages? How do terrestrial providers prioritize their own terrestrial networks, their roaming partners' terrestrial networks, terrestrial networks with which they do not have a roaming agreement, and their own SCS networks? We understand that SCS is to be supplemental to terrestrial networks, including traditional terrestrial call paths, such as roaming, and additional technologies, such as Wi-Fi. However, in order to ensure that 911 calls utilize the best available path for delivery of both the message and location information, we seek comment on how terrestrial providers intend to select the order in which networks are selected. Do terrestrial providers envision any scenarios in which the selection of SCS would involve lack of capacity, versus lack of coverage? Specifically, in the event of a major emergency where network capacity is reached, are there any plans, or possibilities, that SCS would be utilized for additional capacity? In an area where a terrestrial provider does not have a terrestrial network, but a terrestrial network without a roaming agreement does provide coverage in that area, what are the trade-offs of using the terrestrial network without a roaming agreement or SCS to transmit a subscriber's 911 call?

250. *PSAP Outreach*. The Commission has previously asked whether terrestrial partners are or plan to be engaged in any outreach or coordination with public safety entities in advance of implementation.[725] Since the delivery of SCS 911 voice calls includes the possibility of using third party emergency call centers, to promote awareness and transparency, should we mandate terrestrial providers conduct outreach to PSAPs, and, if so, what would such a mandate look like? In addition, we now seek comment on what the planned outreach to the PSAP community entails. Will terrestrial providers be preparing training or briefing documents or presentations for the public safety community? Will terrestrial providers be consulting with public safety agencies and associations to determine the level of training and awareness required? Will terrestrial providers be collaborating with public safety to create and deliver such training and awareness? What are the timelines for such outreach? What assurance will terrestrial providers provide PSAPs that terrestrial providers will maintain oversight over emergency call centers, and call center routing decisions? In the event emergency call centers incorrectly route SCS 911 voice calls (e.g., route a 911 call to a PSAP in the incorrect county), how do terrestrial providers plan to expeditiously resolve complaints from 911 authorities and PSAPs?

251. For 911 calls that are delivered directly to PSAPs, rather than via an emergency call center, how do terrestrial providers envision delivering those calls with regard to current classes of service? Class of service is a designation of the type of wireless location service (e.g., MOBL, W911, WRLS, WPH1, WPH2, WCVC).[726] Public safety telecommunicators are trained to assess calls based on a number of factors, including class of service. Class of service may be used to provide an indication of what type of location information telecommunicators should expect (geodetic x/y/z coordinates or civic location), quality of location information, and whether the caller is using a fixed, mobile, or nomadic device. How will location be represented to the PSAP, e.g., geodetic information? Will there be

[725] *Notice* at 37, para. 91.

[726] *See* APCO International, Wireless 9-1-1 Deployment and Management Effective Practices Guide (2022), https://www.apcointl.org/~documents/standard/11033-2022-wireless-911-deployment-and-management-effective-practices-guide.

confidence and uncertainty factors for that location? Are terrestrial providers considering a new class of service for SCS, and, if so, are terrestrial providers working with the public safety community presently? If terrestrial providers are not considering a new class of service for 911 calls delivered under an SCS arrangement, what class of service will be used, and how will the PSAPs know the call is SCS rather than a traditional wireless call, or a non-service initialized call with no location or callback number?

B. Radio Astronomy Considerations

252. In the accompanying *Report and Order*, we examine the record regarding whether existing rules addressing the protection of radio astronomy and space science services would be sufficient in the SCS context.[727] We find that our part 25 licensing process will provide an opportunity for the Commission to address concerns from federal and non-federal stakeholders related to the protection of radio astronomy and space sciences in the context of specific SCS applications.[728] Therefore, rather than adopt new SCS rules with respect to the protection of radio astronomy and space sciences, we determine that it is in the public interest to address these concerns based on the facts of specific proposals.[729] We encourage SCS applicants to work with appropriate federal agencies in advance, including conducting analyses of potential impacts to radio astronomy systems, and we direct applicants to contact NSF for more information to facilitate this coordination.[730] We expect that such advance engagement will facilitate the Commission's review of SCS applications.

253. While we find in the *Report and Order* that—at this stage—new rules to ensure protection of radio astronomy and space sciences are not required, we recognize the importance of ensuring effective and efficient coordination among federal and non-federal stakeholders related to SCS applications. We also continue to value input from our federal agency partners in the part 25 SCS licensing process and aim to ensure that cooperation and coordination is as efficient and effective as possible. For these reasons, in this *Further Notice*, we seek comment on whether there are additional ways to encourage and improve coordination among federal and non-federal stakeholders with respect to the coexistence of radio astronomy and SCS and whether we should make any changes to our rules to facilitate this coordination.

254. Of particular importance on this question, on February 16, 2024, NTIA filed a white paper prepared by NSF in this proceeding in which NSF describes the potential impacts from SCS on current and planned radio astronomy and other space science operations, particularly from satellite downlinks—SCS transmissions in the space-to-Earth direction—and suggests potential mitigations.[731] In the white paper, NSF states that, in addition to the National Radio Quite Zone (NRQZ), additional sites have been chosen for radio astronomy facilities, and that such "facilities primarily employ remote locations, rather than allocated spectrum, to enable access to the relevant spectrum . . .."[732] The white paper describes several locations of existing and planned radio astronomy observatories which NSF identifies as having potential to be impacted by SCS operations in bands identified for consideration for SCS in the *Notice* and describes technical details about the receivers at each facility.[733] The white paper

---

[727] *See also Notice* at 48, paras. 125-26 (seeking comment on whether the Commission should adopt new coordination requirements for radio astronomy stations in certain locations).

[728] *See supra* para. 211. We note that any national security concerns will also be addressed in the licensing process, as needed.

[729] *See supra* paras. 210-12.

[730] *Id.*

[731] *See generally NSF White Paper*.

[732] *Id.* at 4, 11.

[733] *Id.* at 3, 15-30. We note that in the accompanying *Report and Order*, the Commission declined to include the WCS band as available for SCS at this time, citing NSF's significant concerns about the impact on radio astronomy from SCS operations in the WCS band in the white paper. *See supra* paras. 32-34; *NSF White Paper* at 23

(continued….)

also identifies concerns related to impacts from SCS operations on radio astronomy, and potential recommendations to address those concerns.[734]

255. While we anticipate that the part 25 licensing process will provide an opportunity for the Commission to address concerns related to protecting radio astronomy in the context of specific SCS applications, we also plan to continue to evaluate our procedures as SCS—and the technology enabling it—evolves. To that end, we seek comment on whether the unique nature of SCS may warrant additional consideration, including rule changes, related to the protection of radio astronomy. We ask that commenters provide as much specificity as possible. For example, should we consider rule changes to part 1, part 25, or another rule part that would require coordination of SCS applications? Section 1.924 of the Commission's rules—along with the NTIA Manual of Regulations and Procedures for Federal Radio Frequency Management—set forth procedures regarding coordination of certain applications within identified Quite Zones, including the NRQZ, the Arecibo Observatory, and other sites.[735] We ask commenters whether it would be appropriate to consider changes to section 1.924, to require a coordination process with regard to SCS applications. We seek comment only on whether to consider changes to section 1.924 related to SCS applications, and note that rule changes regarding other radio services are not a part of the SCS implementations which are the focus of this proceeding. If we were to consider rule changes specific to SCS, should coordination requirements apply only to SCS transmissions into the NRQZ, or also to SCS transmissions into other locations with sensitive scientific facilities and, if we should include other facilities, which should be included?[736] For example, we note that in its white paper, NSF identified several locations of existing and planned radio astronomy observatories and the details of the receiver bands at each facility.[737] Should any changes to our rules be band-specific or should they apply to all SCS operations? In lieu of or in addition to adopting new rules, are there other incentives the Commission could implement to encourage coordination and coexistence of radio astronomy operations and SCS?[738]

256. We note that, while we are not adopting requirements for SCS applicants to coordinate with potentially-affected federal users at this time, some stakeholders have already engaged in

(describing the WCS band as "the top band[ ] recommended for removal from consideration" given its use for S/X Celestial Reference Frame legacy observations).

[734] *See NSF White Paper* at 31-41.

[735] *See* 47 CFR § 1.924; NTIA, Manual of Regulations and Procedures for Federal Radio Frequency Management (2021), https://www.ntia.gov/publications/redbook-manual; *NSF White Paper* at 3. The NRQZ is a specified area designed to minimize interference to radio astronomy observations at the NRAO site located at Green Bank, Pocahontas County, West Virginia, and the Naval Radio Research Observatory (NRRO) site at Sugar Grove, Pendleton County, West Virginia. 47 CFR § 1.924(a). Section 1.924(a) requires that applicants or licensees seeking to establish a new or modified station at a fixed, permanent location in the NRQZ must notify the Director of the NRAO in writing, either prior to or simultaneously with their application to the Commission. *See id.* § 1.924(a)(1). The Commission then allows a period of 20 days for comments and objections, unless the applicant submits written consent from the NRAO with its application. *See id.* § 1.924(a)(2). If objections from the NRAO are filed prior to the end of the 20-day period, the Commission will, after consideration of the record, take whatever action is deemed appropriate. *See id.* § 1.924(a)(3). Section 1.924(a) currently applies to applicants and licensees for the range of services that fall under the category of the Wireless Radio Services. *See id.* §§ 1.901, 1.907.

[736] *See* Omnispace Comments at 28-31 (discussing the potential impacts SCS operations could have on radio astronomy and space science services); NRAO Feb. 24, 2024, *Ex Parte* at 1 ("Protection of radio astronomy operations inside the NRQZ is not just a matter of respecting the frequency allocations to radio astronomy -- such is the case everywhere -- but of observing the NRQZ rules that protect radio astronomy operations at all frequencies from the transmitters for which SCS will substitute.").

[737] *NSF White Paper* at 15-30.

[738] *See id. But see* SpaceX Comments at 19-20 (noting the "same incentives that will drive satellite operators to protect other active services by meeting mobile interference limits will also protect passive services, including radio astronomy and space services, obviating the need for new satellite-specific rules.").

coordination efforts related to SCS applications and radio astronomy. For example, in a filing opposing SpaceX's application to modify its authorization for its Gen2 NGSO satellite system to add SCS, NRAO nonetheless notes "with appreciation SpaceX's continuing cooperation in coordination and field-testing their Ku-band FSS operations."[739] SpaceX also points out that it has been working closely with NRAO to coordinate and "looks forward to continuing its precedent-setting coordination discussions with NRAO that are finding ways to allow consumers to benefit from this new service, while coexisting with radio astronomy."[740] To this end, we note that in its transmittal accompanying the NSF white paper, NTIA states that the white paper "highlights the value of early coordination efforts between potential applicants for such [SCS] authority and affected federal spectrum users, ideally prior to applicants finalizing their system designs."[741] We seek comment on whether such early coordination efforts by stakeholders are and can be successful to enable the coexistence of SCS and radio astronomy, and if so, under what circumstances. How can such early coordination efforts facilitate review and consideration of part 25 SCS license applications by federal agencies? Would submission of other technical information by SCS applicants regarding the protection of radio astronomy operations—in addition to Monte Carlo analyses—be helpful in these coordination efforts?[742]

V. PROCEDURAL MATTERS

257. *Regulatory Flexibility Act.* The Regulatory Flexibility Act of 1980, as amended (RFA),[743] requires that an agency prepare a regulatory flexibility analysis for notice and comment rulemakings, unless the agency certifies that "the rule will not, if promulgated, have a significant economic impact on a substantial number of small entities."[744] Accordingly, we have prepared a Final Regulatory Flexibility Analysis (FRFA) concerning the possible impact of rule and policy changes contained in this *Report and Order*. The FRFA is set forth in Appendix C.

258. We have also prepared an Initial Regulatory Flexibility Analysis (IRFA) concerning the potential impact of the rule and policy changes contained in the *Further Notice*. The IRFA is set forth in Appendix D. Written public comments are requested on the IRFA. Comments must be filed by the deadlines for comments on the *Further Notice* indicated on the first page of this document and must have a separate and distinct heading designating them as responses to the IRFA.

259. *Paperwork Reduction Act Analysis*. This *Report and Order* may contain new or modified information collection requirements subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104-13. All such requirements will be submitted to the Office of Management and Budget (OMB) for review under Section 3507(d) of the PRA. OMB, the general public, and other federal agencies will be invited to comment on any new or modified information collection requirements contained in this proceeding. In addition, we note that pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198, *see* 44 U.S.C. § 3506(c)(4), we previously sought specific comment on how the Commission might further reduce the information collection burden for small business concerns with fewer than 25 employees.

---

[739] NRAO SpaceX Filing Comments at 2, para. 5.

[740] SpaceX May 30, 2023 Consolidated Opposition at 6, 21-22; *see also* T-Mobile Reply at 16-17. Similarly, in its reply, AST states that it "remains committed to ensuring that RAS operations . . . enjoy effective interference protection." AST Reply at 11-14.

[741] Letter from Sean T. Conway, Deputy Chief Counsel, NTIA, U.S. Department of Commerce, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 23-65 et al. (filed Feb. 16, 2024) (submitting the *NSF White Paper* prepared by NSF).

[742] *See supra* para. 212.

[743] 5 U.S.C. §§ 601-612. The RFA has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), Pub. L. No. 104-121, Title II, 110 Stat. 857 (1996).

[744] 5 U.S.C. § 605(b).

260. In this present document, we have assessed the effects of our adoption of rules implementing the part 25 license entry criteria and requirements, part 1 leasing requirements, 911 text and call routing requirements, and technical requirements for the SCS Bands, and find that they will have a small impact on small business concerns. Due to the significant costs involved in SCS development and deployment, we anticipate that few entities impacted by this rulemaking would qualify as small businesses.

261. In addition, this *Further Notice* may contain potential new or revised information collection requirements subject to the Paperwork Reduction Act of 1995.[745] All such new or modified information collection requirements will be submitted to OMB for review under section 3507(d) of the PRA. OMB, the general public, and other federal agencies are invited to comment on any new or modified information collection requirements contained in this proceeding. In addition, pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198, see 44 U.S.C. § 3506(c)(4)), we seek specific comment on how we might further reduce the information collection burden for small business concerns with fewer than 25 employees.

262. *Congressional Review Act.* The Commission will submit this draft *Report and Order* and *Further Notice* to the Administrator of the Office of Information and Regulatory Affairs, Office of Management and Budget, for concurrence as to whether this rule is "major" or "non-major" under the Congressional Review Act, 5 U.S.C. § 804(2). The Commission will send a copy of this *Report and Order* and *Further Notice* to Congress and the Government Accountability Office pursuant to 5 U.S.C. § 801(a)(1)(A).

263. *Providing Accountability Through Transparency Act*. Consistent with the Providing Accountability Through Transparency Act, Public Law 118-9, a summary of this *Further Notice* will be available on https://www.fcc.gov/proposed-rulemakings.

264. *Ex Parte Presentations.* The proceeding this *Further Notice* initiates shall be treated as a "permit-but-disclose" proceeding in accordance with the Commission's *ex parte* rules.[746] Persons making *ex parte* presentations must file a copy of any written presentation or a memorandum summarizing any oral presentation within two business days after the presentation (unless a different deadline applicable to the Sunshine period applies). Persons making oral *ex parte* presentations are reminded that memoranda summarizing the presentation must: (1) list all persons attending or otherwise participating in the meeting at which the *ex parte* presentation was made, and (2) summarize all data presented and arguments made during the presentation. If the presentation consisted in whole or in part of the presentation of data or arguments already reflected in the presenter's written comments, memoranda or other filings in the proceeding, the presenter may provide citations to such data or arguments in his or her prior comments, memoranda, or other filings (specifying the relevant page and/or paragraph numbers where such data or arguments can be found) in lieu of summarizing them in the memorandum. Documents shown or given to Commission staff during *ex parte* meetings are deemed to be written *ex parte* presentations and must be filed consistent with rule 1.1206(b). In proceedings governed by rule 1.49(f) or for which the Commission has made available a method of electronic filing, written *ex parte* presentations and memoranda summarizing oral *ex parte* presentations, and all attachments thereto, must be filed through the electronic comment filing system available for that proceeding, and must be filed in their native format (*e.g.*, .doc, .xml, .ppt, searchable .pdf). Participants in this proceeding should familiarize themselves with the Commission's *ex parte* rules.

265. *Comment Period and Filing Procedures.* Pursuant to sections 1.415 and 1.419 of the Commission's rules, 47 CFR §§ 1.415, 1.419, interested parties may file comments and reply comments on or before the dates indicated on the first page of this document. Comments may be filed using the

[745] Paperwork Reduction Act of 1995, Pub. L. No. 104-13, 109 Stat. 163 (1995) (codified at 44 U.S.C. § 3501 *et seq.*).

[746] 47 CFR § 1.1200 *et seq.*

Commission's Electronic Comment Filing System (ECFS).[747] Commenters should refer to GN Docket No. 23-65 when filing in response to this *Further Notice*.

- Electronic Filers: Comments may be filed electronically using the Internet by accessing the ECFS: https://www.fcc.gov/ecfs/.
- Paper Filers: Parties who choose to file by paper must file an original and one copy of each filing.
- Filings can be sent by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail. All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.
- Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9050 Junction Drive, Annapolis Junction, MD 20701, U.S. Postal Service first-class, Express, and Priority mail must be addressed to 45 L Street NE, Washington, DC 20554.
- Effective March 19, 2020, and until further notice, the Commission no longer accepts any hand or messenger delivered filings. This is a temporary measure taken to help protect the health and safety of individuals, and to mitigate the transmission of COVID-19.[748]

266. *People with Disabilities*. To request materials in accessible formats for people with disabilities (braille, large print, electronic files, audio format), send an e-mail to fcc504@fcc.gov or call the Consumer & Governmental Affairs Bureau at 202-418-0530 (voice), 202-418-0432 (TTY).

267. *Further Information.* For additional information on this proceeding, contact Jon Markman of the Mobility Division, Wireless Telecommunications Bureau, at Jonathan.Markman@fcc.gov or (202) 418-7090, or Merissa Velez of the Space Bureau Satellite Programs and Policy Division, at Merissa.Velez@fcc.gov or (202) 418-0751.

VI. ORDERING CLAUSES

268. Accordingly, **IT IS ORDERED** that, pursuant to the authority found in sections 1, 4(i), 157, 301, 303, 307, 308, 309, and 310 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 154(i), 157, 301, 303, 307, 308, 309, and 310, that this *Report and Order and Further Notice of Proposed Rulemaking* **IS HEREBY ADOPTED**.

269. **IT IS FURTHER ORDERED** that this *Report and Order* **SHALL BE EFFECTIVE** 30 days after publication in the Federal Register, with the exception of revisions to sections 1.9047(d)(2), 9.10(t)(3)-(5), 25.125(b)(1)-(2), and 25.125(c) of the Commission's rules, 47 CFR § 1.9047(d)(2), 47 CFR § 9.10(t)(3)-(5), 47 CFR § 25.125(b)(1)-(2), and 47 CFR § 25.125(c) (amendatory instructions 3, 8, and 16 in Appendix B below), which may contain new or modified information collection requirements and will not be effective until after the Office of Management and Budget completes any review the Wireless Telecommunications Bureau and the Space Bureau determine is required under the Paperwork Reduction Act and provide an effective date by subsequent Public Notice.

270. **IT IS FURTHER ORDERED** that, pursuant to Section 4(i) of the Communications Act, as amended, 47 U.S.C. § 154(i), and Section 1.3 of the Commission's rules, 47 CFR § 1.3, the following rules are waived, effective immediately upon adoption of this *Report and Order* and extending until the date that is six months following the effective date announced in the Public Notice issued pursuant to paragraph 269, to the limited extent and as described herein: Sections 2.1043(c), and 2.911(c) and (e) of

[747] *See* FCC, Electronic Filing of Documents in Rulemaking Proceedings, 63 Fed. Reg. 24121 (June 30, 1998).

[748] *See FCC Announces Closure of FCC Headquarters Open Window and Change in Hand-Delivery Policy*, Public Notice, 35 FCC Rcd 2788 (2020).

the Commission's rules, 47 CFR §§ 2.1043(c), and 2.911(c) and (e). This temporary waiver is granted only for the purpose of adding a part 25 designation to equipment certifications granted on or before the 60th day after a summary of this *Report and Order* is published in the Federal Register.

271. **IT IS FURTHER ORDERED** that the Commission's Office of the Secretary, SHALL SEND a copy of this *Report and Order and Further Notice of Proposed Rulemaking*, including the Final Regulatory Flexibility Analysis and the Initial Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration.

272. **IT IS FURTHER ORDERED** that the Commission SHALL SEND a copy of this *Report and Order* in a report to be sent to Congress and the Government Accountability Office pursuant to the Congressional Review Act, *see* 5 U.S.C. § 801(a)(1)(A).

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary

APPENDIX A

List of Commenters
(GN Docket No. 23-65)

Aalyria Technologies, Inc.
Aerospace and Flight Test Radio Coordinating Council, Inc. (AFTRCC)
Association of Public-Safety Communications Officials-International, Inc. (APCO)
Apple Inc.
AST SpaceMobile, Inc. (AST)
AT&T Services, Inc. (AT&T)
Aviation Spectrum Resources, Inc. (ASRI)
Astronomy Department of California Institute of Technology and Owens Valley Radio Observatory (Caltech et al.)
CTIA
DISH Network Corporation, EchoStar Global LLC, Hughes Network Systems, LLC, and EchoStar Mobile Limited (DISH, et al.)
Dynamic Spectrum Alliance (DSA)
Evergreen Colorado Rotary Wildfire Ready Team
Fairspectrum Oy
Globalstar, Inc. (Globalstar)
High Altitude Platform Stations (HAPS) Alliance
Intelsat License, LLC (Intelsat)
Iridium Communications, Inc.
Kepler Communications, Inc.
Kuiper Systems (Amazon)
Ligado Networks LLC
Lockheed Martin Corporation
LoRa Alliance
Lynk Global, Inc. (Lynk)
National Academy of Sciences Committee on Radio Frequencies (CORF)
National Radio Astronomy Observatory (NRAO)
National Telecommunications and Information Administration on behalf of First Responder Network Authority (FirstNet)
Nextivity, Inc.
Omnispace, LLC (Omnispace)
OneWeb
Rural Wireless Association, Inc. (RWA)
Shure Incorporated
Sirius XM Radio, Inc. (Sirius XM)
Skylo Technologies, Inc.
Sonoma County Department of Emergency Management
Space Exploration Technologies Corporation (SpaceX)
T-Mobile USA, Inc. (T-Mobile)
TechFreedom
TerreStar Solutions Inc.
Verizon
Viasat, Inc.

Reply Comments
(GN Docket No. 23-65)

AFTRCC
AST
AT&T
Boulder Emergency Telephone Service Authority
Competitive Carriers Association (CCA)
CTIA
Fleet Space
Globalstar
Intelsat
Intrado Life & Safety, Inc. (Intrado)
Iridium
Lynk
Omnispace
OptimERA Holdings, Inc.
NSighttel Wireless, LLC d/b/a Cellcom
RWA
Satellite Industry Association (SIA)
Sirius XM
SpaceX
T-Mobile
Verizon

Ex Partes
(GN Docket No. 23-65)

AFTRCC
AST
AT&T
CCA
DISH, et al.
Fairspectrum Oy
Intrado
Lynk
NRAO
Omnispace
RWA
SpaceX
T-Mobile
Verizon

APPENDIX B

Final Rules

The Federal Communications Commission amends 47 CFR parts 1, 2, 9, and 25 as follows:

PART 1 – Practice and Procedure

1. The authority citation for part 1 continues to read as follows:

AUTHORITY: 47 U.S.C. chs. 2, 5, 9, 13; 28 U.S.C. 2461 note, unless otherwise noted.

2. Effective 30 days after publication in the *Federal Register*, revise § 1.9047 to read as follows:

§ 1.9047 Special Provisions relating to spectrum leasing arrangements involving terrestrial spectrum rights for Supplemental Coverage from Space.

(a) *Supplemental Coverage from Space.* For purposes of this section, Supplemental Coverage from Space (SCS) has the same meaning as in § 25.103 of this chapter.

(b) *Geographically independent area (GIA).* For purposes of this section, geographically independent area (GIA) has the same meaning as in § 25.103 of this chapter.

(c) *Part 25 SCS Entry Criteria.* For purposes of this section, part 25 SCS Entry Criteria refers to the requirements outlined in § 25.125(a) and (b) of this chapter.

(d) *Scope.* Under this section, a licensee may enter into a spectrum manager (*see* § 1.9020) or *de facto* transfer (*see* §§ 1.9030 and 1.9035) leasing or subleasing arrangement with a spectrum lessee in only the bands identified in § 2.106(d)(33)(i) of this chapter for the purpose of meeting the part 25 SCS Entry Criteria.

(1) The licensee seeking to engage in spectrum leasing under this section may do so under the following parameters:

(i) A single licensee that holds all co-channel licenses on the relevant band in a GIA may enter into a leasing arrangement with one or more satellite operators.

(ii) If there are multiple co-channel licensees that collectively hold all co-channel licenses in a particular band throughout one of six GIAs, the licensees may enter into spectrum leasing arrangements only under one of the following conditions:

(A) One licensee holding a license in the GIA must enter into an individual spectrum leasing arrangement with each of the other co-channel licensees in that GIA. The licensee may then enter into a leasing arrangement with one satellite operator; or

(B) One satellite operator may enter into individual leasing arrangements with each of the relevant co-channel licensees that together hold all co-channel licenses on the relevant band in the GIA.

(2) [Reserved].

(e) *FirstNet.* In order for the First Responder Network Authority (FirstNet), as defined in 47 U.S.C. § 1424, to fulfill the part 25 SCS Entry Criteria, FirstNet must file a FCC Form 601 in the Universal Licensing System (ULS) that:

(1) Describes the manner in which FirstNet has conveyed to its satellite partner an authorization to utilize the 758-769/788-799 MHz band or portions of the band;

(2) Identifies and describes the geographic area(s) and nature of the proposed SCS operations; and

(3) Demonstrates how, under the agreement, the rights and responsibilities of the satellite operator partner are substantively the same as those of a lessee under this part.

(f) *Subleasing.* Notwithstanding the provisions of §§ 1.9020(l) and 1.9030(k), an SCS spectrum lessee may sublease spectrum usage rights subject to the following condition.

(1) Satellite operators may not enter into a spectrum subleasing arrangement where there are multiple terrestrial licensees jointly leasing their co-channel rights in a given GIA pursuant to paragraph (d)(1)(ii) of this section.

(2) [Reserved].

(g) *Construction/performance requirements.* Notwithstanding the provisions of §§ 1.9020(d)(5)(i) and 1.9030(d)(5)(i), a licensee may not attribute to itself the build-out or performance activities of its SCS spectrum lessee(s) for purposes of complying with any applicable performance or build-out requirement.

3. Delayed indefinitely, further revise § 1.9047 by adding paragraph (d)(2) to read as follows:

* * * * *

(d) * * *

(2) The spectrum lessee or sublessee seeking to engage in spectrum leasing under this section must provide within the FCC Form 608:

(i) a certification that the parties are entering into the leasing arrangement for the purpose of fulfilling the part 25 Entry Criteria;

(ii) a description of which method, single or multiple terrestrial licensee, the parties are utilizing to meet the part 25 Entry Criteria; and

(iii) if the parties are utilizing the spectrum leasing arrangement outlined in paragraph (d)(1)(ii) of this section, the parties must:

(A) describe the nature of the leasing arrangement(s); and

(B) demonstrate how the entirety of the GIA is covered by the lease arrangement(s).

PART 2 – FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

4. The authority citation for part 2 continues to read as follows:

AUTHORITY: 47 U.S.C. 154, 302a, 303, and 336, unless otherwise noted.

5. Amend § 2.106 as follows:

a. Revise paragraph (a) pages 30, 36, 37, and 38;

b. Add paragraph (d)(33)(i); and

c. Add and reserve paragraph (d)(33)(ii).

The revisions and additions read as follows:

§ 2.106 Table of Frequency Allocations.

(a) * * *

* * * * *

5.149 5.291A 5.294 5.296 5.300 5.304 5.306 5.312	614-698 BROADCASTING Fixed Mobile 5.293 5.308 5.308A 5.309	
694-790 MOBILE except aeronautical mobile 5.312A 5.317A BROADCASTING		
	698-806 MOBILE 5.317A BROADCASTING Fixed	
5.300 5.311A 5.312		
790-862 FIXED MOBILE except aeronautical mobile 5.316B 5.317A BROADCASTING		
	5.293 5.309	
	806-890 FIXED MOBILE 5.317A BROADCASTING	
5.312 5.319		

614-890	614-698 FIXED MOBILE Mobile-satellite NG33A NG5 NG14 NG33 NG115 NG149	RF Devices (15) Satellite Communications (25) Wireless Communications (27) LPTV, TV Translator/Booster (74G Low Power Auxiliary (74H)
	698-758 FIXED MOBILE BROADCASTING Mobile-satellite NG33A NG159	Satellite Communications (25) Wireless Communications (27) LPTV and TV Translator (74G)
	758-775 FIXED MOBILE Mobile-satellite NG33A NG34 NG159	Satellite Communications (25) Public Safety Land Mobile (90R)
	775-788 FIXED MOBILE BROADCASTING Mobile-satellite NG33A NG159	Satellite Communications (25) Wireless Communications (27) LPTV and TV Translator (74G)
	788-805 FIXED MOBILE Mobile-satellite NG33A NG34 NG159	Satellite Communications (25) Public Safety Land Mobile (90R)
	805-806 FIXED MOBILE BROADCASTING Mobile-satellite NG33A NG159	Satellite Communications (25) Wireless Communications (27) LPTV and TV Translator (74G)
	806-809 LAND MOBILE	Public Safety Land Mobile (90S)
	809-849 FIXED LAND MOBILE Mobile-satellite NG33A	Public Mobile (22) Satellite Communications (25) Private Land Mobile (90)
	849-851 AERONAUTICAL MOBILE	Public Mobile (22)
	851-854 LAND MOBILE	Public Safety Land Mobile (90S)
	854-894	

862-890 FIXED MOBILE except aeronautical mobile 5.317A BROADCASTING 5.322 5.319 5.323	5.317 5.318	5.149 5.305 5.306 5.307 5.320		FIXED LAND MOBILE Mobile-satellite NG33A US116 US268	Public Mobile (22) Satellite Communications (25) Private Land Mobile (90)

1700-1710 FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.289 5.341		1700-1710 FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.289 5.341 5.384	5.341	5.341 US88	
1710-1930 FIXED MOBILE 5.384A 5.388A 5.388B 5.149 5.341 5.385 5.386 5.387 5.388			1710-1761 5.341 US91 US378 US385	1710-1780 FIXED MOBILE 5.341 US91 US378 US385	
			1761-1780 SPACE OPERATION (Earth-to-space) G42 US91		
			1780-1850 FIXED MOBILE SPACE OPERATION (Earth-to-space) G42	1780-1850	
			1850-2025	1850-2000 FIXED MOBILE Mobile-satellite NG33A	RF Devices (15) Personal Communications (24) Satellite Communications (25 Wireless Communications (27) Fixed Microwave (101)
1930-1970 FIXED MOBILE 5.388A 5.388B 5.388	1930-1970 FIXED MOBILE 5.388A 5.388B Mobile-satellite (Earth-to-space) 5.388	1930-1970 FIXED MOBILE 5.388A 5.388B 5.388			
1970-1980 FIXED MOBILE 5.388A 5.388B 5.388					
1980-2010 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.351A 5.388 5.389A 5.389B 5.389F				2000-2020 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space)	Satellite Communications (25) Wireless Communications (27)
2010-2025 FIXED MOBILE 5.388A 5.388B 5.388	2010-2025 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.388 5.389C 5.389E	2010-2025 FIXED MOBILE 5.388A 5.388B 5.388		2020-2025 FIXED	

				MOBILE	
2025-2110 SPACE OPERATION (Earth-to-space) (space-to-space) EARTH EXPLORATION-SATELLITE (Earth-to-space) (space-to-space) FIXED MOBILE 5.391 SPACE RESEARCH (Earth-to-space) (space-to-space) 5.392			2025-2110 SPACE OPERATION (Earth-to-space) (space-to-space) EARTH EXPLORATION-SATELLITE (Earth-to-space) (space-to-space) SPACE RESEARCH (Earth-to-space) (space-to-space) FIXED MOBILE 5.391 5.392 US90 US92 US222 US346 US347	2025-2110 FIXED NG118 MOBILE 5.391 5.392 US90 US92 US222 US346 US347	TV Auxiliary Broadcasting (74F) Cable TV Relay (78) Local TV Transmission (101J)

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
2110-2120 FIXED MOBILE 5.388A 5.388B SPACE RESEARCH (deep space) (Earth-to-space) 5.388			2110-2120 US252	2110-2120 FIXED MOBILE US252	Public Mobile (22) Wireless Communications (27) Fixed Microwave (101)
2120-2170 FIXED MOBILE 5.388A 5.388B 5.388	2120-2160 FIXED MOBILE 5.388A 5.388B Mobile-satellite (space-to-Earth) 5.388 2160-2170 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.388 5.389C 5.389E	2120-2170 FIXED MOBILE 5.388A 5.388B 5.388	2120-2200	2120-2180 FIXED MOBILE NG41	
2170-2200 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A 5.388 5.389A 5.389F				2180-2200 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth)	Satellite Communications (25) Wireless Communications (27)

2200-2290 SPACE OPERATION (space-to-Earth) (space-to-space) EARTH EXPLORATION-SATELLITE (space-to-Earth) (space-to-space) FIXED MOBILE 5.391 SPACE RESEARCH (space-to-Earth) (space-to-space) 5.392		2200-2290 SPACE OPERATION (space-to-Earth) (space-to-space) US96 EARTH EXPLORATION-SATELLITE (space-to-Earth) (space-to-space) FIXED (line-of-sight only) MOBILE (line-of-sight only including aeronautical telemetry, but excluding flight testing of manned aircraft) 5.391 SPACE RESEARCH (space-to-Earth) (space-to-space) 5.392 US303	2200-2290 US96 US303	
2290-2300 FIXED MOBILE except aeronautical mobile SPACE RESEARCH (deep space) (space-to-Earth)		2290-2300 FIXED MOBILE except aeronautical mobile SPACE RESEARCH (deep space) (space-to-Earth)	2290-2300 SPACE RESEARCH (deep space) (space-to-Earth)	
2300-2450 FIXED MOBILE 5.384A Amateur Radiolocation	2300-2450 FIXED MOBILE 5.384A RADIOLOCATION Amateur	2300-2305 G122	2300-2305 Amateur	Amateur Radio (97)
		2305-2310 US97 G122	2305-2310 FIXED MOBILE except aeronautical mobile RADIOLOCATION Amateur US97	Wireless Communications (27) Amateur Radio (97)
		2310-2320 Fixed Mobile US100 Radiolocation G2 US97 US327	2310-2320 FIXED MOBILE BROADCASTING-SATELLITE RADIOLOCATION US97 US100 US327	Wireless Communications (27)
		2320-2345 Fixed Radiolocation G2 US327	2320-2345 BROADCASTING-SATELLITE US327	Satellite Communications (25)
5.150 5.282 5.395	5.150 5.282 5.393 5.394	2345-2360 Fixed Mobile US100 Radiolocation G2	2345-2360 FIXED MOBILE US100 BROADCASTING-SATELLITE RADIOLOCATION	Wireless Communications (27)

		US327	US327	
		2360-2390 MOBILE US276 RADIOLOCATION G2 G120 Fixed US101	2360-2390 MOBILE US276 US101	Aviation (87) Personal Radio (95)
		2390-2395 MOBILE US276 US101	2390-2395 AMATEUR MOBILE US276 US101	Aviation (87) Personal Radio (95) Amateur Radio (97)
		2395-2400 US101 G122	2395-2400 AMATEUR US101	Personal Radio (95) Amateur Radio (97)
		2400-2417 5.150 G122	2400-2417 AMATEUR 5.150 5.282	RF Devices (15) ISM Equipment (18) Amateur Radio (97)
		2417-2450 Radiolocation G2 5.150	2417-2450 Amateur 5.150 5.282	
2450-2483.5 FIXED MOBILE Radiolocation 5.150	2450-2483.5 FIXED MOBILE RADIOLOCATION 5.150	2450-2483.5 5.150 US41	2450-2483.5 FIXED MOBILE Radiolocation 5.150 US41	RF Devices (15) ISM Equipment (18) TV Auxiliary Broadcasting (74F) Private Land Mobile (90) Fixed Microwave (101) Page 38

* * * * *

(d) * * *

* * * * *

(33) * * *

(i) NG33A The secondary MSS operations in the bands 614-652 MHz and 663-769 MHz, 775-799 MHz, and 805-806 MHz, 824-849 MHz and 869-894 MHz, and 1850-1920 MHz and 1930-2000 MHz are limited to Supplemental Coverage from Space (SCS) and are subject to the Commission's SCS rules in part 25 of this chapter.

(ii) [Reserved]

* * * * *

PART 9 – 911 REQUIREMENTS

6. The authority citation for part 9 continues to read as follows:

Authority: 47 U.S.C. 151–154, 152(a), 155(c), 157, 160, 201, 202, 208, 210, 214, 218, 219, 222, 225, 251(e), 255, 301, 302, 303, 307, 308, 309, 310, 316, 319, 332, 403, 405, 605, 610, 615, 615 note, 615a, 615b, 615c, 615a–1, 616, 620, 621, 623, 623 note, 721, and 1471, and Section 902 of Title IX, Division FF, Pub. L. 116–260, 134 Stat. 1182, unless otherwise noted.

7. Effective 30 days after publication in the *Federal Register*, amend § 9.10 by revising paragraph (a) and adding paragraph (t) to read as follows:

§ 9.10 911 Service.

(a) *Scope of section*. Except as described in paragraph (r) of this section, the following requirements of paragraphs (a) through (t) of this section are only applicable to CMRS providers, excluding mobile satellite service (MSS) operators, to the extent that they:

* * * * *

(t) *Interim 911 Requirements for Supplemental Coverage from Space —*

(1) *Supplemental Coverage from Space.* For purposes of this paragraph (t), "Supplemental Coverage from Space" or "SCS" has the same meaning as in part 25, subpart A of this chapter; "SCS 911 calls" are 911 calls (as defined in § 9.3) that are carried over satellite facilities pursuant to a CMRS provider's SCS arrangement; and an "SCS 911 text message" is a 911 text message (as defined in paragraph (q)(9) of this section) that is carried over satellite facilities pursuant to a CMRS provider's SCS arrangement.

(2) *Call Transmission Requirements*. For purposes of delivering SCS 911 voice calls and SCS 911 text messages, CMRS providers must either:

(i) Use information regarding the location of a device, including but not limited to device-based location information, to route SCS 911 voice calls and SCS 911 text messages to an appropriate PSAP and transmit the phone number of the device used to send the SCS 911 voice call or SCS 911 text message and available location information to an appropriate PSAP; or

(ii) Use an emergency call center, at which emergency call center personnel must determine the emergency caller's phone number and location and then transfer or otherwise direct the 911 caller to an appropriate PSAP.

8. Delayed indefinitely, further amend § 9.10 by adding paragraphs (t)(3) through (5) to read as follows:

* * * * *

(t) * * *

(3) *Reporting*. Each CMRS provider that utilizes SCS arrangements to expand its coverage areas for providing service to its end-user subscribers must maintain records of all SCS 911 voice calls and SCS 911 text messages received on its network and received at its emergency call center. By October 15 of each year, each CMRS provider that utilizes SCS arrangements to expand its coverage areas for providing service to its end-user subscribers must submit a report to the Commission regarding SCS 911 voice calls and 911 text messages, and its emergency call center data, current as of September 30 of that year. CMRS providers that utilize SCS arrangements to expand their coverage areas for providing service to their end-user subscribers must submit this certification in the Commission's Electronic Comment Filing System. These reports must include, at a minimum, the following:

(i) The name and address of the CMRS provider, the address of that CMRS provider's emergency call center, and the contact information of the emergency call center;

(ii) The aggregate number of SCS 911 voice calls and SCS 911 text messages received by the network of the CMRS provider that provides SCS service to its end-user subscribers during each month during the relevant reporting period;

(iii) The aggregate number of SCS 911 voice calls and SCS 911 text messages received by the emergency call center each month during the relevant reporting period;

(iv) The aggregate number of SCS 911 voice calls and SCS 911 text messages received by the emergency call center each month during the relevant reporting period that required forwarding to a PSAP and how many did not require forwarding to a PSAP;

(v) The aggregate number of SCS 911 voice calls that were routed using location information that met the timeliness and accuracy thresholds defined in paragraphs (s)(3)(i)(A) and (B) of this section;

(vi) The aggregate number of SCS 911 voice calls and SCS 911 text messages that were routed using location information that did not meet the timeliness and accuracy thresholds defined in paragraphs (s)(3)(i)(A) and (B) of this section; and

(vii) An explanation of how the SCS deployment, including network architecture, systems, and procedures, will support routing SCS 911 voice calls and SCS 911 text messages to the geographically appropriate PSAP with sufficient location information in compliance with paragraph (t)(2) of this section.

(4) *Certification*. CMRS providers that utilize SCS arrangements to expand their coverage areas for providing service to their end-user subscribers must certify on a one-time basis that neither they nor any third party they rely on to obtain location information or associated data used for compliance with paragraph (t)(2)(i) or (ii) will use such location information or associated data for any non-911 purpose, except with prior express consent or as otherwise permitted or required by law. The certification must state that the CMRS provider and any third parties it relies on to obtain location information or associated data used for compliance with paragraph (t)(2)(i) or (ii) have implemented measures sufficient to safeguard the privacy and security of such location information or associated data. CMRS providers that utilize SCS arrangements to expand their coverage areas for providing service to their end-user subscribers must submit this one-time certification in the Commission's Electronic Comment Filing System on the due date of the first report made under paragraph (t)(3) of this section.

(5) *Subscriber notification.* Each CMRS provider that utilizes SCS arrangements to expand its coverage areas for providing service to its end-user subscribers shall specifically advise every subscriber, both new and existing, in writing prominently and in plain language, of the circumstances under which 911 service

for all SCS 911 calls, or SCS 911 text messages may not be available via SCS or may be in some way limited by comparison to traditional enhanced 911 service.

PART 25 - SATELLITE COMMUNICATIONS

9. The authority citation for part 25 continues to read as follows:

AUTHORITY: 47 U.S.C. 154, 301, 302, 303, 307, 309, 310, 319, 332, 605, and 721, unless otherwise noted.

10. Amend § 25.103 by adding the following definitions in alphabetical order to read as follows:

§ 25.103 Definitions.

* * * * *

Geographically independent area (GIA). Any of the following six areas: (1) CONUS; (2) Alaska; (3) Hawaii; (4) American Samoa; (5) Puerto Rico/U.S. Virgin Islands; and (6) Guam/Northern Mariana Islands.

* * * * *

Supplemental Coverage from Space (SCS). The provision of coverage to terrestrial wireless subscribers through an arrangement or agreement (see § 1.9047 of this chapter) between one or more NGSO or GSO operator(s) and one or more terrestrial wireless licensee(s), involving transmissions between space stations and SCS earth stations. NGSO and GSO operators and terrestrial wireless service licensees seeking to provide SCS must be authorized in compliance with § 25.125.

* * * * *

SCS earth stations. Any earth station used for the provision of Supplemental Coverage from Space consistent with § 25.115(q).

* * * * *

11. Amend § 25.109 by adding paragraph (f) to read as follows:

§ 25.109 Cross-reference.

* * * * *

(f) Space and SCS earth stations providing SCS are subject to technical rules in parts 2, 22, 24, and 27 of this chapter where applicable.

12. Amend § 25.114 by adding paragraph (a)(4) to read as follows:

§ 25.114 Applications for space station authorizations.

* * * * *

(a)(4) For an application filed pursuant to the SCS procedure in § 25.125, the filing must be submitted on FCC Form 312, Main Form and Schedule S, with attached exhibits as required by paragraph (d) of this section, and must constitute a comprehensive proposal.

* * * * *

13. Amend § 25.115 by adding paragraph (q) to read as follows:

§ 25.115 Applications for earth station authorizations.

* * * * *

(q) *SCS earth stations.* An applicant seeking to use SCS earth stations to provide SCS must comply with § 25.125.

(1) A satellite operator licensed under § 25.125 to provide SCS is permitted to communicate with all terrestrial wireless licensee(s)-associated SCS earth stations that have been approved for such use under part 2 of this chapter.

(i) Such earth stations must show compliance with this part and at least one of either part 22, 24, or 27 of this chapter to provide SCS within the technical parameters and provisions associated with the device certification.

(ii) The device certification must show compliance with the licensed parameters of the terrestrial wireless license(s) and at least one of either part 22, 24, or 27 of this chapter, as applicable.

(2) An earth station may be used for the provision of SCS when:

(i) The satellite operator licensed under § 25.125 is a party to a valid and approved spectrum leasing arrangement or agreement pursuant to § 1.9047 of this chapter with at least one terrestrial wireless licensee(s) licensed under one of either part 22, 24, or 27 of this chapter; and

(ii) That terrestrial wireless licensee(s) has met and operates within all conditions associated with the relevant terrestrial wireless license(s).

(3) A satellite operator authorized to provide SCS under § 25.125 is authorized under paragraph (q)(1) of this section to communicate with SCS earth stations for any period during which each of the following apply:

(i) The service is provided during the valid duration of any spectrum leasing arrangement or agreement pursuant to § 1.9047 of this chapter between the terrestrial wireless licensee(s) and satellite operator;

(ii) The devices to which service is provided are certified under part 2 of this chapter; and

(iii) The terrestrial wireless licensee(s) is a valid licensee(s) under part 22, 24, or 27 of this chapter.

(4) A satellite operator with SCS authorization via a market access grant can avail itself of the provisions of this paragraph (q) but, in addition to the parameters established in paragraphs (q)(1) and (2) of this section, must also comply with any additional parameters included in the satellite operator's space station market access grant.

(5) A satellite operator operating in conformance with the parameters established in this part does not need a separate earth station authorization for the provision of SCS under this part.

14. Amend § 25.117 by adding paragraph (j) to read as follows:

§ 25.117 Modification of station license.

* * * * *

(j) An application for modification of a space station authorization to provide SCS must comply with § 25.125.

15. Effective 30 days after publication in the *Federal Register*, add § 25.125 to read as follows:

§ 25.125 Applications for supplemental coverage from space (SCS).

(a) *SCS entry criteria.* This section applies only to applicants seeking to provide SCS. An applicant for SCS space station authorization must hold either an existing NGSO or GSO license or grant of U.S. market access under this part, or must be seeking a NGSO or GSO license or grant of U.S. market access under this part, and must have a lease arrangement(s) or agreement pursuant to § 1.9047 of this chapter with one or more terrestrial wireless licensee(s) that hold,

collectively or individually, all co-channel licenses throughout a GIA in a band identified in § 2.106(d)(33)(i) of this chapter. Applicants for SCS space stations must comply with the requirements set forth in paragraph (b) of this section.

(b) *SCS space station application requirements.* An applicant seeking a space station authorization to provide SCS must either submit an application requesting modification of a current NGSO or GSO license or grant of U.S. market access under this part, or an application seeking a new NGSO or GSO license or grant of U.S. market access under this part.

(1) - (2) [Reserved].

(3) Applications to modify an authorization under this part to provide SCS and applications seeking to provide SCS in the bands identified in § 2.106(d)(33)(i) of this chapter will not be subject to the processing round procedures or first-come, first-served procedures in §§ 25.137, 25.157, and 25.158.

(c) [Reserved].

(d) *Effective date and continued operation of SCS authorization.* SCS authorization will be deemed effective in the Commission's records and for purposes of the application of the rules set forth in this section after each of the following requirements is satisfied:

(1) Grant of:

(i) A modification application under this part or request for modification of a grant of market access; or

(ii) An application to launch and operate or market access;

(2) Approval of a leasing arrangement(s) or agreement(s) under part 1 of this chapter (*see* § 1.9047 of this chapter); and

(3) Grant of a valid SCS earth station equipment certification under part 2 of this chapter.

(e) *SCS earth station equipment certification requirements.* Applicants for certification for SCS earth stations for use with a satellite system must meet all requirements for equipment certification and equipment test data necessary to demonstrate compliance with pertinent standards under part 22, 24, or 27 of this chapter as applicable.

16. Delayed indefinitely, amend § 25.125 by adding paragraphs (b)(1) and (2) and (c) to read as follows:

§ 25.125 Applications for supplemental coverage from space (SCS).

* * * * *

(b) * * *

(1) The application must include a certification that:

(i) A lease notification(s) or application(s), pursuant to § 1.9047 of this chapter, where a single terrestrial wireless licensee holds or multiple co-channel licensees collectively hold all co-channel licenses within the relevant GIA in the bands identified in § 2.106(d)(33)(i) of this chapter, or as it pertains to FirstNet, an agreement, is on file with the Commission;

(ii) The current space station licensee under this part or grantee of market access for NGSO or GSO satellite operation under this part seeks modification of authority to provide SCS in the same geographic areas covered in the relevant

GIA, or the applicant for a space station license under this part or grant of market access for NGSO or GSO satellite operation under this part seeks to provide SCS in the same geographic areas covered in the relevant GIA; and

(iii) SCS earth stations will qualify as "licensed by rule" earth stations under § 25.115(q).

(2) The application must include a comprehensive proposal for the prospective SCS system on FCC Form 312, Main Form and Schedule S, as described in § 25.114, together with the certification described in paragraph (b)(1) of this section and include a list of the file and identification numbers associated with the relevant leasing notification(s) under part 1 of this chapter, application(s), and FCC Form 601(s), with a brief description of the coverage areas that will be served, domestically and internationally.

* * * * *

(c) *Equipment authorization for SCS earth stations.* Each SCS earth station used to provide SCS under this section must meet the equipment authorization requirements under paragraph (e) of this section and all equipment authorization requirements for all intended uses of the device pursuant to the procedures specified in part 2 of this chapter and the requirements of at least one of part 22, 24, or 27 of this chapter.

* * * * *

17. Amend § 25.137 by revising paragraphs (b) and (f) to read as follows:

§ 25.137 Requests for U.S. market access through non-U.S.-licensed space stations.

* * * * *

(b) Any request pursuant to paragraph (a) of this section must be filed electronically through the International Communications Filing System and must include an exhibit providing legal and technical information for the non-U.S.-licensed space station of the kind that §§ 25.114, 25.122, 25.123, or 25.125 would require in a license application for that space station, including but not limited to information required to complete Schedule S. An applicant may satisfy this requirement by cross-referencing a pending application containing the requisite information or by citing a prior grant of authority to communicate via the space station in question in the same frequency bands to provide the same type of service.

* * * * *

(f) A non-U.S.-licensed space station operator that has been granted access to the United States market pursuant to a declaratory ruling may modify its U.S. operations under the procedures set forth in §§ 25.117(d), (h), and (j) and 25.118(e).

* * * * *

18. Amend § 25.161 by adding paragraph (e) to read as follows:

§ 25.161 Automatic termination of station authorization.

* * * * *

(e) The failure to provide any SCS on all or some of the SCS authorized frequencies for more than 90 days in the event of termination of the lease arrangement(s) or agreement(s) specified in the § 25.125(a) SCS entry criteria. In this instance, the authorization will be terminated in whole or in part with respect to the relevant frequencies on which SCS has not been operational for more than 90 days in the United States, unless specific authority is requested.

19. Amend § 25.202 by adding paragraph (k) to read as follows:

25.202 Frequencies, frequency tolerance, and emission limits.

* * * * *

(k) Space station downlinks operating as SCS under the provisions of § 25.125 and § 2.106(d)(33)(i) of this chapter are subject to the following rules.

(1) *Out of band emission limits.* Notwithstanding the emission limitations of paragraph (f) of this section, the aggregation of all space station downlink emissions outside a licensee's SCS frequency band(s) of operation shall not exceed a power flux density of -120 dBW/m^2/MHz at 1.5 meters above ground level.

(2) *Interference caused by out of band emissions.* If any emission from a transmitter operating in the SCS service results in harmful interference to users of another radio service, the FCC may require a greater attenuation of the emission than specified in this section.

20. Amend § 25.204 by revising the section heading and adding paragraph (g) to read as follows:

§ 25.204 Power and out-of-band emission limits for earth stations.

* * * * *

(g) SCS earth stations providing SCS pursuant to §§ 25.125 and 25.115 shall comply with the power requirements and out-of-band emission limits corresponding to devices operating in parts 22, 24, or 27 of this chapter (e.g., §§ 22.913, 24.232, 27.50), as required for their operating frequencies.

21. Amend § 25.208 by revising the section heading and adding paragraph (w) to read as follows:

§ 25.208 Power flux-density and in-band field strength limits.

* * * * *

(w) The aggregate field strength at the earth's surface produced by all visible beams and satellites within each satellite constellation providing SCS service as they move over any given point or area in bands authorized by NG33A in the United States Table of Frequency Allocations and § 25.125 must meet:

(1) 40 dBμV/m for the 600 MHz, 700 MHz, and 800 MHz bands; and

(2) 47 dBμV/m for the AWS and PCS bands; and

(3) Licensees must comply with all applicable provisions and requirements of treaties and other international agreements between the United States government and the governments of other countries, including Canada and Mexico. Absent specific international agreements regarding SCS, licensees must comply with the limited provided in paragraphs (w)(1) and (2) of this section.

APPENDIX C

Final Regulatory Flexibility Analysis

1. As required by the Regulatory Flexibility Act of 1980, as amended (RFA),[1] an Initial Regulatory Flexibility Analysis (IRFA) was incorporated in the *Single Network Future: Supplemental Coverage from Space, Space Innovation, Notice of Proposed Rulemaking* (*Notice*) released in March 2023.[2] The Federal Communications Commission (Commission) sought written public comment on the proposals in the *Notice*, including comment on the IRFA. No comments were filed addressing the IRFA. This Final Regulatory Flexibility Analysis (FRFA) conforms to the RFA.[3]

A. Need for, and Objectives of, the Report and Order

2. In the *Report and Order*, the Commission takes a major step toward harnessing the power of hybrid satellite-terrestrial networks to connect people to modern communications services. To accomplish this objective, the Commission adopts a regulatory framework to enable collaborations between satellite operators and terrestrial service providers to offer ubiquitous connectivity directly to consumer handsets using spectrum previously allocated only to terrestrial service. Supplemental coverage from space (SCS) will enable consumers in areas not covered by terrestrial infrastructure to be connected using their existing devices via satellite-based communications. The framework the Commission adopts in the *Report and Order* balances the desire to accelerate innovative SCS operations that will serve these critical public interest goals with the need to retain service quality of terrestrial networks, protect spectrum usage rights, and minimize the risk of harmful interference, both domestically and internationally. The objectives of the framework include facilitating ubiquitous wireless coverage across the nation, expanding the availability of emergency communications to consumers and the geographic range of first responders to provide emergency services, and promoting competition in the provision of wireless services to consumers.

3. In the *Report and Order*, to allow satellite communications on spectrum previously allocated only to terrestrial services, the Commission modifies the United States Table of Frequency Allocations (U.S. Table) to authorize bi-directional, secondary mobile-satellite service (MSS) operations in certain spectrum bands that have no primary, non-flexible-use legacy incumbents, federal or non-federal. For these bands, the Commission authorizes SCS only where one or more terrestrial licensees—together holding all licenses on the relevant channel throughout a defined geographically independent area (GIA)—lease access to their spectrum rights to a participating satellite operator, whose part 25 license reflects these frequencies and the GIA in which they will offer SCS. The list of bands (SCS Bands) that will be available for the provision of SCS is as follows:

- 600 MHz: 614-652 MHz and 663-698 MHz;
- 700 MHz: 698-769 MHz, 775 MHz-799 MHz, and 805-806 MHz;
- 800 MHz: 824-849 MHz and 869-894 MHz;
- Broadband PCS: 1850-1915 MHz and 1930-1995 MHz; and
- AWS-H Block: 1915-1920 MHz and 1995-2000 MHz

In an effort to realize the public interest benefits of SCS as soon as possible, while minimizing the risk of harmful interference, the Commission adopts the proposal to limit SCS authorizations to the following GIAs: (1) the contiguous United States (CONUS); (2) Alaska; (3) Hawaii; (4) American Samoa; (5)

[1] 5 U.S.C. § 603. The RFA, 5 U.S.C. §§ 601-612, was amended by the Small Business Regulatory Enforcement Fairness Act of 1996, (SBREFA) Pub. L. No. 104-121, Title II, 110 Stat. 857 (1996).

[2] *Single Network Future: Supplemental Coverage from Space, Space Innovation*, GN Docket No. 23-65 and IB Docket No. 22-271, Notice of Proposed Rulemaking, FCC 23-22 (Mar. 17, 2023) (*Notice*).

[3] 5 U.S.C. § 604.

Puerto Rico/U.S. Virgin Islands; and (6) Guam/Northern Mariana Islands.

4. Additionally, in the *Report and Order*, the Commission adopts rules requiring a part 25 license as a necessary component of an SCS authorization that must be obtained prior to commencing SCS. The Commission also adopts entry criteria that non-geostationary satellite orbit (NGSO) and geostationary satellite orbit (GSO) operators must meet to apply for or modify an existing part 25 license to operate satellites in SCS Bands. The Commission adopts rules to establish a license by rule approach for terrestrial devices as earth stations communicating with a satellite network for the purposes of SCS. Furthermore, the *Report and Order* authorizes SCS based on a lease arrangement or agreement between one or more terrestrial licensees and one or more satellite operators, subject to the restrictions adopted. The Commission also adopts limited amendments to the service rules governing satellite and terrestrial licensees to enable the provision of SCS.

5. Similarly, the Commission adopts certain technical rules, including requiring terrestrial device equipment authorization grantees to modify existing, or obtain new, equipment authorizations for previously certified terrestrial devices and also grants a limited waiver of certain rules. The Commission also addresses international coordination, stating that SCS will be authorized pursuant to a secondary MSS allocation in the U.S. Table. These operations may not cause harmful interference to—and shall not claim protection from—any station operating in accordance with ITU provisions, whether in the United States or internationally. Finally, the Commission clarifies that the SCS framework is limited to operations performed in the bands designated in the *Report and Order* for SCS and remains separate from the service rules for MSS systems. Consequently, the rules the Commission adopts in the *Report and Order* represent an initial step to encourage the development of SCS while minimizing the risks of harmful interference to existing terrestrial and satellite networks that support non-federal and federal users.

B. Summary of Significant Issues Raised by Public Comments in Response to the IRFA

6. Parties that filed comments did not specifically reference the IRFA in their comments; however, some commenters, some of which include small entities, expressed concerns that the proposal in the *Notice* in which a single terrestrial licensee must hold all co-channel licenses in a given GIA would either limit SCS to large carriers with nationwide authority over a block of spectrum, or, at a minimum, exclude smaller or regional terrestrial operators from participation in the framework.[4] These concerns are discussed in greater detail in section F of this FRFA.

C. Response to Comments by the Chief Counsel for Advocacy of the Small Business Administration

7. Pursuant to the Small Business Jobs Act of 2010, which amended the RFA, the Commission is required to respond to any comments filed by the Chief Counsel for Advocacy of the Small Business Administration (SBA), and to provide a detailed statement of any change made to the proposed rules as a result of those comments.[5]

8. The Chief Counsel did not file any comments in response to the proposed rules or policies in this proceeding.

D. Description and Estimate of the Number of Small Entities to Which the Rules Will

[4] *See Report and Order*, para. 58.

[5] 5 U.S.C. § 604(a)(3).

Apply

9. The RFA directs agencies to provide a description of, and where feasible, an estimate of, the number of small entities that may be affected by the rules adopted herein.[6] The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction."[7] In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act.[8] A "small business concern" is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the SBA.[9]

10. *Small Businesses, Small Organizations, Small Government Jurisdictions.* Our actions, over time, may affect small entities that are not easily categorized at present. We therefore describe, at the outset, three broad groups of small entities that could be directly affected herein.[10] First, where there are industry specific size standards for businesses that are used in the regulatory flexibility analysis, according to data from the Small Business Administration's (SBA) Office of Advocacy, in general a small business is an independent business having fewer than 500 employees.[11] These types of small businesses represent 99.9% of all businesses in the United States, which translates to 33.2 million businesses.[12]

11. Next, the type of small entity described as a "small organization" is generally "any not-for-profit enterprise which is independently owned and operated and is not dominant in its field."[13] The Internal Revenue Service (IRS) uses a revenue benchmark of $50,000 or less to delineate its annual electronic filing requirements for small exempt organizations.[14] Nationwide, for tax year 2020, there were approximately 447,689 small exempt organizations in the U.S. reporting revenue of $50,000 or less according to the registration and tax data for exempt organizations available from the IRS.[15]

---

[6] *Id.* § 604(a)(4).

[7] *Id.* § 601(6).

[8] *Id.* § 601(3) (incorporating by reference the definition of "small-business concern" in the Small Business Act, 15 U.S.C. § 632). Pursuant to 5 U.S.C. § 601(3), the statutory definition of a small business applies "unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register."

[9] 15 U.S.C. § 632.

[10] *See* 5 U.S.C. § 601(3)-(6).

[11] *See* SBA, Office of Advocacy, "What's New With Small Business?," https://advocacy.sba.gov/wp-content/uploads/2023/03/Whats-New-Infographic-March-2023-508c.pdf (Mar. 2023).

[12] *Id.*

[13] *See* 5 U.S.C. § 601(4).

[14] The IRS benchmark is similar to the population of less than 50,000 benchmark in 5 U.S.C § 601(5) that is used to define a small governmental jurisdiction. Therefore, the IRS benchmark has been used to estimate the number of small organizations in this small entity description. S*ee* Annual Electronic Filing Requirement for Small Exempt Organizations – Form 990-N (e-Postcard), "Who must file," https://www.irs.gov/charities-non-profits/annual-electronic-filing-requirement-for-small-exempt-organizations-form-990-n-e-postcard. We note that the IRS data does not provide information on whether a small exempt organization is independently owned and operated or dominant in its field.

[15] *See* Exempt Organizations Business Master File Extract (EO BMF), "CSV Files by Region," https://www.irs.gov/charities-non-profits/exempt-organizations-business-master-file-extract-eo-bmf. The IRS Exempt Organization Business Master File (EO BMF) Extract provides information on all registered tax-

(continued….)

12. Finally, the small entity described as a "small governmental jurisdiction" is defined generally as "governments of cities, counties, towns, townships, villages, school districts, or special districts, with a population of less than fifty thousand."[16] U.S. Census Bureau data from the 2017 Census of Governments[17] indicate there were 90,075 local governmental jurisdictions consisting of general purpose governments and special purpose governments in the United States.[18] Of this number, there were 36,931 general purpose governments (county,[19] municipal, and town or township[20]) with populations of less than 50,000 and 12,040 special purpose governments—independent school districts[21] with enrollment populations of less than 50,000.[22] Accordingly, based on the 2017 U.S. Census of Government data, we estimate that at least 48,971 entities fall into the category of "small government jurisdictions."[23]

13. *Satellite Telecommunications.* This industry comprises firms "primarily engaged in providing telecommunications services to other establishments in the telecommunications and broadcasting industries by forwarding and receiving communications signals via a system of satellites or

exempt/non-profit organizations. The data utilized for purposes of this description was extracted from the IRS EO BMF data for businesses for the tax year 2020 with revenue less than or equal to $50,000 for Region 1-Northeast Area (58,577), Region 2-Mid-Atlantic and Great Lakes Areas (175,272), and Region 3-Gulf Coast and Pacific Coast Areas (213,840) that includes the continental U.S., Alaska, and Hawaii. This data does not include information for Puerto Rico.

[16] *See* 5 U.S.C. § 601(5).

[17] *See* 13 U.S.C. § 161. The Census of Governments survey is conducted every five (5) years compiling data for years ending with "2" and "7". *See also* Census of Governments, https://www.census.gov/programs-surveys/cog/about.html.

[18] *See* U.S. Census Bureau, 2017 Census of Governments – Organization Table 2. Local Governments by Type and State: 2017 [CG1700ORG02], https://www.census.gov/data/tables/2017/econ/gus/2017-governments.html. Local governmental jurisdictions are made up of general purpose governments (county, municipal and town or township) and special purpose governments (special districts and independent school districts). *See also* tbl.2. CG1700ORG02 Table Notes_Local Governments by Type and State_2017.

[19] *See id.* at tbl.5. County Governments by Population-Size Group and State: 2017 [CG1700ORG05], https://www.census.gov/data/tables/2017/econ/gus/2017-governments.html. There were 2,105 county governments with populations less than 50,000. This category does not include subcounty (municipal and township) governments.

[20] *See id.* at tbl.6. Subcounty General-Purpose Governments by Population-Size Group and State: 2017 [CG1700ORG06], https://www.census.gov/data/tables/2017/econ/gus/2017-governments.html. There were 18,729 municipal and 16,097 town and township governments with populations less than 50,000.

[21] *See id.* at tbl.10. Elementary and Secondary School Systems by Enrollment-Size Group and State: 2017 [CG1700ORG10], https://www.census.gov/data/tables/2017/econ/gus/2017-governments.html. There were 12,040 independent school districts with enrollment populations less than 50,000. *See also* tbl.4. Special-Purpose Local Governments by State Census Years 1942 to 2017 [CG1700ORG04], CG1700ORG04 Table Notes_Special Purpose Local Governments by State_Census Years 1942 to 2017.

[22] While the special purpose governments category also includes local special district governments, the 2017 Census of Governments data does not provide data aggregated based on population size for the special purpose governments category. Therefore, only data from independent school districts is included in the special purpose governments category.

[23] This total is derived from the sum of the number of general purpose governments (county, municipal and town or township) with populations of less than 50,000 (36,931) and the number of special purpose governments - independent school districts with enrollment populations of less than 50,000 (12,040), from the 2017 Census of Governments - Organizations tbls. 5, 6 & 10.

reselling satellite telecommunications."[24] Satellite telecommunications service providers include satellite and earth station operators. The SBA small business size standard for this industry classifies a business with $38.5 million or less in annual receipts as small.[25] U.S. Census Bureau data for 2017 show that 275 firms in this industry operated for the entire year.[26] Of this number, 242 firms had revenue of less than $25 million.[27] Additionally, based on Commission data in the 2022 Universal Service Monitoring Report, as of December 31, 2021, there were 65 providers that reported they were engaged in the provision of satellite telecommunications services.[28] Of these providers, the Commission estimates that approximately 42 providers have 1,500 or fewer employees.[29] Consequently, using the SBA's small business size standard, a little more than half of these providers can be considered small entities.

14. *Wireless Telecommunications Carriers (except Satellite)*. This industry comprises establishments engaged in operating and maintaining switching and transmission facilities to provide communications via the airwaves.[30] Establishments in this industry have spectrum licenses and provide services using that spectrum, such as cellular services, paging services, wireless internet access, and wireless video services.[31] The SBA size standard for this industry classifies a business as small if it has 1,500 or fewer employees.[32] U.S. Census Bureau data for 2017 show that there were 2,893 firms in this industry that operated for the entire year.[33] Of that number, 2,837 firms employed fewer than 250 employees.[34] Additionally, based on Commission data in the 2021 Universal Service Monitoring Report, as of December 31, 2020, there were 797 providers that reported they were engaged in the provision of wireless services.[35] Of these providers, the Commission estimates that 715 providers have 1,500 or fewer

[24] *See* U.S. Census Bureau, *2017 NAICS Definition, "517410 Satellite Telecommunications,"* https://www.census.gov/naics/?input=517410&year=2017&details=517410.

[25] *See* 13 CFR § 121.201, NAICS Code 517410.

[26] *See* U.S. Census Bureau, *2017 Economic Census of the United States*, *Selected Sectors: Sales, Value of Shipments, or Revenue Size of Firms for the U.S.: 2017,* Table ID: EC1700SIZEREVFIRM, NAICS Code 517410, https://data.census.gov/cedsci/table?y=2017&n=517410&tid=ECNSIZE2017.EC1700SIZEREVFIRM&hidePreview=false.

[27] *Id.* The available U.S. Census Bureau data does not provide a more precise estimate of the number of firms that meet the SBA size standard. We also note that according to the U.S. Census Bureau glossary, the terms receipts and revenues are used interchangeably, *see* https://www.census.gov/glossary/#term_ReceiptsRevenueServices.

[28] Federal-State Joint Board on Universal Service, Universal Service Monitoring Report at 26, Table 1.12 (2022), https://docs.fcc.gov/public/attachments/DOC-391070A1.pdf.

[29] *Id.*

[30] *See* U.S. Census Bureau, *2017 NAICS Definition, "517312 Wireless Telecommunications Carriers (except Satellite),"* https://www.census.gov/naics/?input=517312&year=2017&details=517312.

[31] *Id.*

[32] *See* 13 CFR § 121.201, NAICS Code 517312 (as of 10/1/22, NAICS Code 517112).

[33] *See* U.S. Census Bureau, *2017 Economic Census of the United States*, *Employment Size of Firms for the U.S.: 2017,* Table ID: EC1700SIZEEMPFIRM, NAICS Code 517312, https://data.census.gov/cedsci/table?y=2017&n=517312&tid=ECNSIZE2017.EC1700SIZEEMPFIRM&hidePreview=false.

[34] *Id.* The available U.S. Census Bureau data does not provide a more precise estimate of the number of firms that meet the SBA size standard.

[35] Federal-State Joint Board on Universal Service, Universal Service Monitoring Report at 26, Table 1.12 (2022), https://docs.fcc.gov/public/attachments/DOC-391070A1.pdf.

employees.[36] Consequently, using the SBA's small business size standard, most of these providers can be considered small entities.

15. *600 MHz Band*. These wireless communications services are radiocommunication services licensed in the 617-652 MHz and 663-698 MHz frequency bands that can be used for fixed and mobile flexible uses.[37] 600 MHz Band services fall within the scope of the Wireless Telecommunications Carriers (except Satellite)[38] industry where the SBA small business size standard classifies a business as small if it has 1,500 or fewer employees.[39] U.S. Census Bureau data for 2017 show that there were 2,893 firms that operated in this industry for the entire year.[40] Of this number, 2,837 firms employed fewer than 250 employees.[41] Thus under the SBA size standard, the Commission estimates that a majority of licensees in this industry can be considered small.

16. Based on Commission data as of November 2021, there were approximately 3,327 active licenses in the 600 MHz Band service.[42] The Commission's small business size standards with respect to 600 MHz Band services involve eligibility for bidding credits and installment payments in the auction of licenses for these services. For purposes of bidding credits, the Commission defined "small business" as an entity with average gross revenues not exceeding $55 million for each of the three preceding years, and a "very small business" as an entity with average gross revenues not exceeding $20 million for each of the three preceding years for the 600 MHz band auction.[43] Pursuant to these definitions, 15 bidders claiming small business status won 290 licenses.[44]

17. In frequency bands where licenses were subject to auction, the Commission notes that as a general matter, the number of winning bidders that qualify as small businesses at the close of an auction does not necessarily represent the number of small businesses currently in service. Further, the Commission does not generally track subsequent business size unless, in the context of assignments or transfers, unjust enrichment issues are implicated. Additionally, since the Commission does not collect data on the number of employees for licensees providing these services, at this time we are not able to

---

[36] *Id.*

[37] *See* 47 CFR §§ 27.4, 27.5(l).

[38] *See* U.S. Census Bureau, *2017 NAICS Definition, "517312 Wireless Telecommunications Carriers* (*except Satellite*)," https://www.census.gov/naics/?input=517312&year=2017&details=517312.

[39] *See* 13 CFR § 121.201, NAICS Code 517312 (as of 10/1/22, NAICS Code 517112).

[40] *See* U.S. Census Bureau, *2017 Economic Census of the United States*, *Employment Size of Firms for the U.S.: 2017,* Table ID: EC1700SIZEEMPFIRM, NAICS Code 517312, https://data.census.gov/cedsci/table?y=2017&n=517312&tid=ECNSIZE2017.EC1700SIZEEMPFIRM&hidePreview=false.

[41] *Id*. The available U.S. Census Bureau data does not provide a more precise estimate of the number of firms that meet the SBA size standard.

[42] Based on a FCC Universal Licensing System search on November 16, 2021, https://wireless2.fcc.gov/UlsApp/UlsSearch/searchAdvanced.jsp. Search parameters: Service Group = All, "Match only the following radio service(s)", Radio Service = WT; Authorization Type = All; Status = Active. We note that the number of active licenses does not equate to the number of licensees. A licensee can have one or more licenses.

[43] *See* 47 CFR § 27.1301(a).

[44] *See Incentive Auction Closing and Channel Reassignment Public Notice; Incentive Auction Closes; Reverse Auction and Forward Auction Results Announced; Final Television Band Channel Assignments Announced; Post-Auction Deadlines Announced*, 32 FCC Rcd 2786, Appendix B (Auction No.1002) (April 23, 2017), https://www.fcc.gov/document/fcc-announces-results-worlds-first-broadcast-incentive-auction-0/appendix-b.

estimate the number of licensees with active licenses that would qualify as small under the SBA's small business size standard.

18. *Lower 700 MHz Band Licenses*. The lower 700 MHz band encompasses spectrum in the 698-746 MHz frequency bands. Permissible operations in these bands include flexible fixed, mobile, and broadcast uses, including mobile and other digital new broadcast operation; fixed and mobile wireless commercial services (including FDD- and TDD-based services); as well as fixed and mobile wireless uses for private, internal radio needs, two-way interactive, cellular, and mobile television broadcasting services.[45] Wireless Telecommunications Carriers (*except* Satellite)[46] is the closest industry with a SBA small business size standard applicable to licenses providing services in these bands. The SBA small business size standard for this industry classifies a business as small if it has 1,500 or fewer employees.[47] U.S. Census Bureau data for 2017 show that there were 2,893 firms that operated in this industry for the entire year.[48] Of this number, 2,837 firms employed fewer than 250 employees.[49] Thus under the SBA size standard, the Commission estimates that a majority of licensees in this industry can be considered small.

19. According to Commission data as of December 2021, there were approximately 2,824 active Lower 700 MHz Band licenses.[50] The Commission's small business size standards with respect to Lower 700 MHz Band licensees involve eligibility for bidding credits and installment payments in the auction of licenses. For auctions of Lower 700 MHz Band licenses the Commission adopted criteria for three groups of small businesses. A very small business was defined as an entity that, together with its affiliates and controlling interests, has average annual gross revenues not exceeding $15 million for the preceding three years, a small business was defined as an entity that, together with its affiliates and controlling interests, has average gross revenues not exceeding $40 million for the preceding three years, and an entrepreneur was defined as an entity that, together with its affiliates and controlling interests, has average gross revenues not exceeding $3 million for the preceding three years.[51] In auctions for Lower 700 MHz Band licenses seventy-two winning bidders claiming a small business classification won 329

[45] *See* Federal Communications Commission, Economics and Analytics, Auctions, Auctions 44, 49, 60: Lower 700 MHz Band, Fact Sheet, Permissible Operations, https://www.fcc.gov/auction/44/factsheet, https://www.fcc.gov/auction/49/factsheet, https://www.fcc.gov/auction/60/factsheet.

[46] *See* U.S. Census Bureau, *2017 NAICS Definition, "517312 Wireless Telecommunications Carriers* (*except Satellite*)," https://www.census.gov/naics/?input=517312&year=2017&details=517312.

[47] *See* 13 CFR § 121.201, NAICS Code 517312 (as of 10/1/22, NAICS Code 517112).

[48] *See* U.S. Census Bureau, *2017 Economic Census of the United States*, *Employment Size of Firms for the U.S.: 2017,* Table ID: EC1700SIZEEMPFIRM, NAICS Code 517312, https://data.census.gov/cedsci/table?y=2017&n=517312&tid=ECNSIZE2017.EC1700SIZEEMPFIRM&hidePreview=false.

[49] *Id*. The available U.S. Census Bureau data does not provide a more precise estimate of the number of firms that meet the SBA size standard.

[50] Based on a FCC Universal Licensing System search on December 14, 2021, https://wireless2.fcc.gov/UlsApp/UlsSearch/searchAdvanced.jsp. Search parameters: Service Group = All, "Match only the following radio service(s)", Radio Service = WY, WZ; Authorization Type = All; Status = Active. We note that the number of active licenses does not equate to the number of licensees. A licensee can have one or more licenses.

[51] *See* 47 CFR § 27.702(a)(1)-(3).

licenses,[52] twenty-six winning bidders claiming a small business classification won 214 licenses,[53] and three winning bidders claiming a small business classification won all five auctioned licenses.[54]

20. In frequency bands where licenses were subject to auction, the Commission notes that as a general matter, the number of winning bidders that qualify as small businesses at the close of an auction does not necessarily represent the number of small businesses currently in service. Further, the Commission does not generally track subsequent business size unless, in the context of assignments or transfers, unjust enrichment issues are implicated. Additionally, since the Commission does not collect data on the number of employees for licensees providing these services, at this time we are not able to estimate the number of licensees with active licenses that would qualify as small under the SBA's small business size standard.

21. *Upper 700 MHz Band Licenses*. The upper 700 MHz band encompasses spectrum in the 746-806 MHz bands. Upper 700 MHz D Block licenses are nationwide licenses associated with the 758-763 MHz and 788-793 MHz bands.[55] Permissible operations in these bands include flexible fixed, mobile, and broadcast uses, including mobile and other digital new broadcast operation; fixed and mobile wireless commercial services (including FDD- and TDD-based services); as well as fixed and mobile wireless uses for private, internal radio needs, two-way interactive, cellular, and mobile television broadcasting services.[56] Wireless Telecommunications Carriers (*except* Satellite)[57] is the closest industry with a SBA small business size standard applicable to licenses providing services in these bands. The SBA small business size standard for this industry classifies a business as small if it has 1,500 or fewer employees.[58] U.S. Census Bureau data for 2017 show that there were 2,893 firms that operated in this industry for the entire year.[59] Of that number, 2,837 firms employed fewer than 250 employees.[60] Thus, under the SBA size standard, the Commission estimates that a majority of licensees in this industry can be considered small.

22. According to Commission data as of December 2021, there were approximately 152

---

[52] *See* Federal Communications Commission, Economics and Analytics, Auctions, Auction 44: Lower 700 MHz Guard Bands, Summary, Closing Charts, Licenses by Bidder, https://www.fcc.gov/sites/default/files/wireless/auctions/44/charts/44cls2.pdf.

[53] *See* Federal Communications Commission, Economics and Analytics, Auctions, Auction 49: Lower 700 MHz Guard Bands, Summary, Closing Charts, Licenses by Bidder, https://www.fcc.gov/sites/default/files/wireless/auctions/49/charts/49cls2.pdf.

[54] *See* Federal Communications Commission, Economics and Analytics, Auctions, Auction 60: Lower 700 MHz Guard Bands, Summary, Closing Charts, Licenses by Bidder, https://www.fcc.gov/sites/default/files/wireless/auctions/60/charts/60cls2.pdf.

[55] *See* 47 CFR § 27.4.

[56] *See* Federal Communications Commission, Economics and Analytics, Auctions, Auction 73: 700 MHz Band, Fact Sheet, Permissible Operations, https://www.fcc.gov/auction/73/factsheet. We note that in Auction 73, Upper 700 MHz Band C and D Blocks as well as Lower 700 MHz Band A, B, and E Blocks were auctioned.

[57] *See* U.S. Census Bureau, *2017 NAICS Definition, "517312 Wireless Telecommunications Carriers* (*except Satellite*)," https://www.census.gov/naics/?input=517312&year=2017&details=517312.

[58] *See* 13 CFR § 121.201, NAICS Code 517312 (as of 10/1/22, NAICS Code 517112).

[59] *See* U.S. Census Bureau, *2017 Economic Census of the United States*, *Employment Size of Firms for the U.S.: 2017,* Table ID: EC1700SIZEEMPFIRM, NAICS Code 517312, https://data.census.gov/cedsci/table?y=2017&n=517312&tid=ECNSIZE2017.EC1700SIZEEMPFIRM&hidePreview=false.

[60] *Id*. The available U.S. Census Bureau data does not provide a more precise estimate of the number of firms that meet the SBA size standard.

active Upper 700 MHz Band licenses.[61] The Commission's small business size standards with respect to Upper 700 MHz Band licensees involve eligibility for bidding credits and installment payments in the auction of licenses. For the auction of these licenses, the Commission defined a "small business" as an entity that, together with its affiliates and controlling principals, has average gross revenues not exceeding $40 million for the preceding three years, and a "very small business" an entity that, together with its affiliates and controlling principals, has average gross revenues that are not more than $15 million for the preceding three years.[62] Pursuant to these definitions, three winning bidders claiming very small business status won five of the twelve available licenses.[63]

23. In frequency bands where licenses were subject to auction, the Commission notes that as a general matter, the number of winning bidders that qualify as small businesses at the close of an auction does not necessarily represent the number of small businesses currently in service. Further, the Commission does not generally track subsequent business size unless, in the context of assignments or transfers, unjust enrichment issues are implicated. Additionally, since the Commission does not collect data on the number of employees for licensees providing these services, at this time we are not able to estimate the number of licensees with active licenses that would qualify as small under the SBA's small business size standard.

24. *Cellular Radiotelephone Service.* This service is radio service in which licensees are authorized to offer and provide cellular service for hire to the general public and was formerly titled Domestic Public Cellular Radio Telecommunications Service.[64] Cellular Radiotelephone Service falls within the scope the Wireless Telecommunications Carriers (except Satellite)[65] industry, where the SBA small business size standard classifies a business as small if it has 1,500 or fewer employees.[66] U.S. Census Bureau data for 2017 show that there were 2,893 firms that operated in this industry for the entire year.[67] Of this number, 2,837 firms employed fewer than 250 employees.[68] Thus under the SBA size standard, the Commission estimates that a majority of licensees in this industry can be considered small.

---

[61] Based on a FCC Universal Licensing System search on December 14, 2021, https://wireless2.fcc.gov/UlsApp/UlsSearch/searchAdvanced.jsp. Search parameters: Service Group = All, "Match only the following radio service(s)", Radio Service = WP, WU; Authorization Type = All; Status = Active. We note that the number of active licenses does not equate to the number of licensees. A licensee can have one or more licenses.

[62] *See* 47 CFR § 27.502(a).

[63] *See Auction of 700 MHz Band Licenses Closes; Winning Bidders Announced for Auction 73*, Public Notice, DA-08-595, Attachment A, Report No. AUC-08-73-I (Auction 73) (March 20, 2008). The results for Upper 700 MHz Band C Block can be found on pp. 62-63.

[64] *See* 47 CFR § 22.99.

[65] *See* U.S. Census Bureau, *2017 NAICS Definition, "517312 Wireless Telecommunications Carriers* (*except Satellite*)," https://www.census.gov/naics/?input=517312&year=2017&details=517312.

[66] *See* 13 CFR § 121.201, NAICS Code 517312 (as of 10/1/22, NAICS Code 517112).

[67] *See* U.S. Census Bureau, *2017 Economic Census of the United States*, *Employment Size of Firms for the U.S.: 2017,* Table ID: EC1700SIZEEMPFIRM, NAICS Code 517312, https://data.census.gov/cedsci/table?y=2017&n=517312&tid=ECNSIZE2017.EC1700SIZEEMPFIRM&hidePreview=false.

[68] *Id*. The available U.S. Census Bureau data does not provide a more precise estimate of the number of firms that meet the SBA size standard.

25. Based on Commission data, as of November 2021, there were approximately 1,908 active licenses in this service.[69] The Commission's small business size standards with respect to Cellular Radiotelephone Services involve eligibility for bidding credits and installment payments in the auction of licenses for these services. For purposes of bidding credits, the Commission has defined "small business" as an entity that either (1) together with its affiliates and controlling interests has average gross revenues of not more than $3 million for each of the three preceding years, or (2) together with its affiliates and controlling interests has average gross revenues of not more $15 million for each of the three preceding years.[70]

26. In frequency bands where licenses were subject to auction, the Commission notes that as a general matter, the number of winning bidders that qualify as small businesses at the close of an auction does not necessarily represent the number of small businesses currently in service. Further, the Commission does not generally track subsequent business size unless, in the context of assignments or transfers, unjust enrichment issues are implicated. Additionally, since the Commission does not collect data on the number of employees for licensees providing these services, at this time we are not able to estimate the number of licensees with active licenses that would qualify as small under the SBA's small business size standard.

27. *Advanced Wireless Services (AWS) - (1710–1755 MHz and 2110–2155 MHz bands (AWS-1); 1915–1920 MHz, 1995–2000 MHz, 2020–2025 MHz and 2175–2180 MHz bands (AWS-2); 2155–2175 MHz band (AWS-3); 2000-2020 MHz and 2180-2200 MHz (AWS-4)).* Spectrum is made available and licensed in these bands for the provision of various wireless communications services.[71] Wireless Telecommunications Carriers (except Satellite)[72] is the closest industry with a SBA small business size standard applicable to these services. The SBA small business size standard for this industry classifies a business as small if it has 1,500 or fewer employees.[73] U.S. Census Bureau data for 2017 show that there were 2,893 firms that operated in this industry for the entire year.[74] Of this number, 2,837 firms employed fewer than 250 employees.[75] Thus, under the SBA size standard, the Commission estimates that a majority of licensees in this industry can be considered small.

28. According to Commission data as December 2021, there were approximately 4,472 active AWS licenses.[76] The Commission's small business size standards with respect to AWS involve

---

[69] Based on a FCC Universal Licensing System search on November 12, 2021, https://wireless2.fcc.gov/UlsApp/UlsSearch/searchAdvanced.jsp. Search parameters: Service Group = All, "Match only the following radio service(s)", Radio Service = CL; Authorization Type = All; Status = Active. We note that the number of active licenses does not equate to the number of licensees. A licensee can have one or more licenses.

[70] *See* 47 CFR § 22.223(b).

[71] *See* 47 CFR § 27.1(b).

[72] *See* U.S. Census Bureau, *2017 NAICS Definition, "517312 Wireless Telecommunications Carriers* (*except Satellite*)," https://www.census.gov/naics/?input=517312&year=2017&details=517312.

[73] *See* 13 CFR § 121.201, NAICS Code 517312 (as of 10/1/22, NAICS Code 517112).

[74] *See* U.S. Census Bureau, *2017 Economic Census of the United States*, *Employment Size of Firms for the U.S.: 2017,* Table ID: EC1700SIZEEMPFIRM, NAICS Code 517312, https://data.census.gov/cedsci/table?y=2017&n=517312&tid=ECNSIZE2017.EC1700SIZEEMPFIRM&hidePreview=false.

[75] *Id*. The available U.S. Census Bureau data does not provide a more precise estimate of the number of firms that meet the SBA size standard.

[76] Based on a FCC Universal Licensing System search on December 10, 2021, https://wireless2.fcc.gov/UlsApp/UlsSearch/searchAdvanced.jsp. Search parameters: Service Group = All, "Match only the following radio service(s)", Radio Service = AD, AH, AT, AW; Authorization Type = All; Status = Active.
(continued….)

eligibility for bidding credits and installment payments in the auction of licenses for these services. For the auction of AWS licenses, the Commission defined a "small business" as an entity with average annual gross revenues for the preceding three years not exceeding $40 million, and a "very small business" as an entity with average annual gross revenues for the preceding three years not exceeding $15 million.[77] Pursuant to these definitions, 57 winning bidders claiming status as small or very small businesses won 215 of 1,087 licenses.[78] In the most recent auction of AWS licenses 15 of 37 bidders qualifying for status as small or very small businesses won licenses.[79]

29. In frequency bands where licenses were subject to auction, the Commission notes that as a general matter, the number of winning bidders that qualify as small businesses at the close of an auction does not necessarily represent the number of small businesses currently in service. Further, the Commission does not generally track subsequent business size unless, in the context of assignments or transfers, unjust enrichment issues are implicated. Additionally, since the Commission does not collect data on the number of employees for licensees providing these services, at this time we are not able to estimate the number of licensees with active licenses that would qualify as small under the SBA's small business size standard.

30. *All Other Telecommunications*. This industry is comprised of establishments primarily engaged in providing specialized telecommunications services, such as satellite tracking, communications telemetry, and radar station operation.[80] This industry also includes establishments primarily engaged in providing satellite terminal stations and associated facilities connected with one or more terrestrial systems and capable of transmitting telecommunications to, and receiving telecommunications from, satellite systems.[81] Providers of Internet services (e.g. dial-up ISPs) or voice over Internet protocol (VoIP) services, via client-supplied telecommunications connections are also included in this industry.[82] The SBA small business size standard for this industry classifies firms with annual receipts of $35 million or less as small.[83] U.S. Census Bureau data for 2017 show that there were 1,079 firms in this industry that operated for the entire year.[84] Of those firms, 1,039 had revenue of less than $25 million.[85] Based on this data, the Commission estimates that the majority of "All Other Telecommunications" firms can be

---

We note that the number of active licenses does not equate to the number of licensees. A licensee can have one or more licenses.

[77] *See* 47 CFR §§ 27.1002, 27.1102, 27.1104, 27.1106.

[78] *See* Federal Communications Commission, Economics and Analytics, Auctions, Auction 66: Advanced Wireless Services (AWS-1), Summary, Spreadsheets, https://www.fcc.gov/sites/default/files/wireless/auctions/66/charts/66cls2.pdf.

[79] *See Auction of Advanced Wireless Services (AWS-3) Licenses Closes; Winning Bidders Announced for Auction 97*, Public Notice, DA-15-131, Attachments A-B, (Auction No. 97) (January 30, 2015).

[80] *See* U.S. Census Bureau, *2017 NAICS Definition*, "*517919 All Other Telecommunications,*" https://www.census.gov/naics/?input=517919&year=2017&details=517919.

[81] *Id.*

[82] *Id*.

[83] *See* 13 CFR § 121.201, NAICS Code 517919 (as of 10/1/22, NAICS Code 517810).

[84] *See* U.S. Census Bureau, *2017 Economic Census of the United States*, *Selected Sectors: Sales, Value of Shipments, or Revenue Size of Firms for the U.S.: 2017,* Table ID: EC1700SIZEREVFIRM, NAICS Code 517919, https://data.census.gov/cedsci/table?y=2017&n=517919&tid=ECNSIZE2017.EC1700SIZEREVFIRM&hidePreview=false.

[85] *Id.* The available U.S. Census Bureau data does not provide a more precise estimate of the number of firms that meet the SBA size standard. We also note that according to the U.S. Census Bureau glossary, the terms receipts and revenues are used interchangeably, *see* https://www.census.gov/glossary/#term_ReceiptsRevenueServices.

considered small.

E. Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements for Small Entities

31. While the Commission sought to minimize compliance burdens where practicable, the SCS framework adopted in the *Report and Order* will impose new or additional reporting, recordkeeping, and/or other compliance obligations on small entities. In addition, while it sought comment from concerned parties regarding costs related to those obligations, the record does not contain a detailed cost/benefit analysis that would allow us to quantify such related costs to small entities. The rules adopted in the *Report and Order* encompass a broad range of leasing, licensing, and technical compliance requirements that are summarized in further detail below.

32. *Part 25 License Entry Criteria.* The *Report and Order* effectuates SCS in certain flexible-use bands previously allocated solely for terrestrial use by the adoption of rules to authorize satellite-to-terrestrial (uplink and downlink) operations in these bands whereby a NGSO or GSO satellite operator may apply for a new or modify an existing part 25 authorization when that entity meets certain prerequisites, or "entry criteria." The "entry criteria" requires the satellite operator intending to modify its existing part 25 application in order to provide SCS to include a certification that provides the following information: (1) the satellite operator has one or more leasing notification(s) or application(s), or in the case of FirstNet, a Form 601, on file with the Commission to access the spectrum allocated for MSS provision of SCS from a single terrestrial licensee or multiple licensees that hold, collectively or individually, all co-channel licenses throughout a GIA; (2) the current part 25 space station licensee or part 25 grantee of market access for NGSO or GSO satellite operation seeks modification of authority to provide SCS in the same geographic areas covered in the relevant GIA; and (3) the terrestrial devices involved in SCS qualify as "licensed by rule" earth stations under the new provisions of part 25. Similarly, satellite operators may apply for an initial part 25 license with authority to provide SCS if it shows that it meet requirements (1) and (3) above, and if in their part 25 application, those operators request to provide SCS in in the same geographic areas covered in the relevant GIA.

33. In its adopted rules, the Commission maintains its existing part 25 rules for obtaining and modifying a license and applies them to the SCS framework. Under this framework, meeting the proposed entry criteria would allow small and other entities to apply to modify its existing satellite authorization. However, all related applications—including those seeking modification, lease applications, and earth station equipment certifications—must first be granted to provide SCS. Thus, the *Report and Order*'s requirements are in addition to the existing underlying reporting, recordkeeping, and compliance requirements. We further note, however, that due to the significant costs involved in SCS development and deployment, we anticipate that few satellite operators affected by this rulemaking would qualify under the definition of "small entity."

34. *Part 1 Leasing.* In the *Report and Order*, the Commission adopts a framework authorizing SCS by amending its part 1 leasing rules to permit terrestrial licensees to lease terrestrial spectrum rights to satellite operators for the purpose of providing SCS. In order to properly comply, the adopted rules require applicants for and current licensees of the authorized SCS bands to provide the following information using the current FCC Form 608: (1) a certification that the parties are entering into the leasing arrangement for the purpose of fulfilling the part 25 entry criteria; (2) a description of which method, single or multiple terrestrial licensee, the parties are utilizing to meet the part 25 entry criteria; and (3) if the parties are utilizing the spectrum leasing arrangement under the multiple terrestrial licensee method, the parties must: (a) describe the nature of the leasing arrangement(s); and (b) demonstrate how the entirety of the GIA is covered by the lease arrangement(s). The Commission believes that this requirement will improve the level of interference protection licensees receive in the band; and will create a more predictable and transparent spectrum environment for any current and future users of the band(s). This process also utilizes the Commission's current application approval and notification processing

procedures because it will remove unnecessary delay by utilizing the procedures that are already in place. Further, in light of these limited changes to the current application procedures, the Commission does not believe that small entities will have to hire professionals to comply with the *Report and Order*.

35. *Part 25 Automatic Termination.* In the *Report and Order*, the Commission retains the current part 25 rules regarding automatic termination of station authorizations to satellite licensees seeking to provide SCS jointly with a terrestrial operator, and adds a rule whereby the termination of any lease(s) that allow for the use of specific terrestrial spectrum for SCS is a trigger for automatic termination of the part 25 license. This requirement utilizes and applies the Commission's current part 25 automatic termination process. In light of these limited changes to the current procedures, the Commission does not believe that small entities will have to hire professionals to comply with the *Report and Order*.

36. *911 Call Transmission Requirements.* In the *Report and Order*, the Commission establishes on an interim basis that terrestrial providers must transmit all SCS 911 calls and texts to a PSAP using either an emergency call center or location-based routing. Terrestrial providers must also transmit location information and the user's phone number to facilitate dispatch and callback capabilities at the receiving PSAP. This interim step will balance the need for SCS 911 voice calls and texts to be routed to the appropriate PSAP with the need for terrestrial providers to have flexibility in their implementation of SCS. Under this approach, terrestrial providers must either: (1) use information regarding the location of a device, including but not limited to device-based location information, and transmit the phone number of the device used to send the SCS 911 voice call or SCS 911 text message and available information to an appropriate PSAP; or (2) use an emergency call center, at which emergency call center personnel must determine the emergency caller's phone number and location and then transfer or otherwise direct the SCS voice call or SCS text message to an appropriate PSAP. In addition, the Commission requires terrestrial providers that use SCS to file an SCS 911 report with the Commission on an annual basis, by October 15th of each year, that explains how their SCS deployments have supported 911 call/text routing to the geographically appropriate PSAP with sufficient location information. Terrestrial providers that utilize SCS to extend coverage must maintain records of SCS 911 voice calls and 911 text messages received under their SCS arrangements and received at their emergency centers. The Commission finds that these reporting and location-based routing requirements represent minimally burdensome requirements when weighed against the necessity of 911 service for emergency response and disaster preparedness. Further, while these recordkeeping and reporting requirements present new obligations for small entities, we note that these measures will promote the Commission's objectives regarding transparency and accountability in routing SCS voice calls and 911 text messages and provide useful data. Additionally, to advance consumer awareness of the extent to which SCS is used to provide connectivity to 911, the Commission adopts consumer disclosure requirements for terrestrial providers to inform their subscribers of the limitations when using SCS to contact 911. Finally, there is a one-time requirement that, prior to use of SCS location information to meet the Commission's 911 rules, terrestrial providers must certify that neither they nor any third party they rely on to obtain SCS location information will use that information or associated data for any non-911 purpose, except with prior express consent or as otherwise permitted or required by law. The certification also must state that terrestrial providers and any third party they rely on to obtain SCS location information will implement measures sufficient to safeguard the privacy and security of the information.

37. *Market Area Boundary Limits*. In the *Report and Order*, the Commission maintains the existing market area boundary limits in parts 22, 24, and 27 of the Commission's rules. Noting that SCS partners should be expected to coordinate regarding the technical parameters necessary to avoid co-channel interference with one another's operations. Although the introduction of SCS into spectrum licensed for terrestrial networks should have no impact to other radio systems operating in the band within the same or nearby geographical areas, the Commission adopts a rule to limit the signal levels from SCS at and beyond the terrestrial operator's licensed area to be the same as those defined for terrestrial

operation in each respective band. More specifically, the Commission maintains the existing market area boundary limits established in parts 22, 24, and 27 of the Commission's rules. These limits have also been used and shown to be feasible for operations similar to SCS. SCS can therefore only be deployed on the condition that stations using these frequencies will not cause harmful interference to, or claim protection from harmful interference caused by, an international station operating in accordance with the provisions of the Constitution, the Convention, and the Radio Regulations of the ITU.

38. The Commission recognizes that managing time varying signal levels from SCS space stations, which may be moving and utilizing multibeam transmissions, will require careful and dynamic management of power level and beams for small and other entities. Satellite operators must also account for multiple overlapping and changing satellites or beams covering the same areas, as well as leakage and interference from side beams. Therefore, the power limit for interference protection at any given point or area should be applied to aggregation of power received across all visible beams and satellites at all times as they move over any given point or area. In addition, operators may need to cease beam transmissions in zones to allow for signal degradation from the edge of SCS coverage. Given that the size of such zones depends on target services, satellite and beamforming configuration, and power management solutions which may improve over time, the Commission does not set a limit on the zone size as long as the receive power limits are met.

39. *Out of Band Emission (OOBE) Limits*. In the *Report and Order* the Commission adopted a uniform OOBE limit for SCS operation across the SCS Bands expressed as a terrestrial PFD limit. To ensure those adjacent band devices are protected from the risk of harmful interference, we find that both OOBE limits are warranted, and given the nature of SCS, that these limits should be measured and enforced on the ground. In setting these limits, we recognize that different factors may affect the potential for harmful interference due to the inherent difference in propagation effects when the signal is generated from a multibeam satellite constellation compared to when it is transmitted from a terrestrial base station. As a result, we therefore adopt limits that constitute a reasonable middle ground between existing terrestrial OOBE limits and satellite-based limits.

40. The existing OOBE limits for base stations vary across different radio services, and these services are governed by different parts of the Commission's rules (e.g., parts 22, 24, 27). Although different OOBE limits apply across individual SCS Bands, we believe adopting a uniform PFD limit for supplemental satellite coverage across the various bands is reasonable and provides a simple requirement for satellite operator compliance. To provide a uniform limit across the various SCS Bands, the Commission considers some balancing of these effects for PFD limits that are normalized to both 'per MHz' and 'per square meter'; i.e., $dBW/m^2/MHz$. We also specify that this PFD limit will apply at 1.5 meters above ground level, a height frequently associated with handset usage that has been used by the Commission when developing interference protection criteria for other wireless services. We believe that this limit represents an equitable—and technologically feasible—balance between the positions expressed in the record and will effectively protect adjacent band operations across the SCS Bands. Further, given that the Commission is breaking new ground in permitting satellite operations to not only operate in bands allocated for terrestrial systems, but permitting them to be fully integrated into those systems, we believe that it is in the public interest to require that those satellites protect terrestrial systems commensurate with the protections they are afforded from terrestrial-only systems. While the out-of-band PFD limits the Commission adopted may require more stringent attenuation than the emission limits specified in section 25.202(f) for satellite operation, the Commission believes that these stricter limits are both necessary and technologically feasible for small and other satellite operators providing SCS.

41. *Equipment Authorization for SCS.* The adopted rules in the *Report and Order* also require terrestrial device equipment authorization grantees to modify existing, or obtain new, equipment authorizations for previously certified terrestrial devices to reflect those devices' approval to operate under a part 25 MSS allocation and applicable SCS rules. New applicants should include a request for part 25 on future certification applications for equipment that is capable of operation in an SCS mode.

This requirement does introduce a new administrative burden for equipment authorization grantees and applicants, especially as it relates to already certified equipment. The Commission's existing procedures through the permissive change process which enable electrical or mechanical changes to certified equipment when those changes do not affect the characteristics required to be reported to the Commission do not apply here where the only change being made to the certification is adding authorization for part 25. Under the Commission's existing rules, "a change other than a permissive change" requires a grantee to file a new application for certification accompanied by the information specified in part 2 of the Commission's rules.[86] The Commission believes there is good reason to provide grantees a way to effectuate the necessary changes to their equipment authorization grants under the Commission's rules that also minimizes the administrative burdens associated with a new equipment certification application by waiving relevant rule provisions to provide a simplified process for existing grantees to modify their certifications to reflect part 25 authorization for SCS.

42. In granting a limited waiver of its rules, the Commission aims to minimize the burden on small and other equipment certification holders, while ensuring tracking and accountability for devices capable of SCS, and compliance with its prohibition on the authorization of covered equipment. Similarly, for new equipment authorizations, terrestrial devices need only show compliance with the terrestrial technical rules for the rule parts under which they will operate; no additional tests are needed for part 25 SCS capability. Thus, seeking to have the part 25 SCS designation on the equipment certification only requires the applicant to request such a designation pursuant to the SCS rules.

43. *International Coordination*. In the *Report and Order*, the adopted rules require that SCS operations that may occur in bands not allocated for such services in the International Table must be consistent with ITU Radio Regulation No. 4.4, and find that it would serve the public interest to include express conditions in the SCS licenses to ensure that the Commission's obligations are met as the ITU notifying administration for U.S. licensed space station operations. In these cases, the Commission will require additional assurances from SCS licensees that while operating outside of the United States, pursuant to an authorization from another country, the satellite operations will not cause harmful interference into a nearby country. Prior to conducting any communications with earth stations outside the United States, a satellite operator licensed to provide SCS, or applicant for a license to provide SCS, must certify to Space Bureau and the Office of International Affairs (OIA) that it has obtained all necessary authorizations from the relevant country prior to initiation of communications with earth stations in that country. The certification must include steps that were taken to address harmful interference concerns and that these SCS operations will not result in harmful interference to operations that are in conformity with the ITU Radio Regulations in neighboring or nearby countries. The certification must also be accompanied by a demonstration specifying the measures that the U.S. licensee or applicant will take to eliminate any harmful interference immediately, in the event that it is notified of harmful interference resulting from such SCS operations. These requirements are consistent with existing Commission rules, thereby limiting the compliance burden for small and other entities.

F. Steps Taken to Minimize the Significant Economic Impact on Small Entities and Significant Alternatives Considered

44. The RFA requires an agency to provide, "a description of the steps the agency has taken to minimize the significant economic impact on small entities . . . including a statement of the factual, policy, and legal reasons for selecting the alternative adopted in the final rule and why each one of the other significant alternatives to the rule considered by the agency which affect the impact on small entities was rejected.[87]

[86] 47 CFR § 2.1043(c).

[87] 5 U.S.C. § 604(a)(6).

45. As discussed above, the *Report and Order* adopts an SCS framework that allows, through a collaboration between a terrestrial mobile service provider and satellite operator, transmissions directly from satellites to terrestrial devices on spectrum that was previously allocated and licensed exclusively on a terrestrial basis. In the discussion of the issues, the initial *Notice* sought comment on, the Commission raised alternatives and sought input such as a cost and benefit analyses from small and other entities. By requesting such information, the Commission gave small entities the opportunity to broaden the scope of the Commission's understanding of impacts which may not be readily apparent, and offer alternatives not already considered that could minimize the economic impact on small entities.

46. *Waiver-Based Approach.* The Commission declines to adopt a waiver-based approach to enable SCS, opting instead to enable SCS on a variety of bands in all parts of the United States through generally-applicable rules. Some commenters argued for a waiver-based approach instead, but the Commission believes a generally-applicable rules approach allows the Commission to better serve the public by allowing it to more carefully consider the entire landscape of an issue as well as make more comprehensive policy decisions.[88] However, because there are particular SCS implementations that do not perfectly align with this framework, in order to not discourage or delay other innovative solutions for SCS, the Commission will continue to consider on a case-by-case basis filings for waiver or STA made by interested parties for SCS. Permitting case-by-case filings for waiver or STA will allow more flexibility for smaller entities who do not have the resources that larger entities have to participate in providing SCS.

47. *Geographically Independent Area (GIA).* In the initial *Notice*, the Commission proposed to limit the provision of SCS "to instances where a single terrestrial licensee holds all co-channel licenses in the relevant band throughout one of the six GIAs." In the *Report and Order*, the Commission adopted the proposal to limit SCS authorizations to the following GIAs: (1) CONUS; (2) Alaska; (3) Hawaii; (4) American Samoa; (5) Puerto Rico/U.S. Virgin Islands; and (6) Guam/Northern Mariana Islands.[89] The Commission adopted its original proposal to limit SCS to GIAs at this time, and acknowledges that this decision does not foreclose the ability for parties with proposals for providing SCS that do not satisfy the framework from applying to the Commission and demonstrating that they will not cause harmful interference. Some commenters, some of which include small entities, suggested this proposal would limit SCS to large carriers with nationwide authority over a block of spectrum, or otherwise exclude smaller or regional terrestrial operators from participation in the framework.[90] Because of these concerns, the Commission has taken the step of expanding its entry criteria so that multiple terrestrial service providers may work with a satellite operator to provide SCS, as long as together those service providers hold all the licenses in the relevant channel throughout a GIA. These more expansive entry criteria help provide an opportunity for broader deployment of SCS both spectrally and geographically and allows additional licensees to participate, while still minimizing the risk of harmful interference.

48. *Part 25 License Entry Criteria.* In the *Report and Order*, the Commission adopted rules to authorize satellite-to-terrestrial (uplink and downlink) operations in certain bands whereby a NGSO or GSO satellite operator may apply for a new or modify an existing part 25 authorization where that entity meets certain prerequisites, or "entry criteria." This approach will significantly expand and enhance secondary markets in a manner that aligns with the Commission's public interest objectives in order to permit spectrum to flow more freely among users and uses in response to economic demand. The Commission believes that by allowing spectrum to be utilized in this way, it will encourage small entities to become more involved in this process and collaborate with larger providers.

49. Furthermore, in the *Report and Order*, the Commission declined to require part 25

[88] *See Report and Order*, paras. 19-22.

[89] *See id.*, paras. 54-55.

[90] *See id.*, para. 58.

blanket earth station licensing because the comments in the record reflected that blanket licensing would be unnecessarily burdensome to small and other entities. In the initial *Notice*, the Commission proposed that a terrestrial licensee seeking to collaborate with a satellite operator to offer SCS must apply for and obtain a blanket earth station license for all of its subscribers' terrestrial devices that will be transmitting to space stations for SCS operations. The Commission sought comment on this approach as well as any other approaches that would be consistent with statutory and international obligations. However, commenters raised significant concerns regarding blanket licensing, and, thus, the Commission instead adopts a license by rule approach for terrestrial devices as earth stations communicating with a satellite network for the purposes of SCS. By not requiring providers to apply for and obtain a blanket earth station license, the Commission removes a barrier that was potentially unnecessarily burdensome, in particular for small entities with limited resources.

50. *Part 1 Leasing.* The Commission adopts a framework authorizing SCS by amending its part 1 leasing rules to permit terrestrial licensees to lease terrestrial spectrum rights to satellite operators for the purpose of providing SCS. These requirements are consistent with existing Commission part 1 leasing rules, and the Commission will require applicants for and current licensees of the authorized SCS bands to provide the necessary information using current FCC Form 608. This process will benefit small entities by saving time and resources, as it utilizes the Commission's current application approval and notification processing procedures, and it will remove unnecessary delay by utilizing the procedures that are already in place. Additionally, the Commission considered, but declined, to adopt an approach where a lease was not initially required. Some commenters advocated for the adoption of a "two-step" licensing model in response to the *Notice*, which would have involved a deployment grant that would not have required a lease initially. However, the Commission believes that a two-step part 25 licensing process would require a duplicative and inefficient use of staff resources that could create a significant economic burden to small entities.

51. *Part 25 Automatic Termination.* The Commission retains the current part 25 rules regarding automatic termination of station authorizations to satellite licensees seeking to provide SCS jointly with a terrestrial operator and adds a rule whereby the termination of any lease(s) that allow for the use of specific terrestrial spectrum for SCS is a trigger for automatic termination of the part 25 license. The new rule that triggers the current part 25 automatic termination requirement is consistent with the current automatic termination rules. By retaining the current part 25 rules regarding automatic termination, small and other entities will not have to become acquainted with a new set of rules, thus reducing their compliance burden.

52. *911 Call Transmission Requirements.* The Commission establishes on an interim basis that terrestrial providers must transmit all SCS 911 calls and texts to a PSAP using either an emergency call center or location-based routing. Terrestrial providers must also transmit location information and the user's phone number to facilitate dispatch and callback capabilities at the receiving PSAP. This interim step will balance the need for SCS 911 voice calls and texts to be routed to the appropriate PSAP with the need for entities to have flexibility in their implementation of SCS. The Commission implements this interim step because some terrestrial 911 requirements may not be feasible at this time and, thus, balanced feasibility with the vital importance of 911 services. In connection with this interim requirement, terrestrial providers that use SCS to extend coverage must maintain records of SCS 911 voice calls and text messages received on their network and emergency call centers. In addition, the adopted rules require terrestrial providers to file an SCS 911 report with the Commission on an annual basis, which will provide critical information regarding SCS 911 connectivity to the Commission while accomplishing it in a manner that does not create a severe burden for entities required to file. The Commission concluded that extending and adapting the existing MSS 911 reporting and location-based routing requirements are minimally burdensome. While these requirements do present new obligations for small entities, these measures will promote transparency and accountability in routing SCS voice calls and provide useful data. In addition, the concurrently adopted *Further Notice of Proposed Rulemaking*

will also provide an ample record in which the Commission may consider any additional concerns regarding SCS 911-related issues.

53. The *Report and Order* also establishes disclosure requirements for terrestrial providers to inform their subscribers of the limitations resulting from the use of SCS to contact 911. This disclosure requirement is consistent with the disclosure requirement the Commission adopted for interconnected Voice Over Internet Protocol (VoIP) service providers, demonstrating that it will be familiar to entities and not cause a significant economic impact. While this is a new requirement for providers, it will provide vital information to consumers about the limitations of SCS when contacting 911. The Commission also adopts a rule requiring terrestrial providers to file with the Commission a one-time certification regarding safeguarding the privacy and security of SCS location information. These obligations are consistent with the Commission's existing rules that apply to z-axis and dispatchable location data, as well as location information used for location-based routing; therefore, it will be familiar to terrestrial providers and not create an additional costly burden on small entities.

54. *Market Area Boundary Limits.* The Commission maintains the existing market area boundary limits in parts 22, 24, and 27 of the Commission's rules, noting that SCS partners should be expected to coordinate regarding the technical parameters necessary to avoid co-channel interference with one another's operations. Although the existing market area boundary limits remain, the Commission states that certain limits may be necessary and applicable to the boundaries of the GIA, including at international borders or boundaries extending into water. Therefore, the Commission adopts a rule to limit the signal levels from SCS at and beyond the terrestrial operator's licensed area to be the same as those defined for terrestrial operation in each respective band.

55. *Out of Band Emission (OOBE) Limits.* The Commission adopts a uniform OOBE limit for SCS operation across the SCS Bands expressed as a terrestrial PFD limit. The Commission declined to apply the existing OOBE limits for base stations; instead, after the perspective of commenters who expressed mixed views on which OOBE limits to apply, the Commission adopts a uniform PFD limit for SCS, which provides an equitable—and technologically feasible—compromise between the positions expressed in the record and will also effectively protect adjacent band operations across the SCS Bands. Further, by adopting a uniform OOBE limit for SCS operations, entities will not have to become knowledgeable about several different limitations, which will save much needed time and resources for small entities. We note that even though the out-of-band PFD limits adopted may require more stringent attenuation than the emission limits specified in section 25.202(f) for satellite operation, the Commission believes these stricter limits are both necessary and technologically feasible for satellite operators providing SCS.

56. *Equipment Authorization for SCS.* In the *Report and Order*, the Commission requires terrestrial device equipment authorization grantees to modify existing, or obtain new, equipment authorizations for previously certified terrestrial devices to reflect those devices' approval to operate under a part 25 MSS allocation and applicable SCS rules. This requirement does introduce a new administrative burden for equipment authorization grantees and applicants, especially as it relates to already certified equipment. The Commission's existing procedures through the permissive change process which enable electrical or mechanical changes to certified equipment when those changes do not affect the characteristics required to be reported to the Commission do not apply here where the only change being made to the certification is adding authorization for part 25. Under the Commission's existing rules, "a change other than a permissive change" requires a grantee to file a new application for certification accompanied by the information specified in part 2 of the Commission's rules.[91] While the Commission believes there is good reason to provide grantees a way to effectuate the necessary changes to their equipment authorization grants under the Commission's rules that also minimizes the

[91] 47 CFR § 2.1043(c).

administrative burdens associated with a new equipment certification application. The Commission therefore waives relevant provisions to provide a simplified process for existing grantees to modify their certifications to reflect part 25 authorization for SCS. In providing this limited waiver to existing rules, the Commission aims to minimize the burden on equipment certification holders, while ensuring tracking and accountability for devices capable of SCS, and compliance with our prohibition on the authorization of covered equipment. Similarly, for new equipment authorizations, terrestrial devices need only show compliance with the terrestrial technical rules for the rule parts under which they will operate; no additional tests are needed for part 25 SCS capability.

57. *International Coordination.* In the *Report and Order*, the Commission requires that SCS operations in bands not allocated for such services in the International Table must be consistent with ITU Radio Regulation No. 4.4 and finds it would serve the public interest to include express conditions in the SCS licenses to ensure that the Commission's obligations are met as the ITU notifying administration for U.S. licensed space station operations. In these cases, the Commission will require additional assurances from SCS licensees that while operating outside the United States, pursuant to an authorization from another country, the satellite operations will not cause harmful interference. Prior to conducting any communications with earth stations outside the United States, a satellite operator licensed to provide SCS, or applicant for a license to provide SCS, must certify to the Space Bureau and the Office of International Affairs that it has obtained all necessary authorizations from the relevant country prior to initiation of communications with earth stations in that country.

58. *ECIP Program.* The initial *Notice* sought comment on eligibility for the Enhanced Competition Incentive Program (ECIP), which the Commission established in July 2022 to facilitate new opportunities for small carriers and Tribal nations to increase access to spectrum, while incorporating provisions to ensure against program waste, fraud and abuse. Given that the framework is primarily intended to facilitate provision of SCS to existing consumer handsets, and ECIP was adopted with requirements tailored specifically towards provision of service through terrestrial base stations, the Commission considered whether to make SCS participants, necessarily engaged in leasing arrangements, eligible for ECIP benefits which could reduce the economic impacts for small carriers and tribal nations. In the *Report and Order*, the Commission declines to extend ECIP benefits to stakeholders that presently intend to enter into leasing arrangements for the provision of SCS. The Commission highlights that the provisions of SCS do not align with the goals or entry criteria of the ECIP program and believes it is in the public interest to allow the SCS marketplace and the ECIP program to further develop before determining whether it is appropriate for these two new Commission efforts to support one another.

G. Report to Congress

59. The Commission will send a copy of the *Report and Order*, including this FRFA, in a report to Congress pursuant to the Congressional Review Act.[92] In addition, the Commission will send a copy of the *Report and Order*, including this FRFA, to the Chief Counsel for Advocacy of the SBA. A copy of the *Report and Order* and FRFA (or summaries thereof) will also be published in the Federal Register.[93]

[92] 5 U.S.C. § 801(a)(1)(A).

[93] *Id.* § 604(b).

APPENDIX D

Initial Regulatory Flexibility Analysis

1. As required by the Regulatory Flexibility Act of 1980, as amended (RFA),[1] the Federal Communications Commission (Commission) has prepared this Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on a substantial number of small entities by the policies and rules proposed in the *Further Notice of Proposed Rulemaking* (*Further Notice*). The Commission requests written public comments on this IRFA. Comments must be identified as responses to the IRFA and must be filed by the deadlines provided on the first page of the *Further Notice*. The Commission will send a copy of the *Further Notice*, including this IRFA, to the Chief Counsel for Advocacy of the Small Business Administration (SBA).[2] In addition, the *Further Notice* and IRFA (or summaries thereof) will be published in the Federal Register.[3]

A. Need for, and Objectives of, the Proposed Rules

2. Building on the interim 911 call and text routing requirements established in the *Report and Order*, the *Further Notice* will help the Commission move toward its objective of enabling automatic location-based routing of all emergency communications regardless of whether or not there is a terrestrial connection available. As discussed in the *Report and Order*, the Commission takes a major step towards facilitating ubiquitous connectivity, by adopting rules that enable partnerships between terrestrial network operators and satellite operators, who will then utilize terrestrial spectrum to fill coverage gaps, thereby enabling communications with existing and future wireless devices without the need for hardware changes. This regulatory framework serves as a first step, focusing on particular supplemental coverage from space (SCS) implementations which present less complex legal and technical challenges in order to foster the rapid deployment and development of these exciting networks. Given the primary importance of emergency communications over SCS networks in the short term, the Commission seeks to further develop the record in the *Further Notice* on improving 911 service for SCS connections. The Commission seeks comment on a number of ways in which it can propel industry stakeholders towards achieving truly ubiquitous automatic location-based routing of all 911 calls to accelerate connection between first responders and those who need help, regardless of their location.

3. Further, the Commission seeks input from interested parties as to how and whether it should modify requirements for routing SCS 911 voice calls and 911 text messages, including whether it should require the use of location-based routing to route 911 SCS voice calls directly to an appropriate Public Safety Answering Point (PSAP), if technically feasible. The Commission also seeks to expand upon a number of technical issues relating to extending E911 rules to SCS that it sought comment on in the initial *Notice* from this proceeding. Additionally, in light of the Commission's existing requirement that Commercial Mobile Radio Service (CMRS) providers deploy and use location-based routing for wireless 911 voice calls and real-time text communications to 911 when available location information meets certain requirements for accuracy and timeliness, the Commission also seeks updated responses to the questions raised in the initial *Notice* due to new requirements for CMRS providers to deploy and use location-based routing in certain situations.

4. Through its adopted rules in the *Report & Order*, the Commission establishes on an interim basis that terrestrial providers must route all SCS 911 calls to a PSAP using either location-based routing or an emergency call center. This approach will balance the need for SCS 911 voice calls and text messages to be routed to the appropriate PSAP with the need for terrestrial providers to have flexibility in their implementation of SCS. Because of the ongoing deployment and continued innovation of SCS, the *Further Notice* requests any new and updated information regarding technological or other developments

[1] 5 U.S.C. § 603. The RFA, 5 U.S.C. §§ 601-612 was amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), Pub. L. No. 104-121, Title II, 110 Stat. 857 (1996).

[2] 5 U.S.C. § 603(a).

[3] *Id.*

in routing SCS 911 voice calls since the last rounds of filing. In addition, the Commission seeks comment on improvements to the 911 rules that apply to such terrestrial providers when using SCS to extend their coverage.

5. In the *Further Notice*, the Commission also addresses direct-to-satellite connectivity, and acknowledges that a satellite can play a more active role in the network, by connecting directly to the 5G core network. Because 911 calls and texts would typically be placed outdoors with the user device having view of the GPS satellites in the sky and because user devices typically have GPS receivers, user devices should be able to determine their location, and for Assisted GPS, SCS should be able to provide the needed assistance information. In the *Further Notice*, the Commission seeks comment on this tentative analysis. The Commission also seeks comment on establishing rules regarding interconnectivity between terrestrial providers and satellite operators as well as information on satellite data capacities, and satellite link budget, and optimization schemes for the initial SCS deployments and their impact on device-to-satellite connectivity, including time for obtaining a location fix for automatic location-based routing of 911 calls. The Commission also seeks comment on questions related to network selection and roaming in the *Further Notice*, focusing on a situation where a 911 caller would discontinue the 911 call if it is not connected within a certain time period. Finally, in the initial *Notice*, the Commission asked whether terrestrial partners engaged in or planned any outreach or coordination with public safety entities in advance of implementation. Because the delivery of SCS 911 voice calls includes the possibility of using third party emergency call centers, to promote awareness and transparency, the Commission requests comment via the *Further Notice* regarding issues concerning PSAP outreach.

6. Finally, in recognition of the concerns raised by the National Telecommunications and Infrastructure Association (NTIA) and the National Science Foundation (NSF) related to potential impacts from SCS on radio astronomy the Commission seeks further comment on the coordination process between federal and non-federal stakeholders in the SCS context and on whether additional rule changes or policies are necessary to avoid harmful interference to radio astronomy beyond the part 25 SCS licensing process adopted in the *Report and Order*.

B. Legal Basis

7. The proposed action is authorized pursuant to sections 1, 4(i), 157, 301, 303, 307, 308, 309, and 310 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 154(i), 301, 303, 307, 308, 309, and 310.

C. Description and Estimate of the Number of Small Entities to Which the Proposed Rules Will Apply

8. The RFA directs agencies to provide a description of, and where feasible, an estimate of, the number of small entities that may be affected by the proposed rules, if adopted.[4] The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction."[5] In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act.[6] A "small business concern" is one that: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the SBA.[7]

[4] 5 U.S.C. § 603(b)(3).

[5] *Id.* § 601(6).

[6] *Id.* § 601(3) (incorporating by reference the definition of "small business concern" in 15 U.S.C. § 632). Pursuant to 5 U.S.C. § 601(3), the statutory definition of a small business applies "unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register."

[7] 15 U.S.C. § 632.

9. *Small Businesses, Small Organizations, Small Governmental Jurisdictions*. Our actions, over time, may affect small entities that are not easily categorized at present. We therefore describe here, at the outset, three broad groups of small entities that could be directly affected herein.[8] First, while there are industry specific size standards for small businesses that are used in the regulatory flexibility analysis, according to data from the Small Business Administration's (SBA) Office of Advocacy, in general a small business is an independent business having fewer than 500 employees.[9] These types of small businesses represent 99.9% of all businesses in the United States, which translates to 33.2 million businesses.[10]

10. Next, the type of small entity described as a "small organization" is generally "any not-for-profit enterprise which is independently owned and operated and is not dominant in its field."[11] The Internal Revenue Service (IRS) uses a revenue benchmark of $50,000 or less to delineate its annual electronic filing requirements for small exempt organizations.[12] Nationwide, for tax year 2020, there were approximately 447,689 small exempt organizations in the U.S. reporting revenues of $50,000 or less according to the registration and tax data for exempt organizations available from the IRS.[13]

11. Finally, the small entity described as a "small governmental jurisdiction" is defined generally as "governments of cities, counties, towns, townships, villages, school districts, or special districts, with a population of less than fifty thousand."[14] U.S. Census Bureau data from the 2017 Census of Governments[15] indicate that there were 90,075 local governmental jurisdictions consisting of general purpose governments and special purpose governments in the United States.[16] Of this number there were

[8] *See* 5 U.S.C. § 601(3)-(6).

[9] *See* SBA, Office of Advocacy, "What's New With Small Business?," https://advocacy.sba.gov/wp-content/uploads/2023/03/Whats-New-Infographic-March-2023-508c.pdf (Mar. 2023).

[10] *Id*.

[11] 5 U.S.C. § 601(4).

[12] The IRS benchmark is similar to the population of less than 50,000 benchmark in 5 U.S.C § 601(5) that is used to define a small governmental jurisdiction. Therefore, the IRS benchmark has been used to estimate the number small organizations in this small entity description. S*ee* Annual Electronic Filing Requirement for Small Exempt Organizations — Form 990-N (e-Postcard), "Who must file," https://www.irs.gov/charities-non-profits/annual-electronic-filing-requirement-for-small-exempt-organizations-form-990-n-e-postcard. We note that the IRS data does not provide information on whether a small exempt organization is independently owned and operated or dominant in its field.

[13] *See* Exempt Organizations Business Master File Extract (EO BMF), "CSV Files by Region," https://www.irs.gov/charities-non-profits/exempt-organizations-business-master-file-extract-eo-bmf. The IRS Exempt Organization Business Master File (EO BMF) Extract provides information on all registered tax-exempt/non-profit organizations. The data utilized for purposes of this description was extracted from the IRS EO BMF data for businesses for the tax year 2020 with revenue less than or equal to $50,000 for Region 1-Northeast Area (58,577), Region 2-Mid-Atlantic and Great Lakes Areas (175,272), and Region 3-Gulf Coast and Pacific Coast Areas (213,840) that includes the continental U.S., Alaska, and Hawaii. This data does not include information for Puerto Rico.

[14] 5 U.S.C. § 601(5).

[15] *See* 13 U.S.C. § 161. The Census of Government is conducted every five (5) years compiling data for years ending with "2" and "7". *See also See also* Census of Governments, https://www.census.gov/programs-surveys/cog/about.html.

[16] *See* U.S. Census Bureau, 2017 Census of Governments – Organization, Table 2. Local Governments by Type and State: 2017 [CG1700ORG02]. https://www.census.gov/data/tables/2017/econ/gus/2017-governments.html. Local governmental jurisdictions are made up of general purpose governments (county, municipal and town or township) and special purpose governments (special districts and independent school districts). *See also* tbl.2. CG1700ORG02 Table Notes_Local Governments by Type and State_2017.

36,931 general purpose governments (county[17], municipal and town or township[18]) with populations of less than 50,000 and 12,040 special purpose governments - independent school districts[19] with enrollment populations of less than 50,000.[20] Accordingly, based on the 2017 U.S. Census of Governments data, we estimate that at least 48,971 entities fall into the category of "small governmental jurisdictions."[21]

12. *Satellite Telecommunications.* This industry comprises firms "primarily engaged in providing telecommunications services to other establishments in the telecommunications and broadcasting industries by forwarding and receiving communications signals via a system of satellites or reselling satellite telecommunications."[22] Satellite telecommunications service providers include satellite and earth station operators. The SBA small business size standard for this industry classifies a business with $38.5 million or less in annual receipts as small.[23] U.S. Census Bureau data for 2017 show that 275 firms in this industry operated for the entire year.[24] Of this number, 242 firms had revenue of less than $25 million.[25] Additionally, based on Commission data in the 2022 Universal Service Monitoring Report, as of December 31, 2021, there were 65 providers that reported they were engaged in the provision of satellite telecommunications services.[26] Of these providers, the Commission estimates that approximately 42 providers have 1,500 or fewer employees.[27] Consequently, using the SBA's small business size

[17] *See id* at tbl.5, County Governments by Population-Size Group and State: 2017 [CG1700ORG05]. https://www.census.gov/data/tables/2017/econ/gus/2017-governments.html. There were 2,105 county governments with populations less than 50,000. This category does not include subcounty (municipal and township) governments.

[18] *See id* at tbl.6, Subcounty General-Purpose Governments by Population-Size Group and State: 2017 [CG1700ORG06]. https://www.census.gov/data/tables/2017/econ/gus/2017-governments.html. There were 18,729 municipal and 16,097 town and township governments with populations less than 50,000.

[19] *See id* at tbl.10, Elementary and Secondary School Systems by Enrollment-Size Group and State: 2017 [CG1700ORG10]. https://www.census.gov/data/tables/2017/econ/gus/2017-governments.html. There were 12,040 independent school districts with enrollment populations less than 50,000. *See also* tbl.4. Special-Purpose Local Governments by State Census Years 1942 to 2017 [CG1700ORG04], CG1700ORG04 Table Notes_Special Purpose Local Governments by State_Census Years 1942 to 2017.

[20] While the special purpose governments category also includes local special district governments, the 2017 Census of Governments data does not provide data aggregated based on population size for the special purpose governments category. Therefore, only data from independent school districts is included in the special purpose governments category.

[21] This total is derived from the sum of the number of general purpose governments (county, municipal and town or township) with populations of less than 50,000 (36,931) and the number of special purpose governments - independent school districts with enrollment populations of less than 50,000 (12,040), from the 2017 Census of Governments - Organizations tbl.5, 6, & 10.

[22] *See* U.S. Census Bureau, *2017 NAICS Definition, "517410 Satellite Telecommunications,"* https://www.census.gov/naics/?input=517410&year=2017&details=517410.

[23] *See* 13 CFR § 121.201, NAICS Code 517410.

[24] *See* U.S. Census Bureau, *2017 Economic Census of the United States*, *Selected Sectors: Sales, Value of Shipments, or Revenue Size of Firms for the U.S.: 2017,* Table ID: EC1700SIZEREVFIRM, NAICS Code 517410, https://data.census.gov/cedsci/table?y=2017&n=517410&tid=ECNSIZE2017.EC1700SIZEREVFIRM&hidePreview=false.

[25] *Id*. The available U.S. Census Bureau data does not provide a more precise estimate of the number of firms that meet the SBA size standard. We also note that according to the U.S. Census Bureau glossary, the terms receipts and revenues are used interchangeably, *see* https://www.census.gov/glossary/#term_ReceiptsRevenueServices.

[26] Federal-State Joint Board on Universal Service, Universal Service Monitoring Report at 26, Table 1.12 (2022), https://docs.fcc.gov/public/attachments/DOC-391070A1.pdf.

[27] *Id.*

standard, a little more than half of these providers can be considered small entities.

13. *Wireless Telecommunications Carriers (except Satellite)*. This industry comprises establishments engaged in operating and maintaining switching and transmission facilities to provide communications via the airwaves.[28] Establishments in this industry have spectrum licenses and provide services using that spectrum, such as cellular services, paging services, wireless Internet access, and wireless video services.[29] The SBA size standard for this industry classifies a business as small if it has 1,500 or fewer employees.[30] U.S. Census Bureau data for 2017 show that there were 2,893 firms in this industry that operated for the entire year.[31] Of that number, 2,837 firms employed fewer than 250 employees.[32] Additionally, based on Commission data in the 2022 Universal Service Monitoring Report, as of December 31, 2021, there were 594 providers that reported they were engaged in the provision of wireless services.[33] Of these providers, the Commission estimates that 511 providers have 1,500 or fewer employees.[34] Consequently, using the SBA's small business size standard, most of these providers can be considered small entities.

14. *600 MHz Band*. These wireless communications services are radiocommunication services licensed in the 617-652 MHz and 663-698 MHz frequency bands that can be used for fixed and mobile flexible uses.[35] 600 MHz Band services fall within the scope of the Wireless Telecommunications Carriers (except Satellite)[36] industry where the SBA small business size standard classifies a business as small if it has 1,500 or fewer employees.[37] U.S. Census Bureau data for 2017 show that there were 2,893 firms that operated in this industry for the entire year.[38] Of this number, 2,837 firms employed fewer than 250 employees.[39] Thus under the SBA size standard, the Commission estimates that a majority of licensees in this industry can be considered small.

15. Based on Commission data as of November 2021, there were approximately 3,327 active

---

[28] *See* U.S. Census Bureau, *2017 NAICS Definition, "517312 Wireless Telecommunications Carriers (except Satellite),"* https://www.census.gov/naics/?input=517312&year=2017&details=517312.

[29] *Id.*

[30] *See* 13 CFR § 121.201, NAICS Code 517312 (as of 10/1/22, NAICS Code 517112).

[31] *See* U.S. Census Bureau, *2017 Economic Census of the United States*, *Employment Size of Firms for the U.S.: 2017,* Table ID: EC1700SIZEEMPFIRM, NAICS Code 517312, https://data.census.gov/cedsci/table?y=2017&n=517312&tid=ECNSIZE2017.EC1700SIZEEMPFIRM&hidePreview=false.

[32] *Id.* The available U.S. Census Bureau data does not provide a more precise estimate of the number of firms that meet the SBA size standard.

[33] Federal-State Joint Board on Universal Service, Universal Service Monitoring Report at 26, Table 1.12 (2022), https://docs.fcc.gov/public/attachments/DOC-391070A1.pdf.

[34] *Id.*

[35] *See* 47 CFR §§ 27.4, 27.5(l).

[36] *See* U.S. Census Bureau, *2017 NAICS Definition, "517312 Wireless Telecommunications Carriers* (*except Satellite*)," https://www.census.gov/naics/?input=517312&year=2017&details=517312.

[37] *See* 13 CFR § 121.201, NAICS Code 517312 (as of 10/1/22, NAICS Code 517112).

[38] *See* U.S. Census Bureau, *2017 Economic Census of the United States*, *Employment Size of Firms for the U.S.: 2017,* Table ID: EC1700SIZEEMPFIRM, NAICS Code 517312, https://data.census.gov/cedsci/table?y=2017&n=517312&tid=ECNSIZE2017.EC1700SIZEEMPFIRM&hidePreview=false.

[39] *Id.* The available U.S. Census Bureau data does not provide a more precise estimate of the number of firms that meet the SBA size standard.

licenses in the 600 MHz Band service.[40] The Commission's small business size standards with respect to 600 MHz Band services involve eligibility for bidding credits and installment payments in the auction of licenses for these services. For purposes of bidding credits, the Commission defined "small business" as an entity with average gross revenues not exceeding $55 million for each of the three preceding years, and a "very small business" as an entity with average gross revenues not exceeding $20 million for each of the three preceding years for the 600 MHz band auction.[41] Pursuant to these definitions, 15 bidders claiming small business status won 290 licenses.[42]

16. In frequency bands where licenses were subject to auction, the Commission notes that as a general matter, the number of winning bidders that qualify as small businesses at the close of an auction does not necessarily represent the number of small businesses currently in service. Further, the Commission does not generally track subsequent business size unless, in the context of assignments or transfers, unjust enrichment issues are implicated. Additionally, since the Commission does not collect data on the number of employees for licensees providing these services, at this time we are not able to estimate the number of licensees with active licenses that would qualify as small under the SBA's small business size standard.

17. *Lower 700 MHz Band Licenses*. The lower 700 MHz band encompasses spectrum in the 698-746 MHz frequency bands. Permissible operations in these bands include flexible fixed, mobile, and broadcast uses, including mobile and other digital new broadcast operation; fixed and mobile wireless commercial services (including FDD- and TDD-based services); as well as fixed and mobile wireless uses for private, internal radio needs, two-way interactive, cellular, and mobile television broadcasting services.[43] Wireless Telecommunications Carriers (*except* Satellite)[44] is the closest industry with a SBA small business size standard applicable to licenses providing services in these bands. The SBA small business size standard for this industry classifies a business as small if it has 1,500 or fewer employees.[45] U.S. Census Bureau data for 2017 show that there were 2,893 firms that operated in this industry for the entire year.[46] Of this number, 2,837 firms employed fewer than 250 employees.[47] Thus under the SBA size standard, the Commission estimates that a majority of licensees in this industry can be considered small.

---

[40] Based on a FCC Universal Licensing System search on November 16, 2021, https://wireless2.fcc.gov/UlsApp/UlsSearch/searchAdvanced.jsp. Search parameters: Service Group = All, "Match only the following radio service(s)", Radio Service = WT; Authorization Type = All; Status = Active. We note that the number of active licenses does not equate to the number of licensees. A licensee can have one or more licenses.

[41] *See* 47 CFR § 27.1301(a).

[42] *See Incentive Auction Closing and Channel Reassignment Public Notice; Incentive Auction Closes; Reverse Auction and Forward Auction Results Announced; Final Television Band Channel Assignments Announced; Post-Auction Deadlines Announced*, 32 FCC Rcd 2786, Appendix B (Auction No.1002) (April 23, 2017), https://www.fcc.gov/document/fcc-announces-results-worlds-first-broadcast-incentive-auction-0/appendix-b.

[43] *See* Federal Communications Commission, Economics and Analytics, Auctions, Auctions 44, 49, 60: Lower 700 MHz Band, Fact Sheet, Permissible Operations, https://www.fcc.gov/auction/44/factsheet, https://www.fcc.gov/auction/49/factsheet, https://www.fcc.gov/auction/60/factsheet.

[44] *See* U.S. Census Bureau, *2017 NAICS Definition, "517312 Wireless Telecommunications Carriers* (*except Satellite*)," https://www.census.gov/naics/?input=517312&year=2017&details=517312.

[45] *See* 13 CFR § 121.201, NAICS Code 517312 (as of 10/1/22, NAICS Code 517112).

[46] *See* U.S. Census Bureau, *2017 Economic Census of the United States*, *Employment Size of Firms for the U.S.: 2017,* Table ID: EC1700SIZEEMPFIRM, NAICS Code 517312, https://data.census.gov/cedsci/table?y=2017&n=517312&tid=ECNSIZE2017.EC1700SIZEEMPFIRM&hidePreview=false.

[47] *Id*. The available U.S. Census Bureau data does not provide a more precise estimate of the number of firms that meet the SBA size standard.

18. According to Commission data as of December 2021, there were approximately 2,824 active Lower 700 MHz Band licenses.[48] The Commission's small business size standards with respect to Lower 700 MHz Band licensees involve eligibility for bidding credits and installment payments in the auction of licenses. For auctions of Lower 700 MHz Band licenses the Commission adopted criteria for three groups of small businesses. A very small business was defined as an entity that, together with its affiliates and controlling interests, has average annual gross revenues not exceeding $15 million for the preceding three years, a small business was defined as an entity that, together with its affiliates and controlling interests, has average gross revenues not exceeding $40 million for the preceding three years, and an entrepreneur was defined as an entity that, together with its affiliates and controlling interests, has average gross revenues not exceeding $3 million for the preceding three years.[49] In auctions for Lower 700 MHz Band licenses seventy-two winning bidders claiming a small business classification won 329 licenses,[50] twenty-six winning bidders claiming a small business classification won 214 licenses,[51] and three winning bidders claiming a small business classification won all five auctioned licenses.[52]

19. In frequency bands where licenses were subject to auction, the Commission notes that as a general matter, the number of winning bidders that qualify as small businesses at the close of an auction does not necessarily represent the number of small businesses currently in service. Further, the Commission does not generally track subsequent business size unless, in the context of assignments or transfers, unjust enrichment issues are implicated. Additionally, since the Commission does not collect data on the number of employees for licensees providing these services, at this time we are not able to estimate the number of licensees with active licenses that would qualify as small under the SBA's small business size standard.

20. *Upper 700 MHz Band Licenses*. The upper 700 MHz band encompasses spectrum in the 746-806 MHz bands. Upper 700 MHz D Block licenses are nationwide licenses associated with the 758-763 MHz and 788-793 MHz bands.[53] Permissible operations in these bands include flexible fixed, mobile, and broadcast uses, including mobile and other digital new broadcast operation; fixed and mobile wireless commercial services (including FDD- and TDD-based services); as well as fixed and mobile wireless uses for private, internal radio needs, two-way interactive, cellular, and mobile television broadcasting services.[54] Wireless Telecommunications Carriers (*except* Satellite)[55] is the closest industry

[48] Based on a FCC Universal Licensing System search on December 14, 2021, https://wireless2.fcc.gov/UlsApp/UlsSearch/searchAdvanced.jsp. Search parameters: Service Group = All, "Match only the following radio service(s)", Radio Service = WY, WZ; Authorization Type = All; Status = Active. We note that the number of active licenses does not equate to the number of licensees. A licensee can have one or more licenses.

[49] *See* 47 CFR § 27.702(a)(1)-(3).

[50] *See* Federal Communications Commission, Economics and Analytics, Auctions, Auction 44: Lower 700 MHz Guard Bands, Summary, Closing Charts, Licenses by Bidder, https://www.fcc.gov/sites/default/files/wireless/auctions/44/charts/44cls2.pdf.

[51] *See* Federal Communications Commission, Economics and Analytics, Auctions, Auction 49: Lower 700 MHz Guard Bands, Summary, Closing Charts, Licenses by Bidder, https://www.fcc.gov/sites/default/files/wireless/auctions/49/charts/49cls2.pdf.

[52] *See* Federal Communications Commission, Economics and Analytics, Auctions, Auction 60: Lower 700 MHz Guard Bands, Summary, Closing Charts, Licenses by Bidder, https://www.fcc.gov/sites/default/files/wireless/auctions/60/charts/60cls2.pdf.

[53] *See* 47 CFR § 27.4.

[54] *See* Federal Communications Commission, Economics and Analytics, Auctions, Auction 73: 700 MHz Band, Fact Sheet, Permissible Operations, https://www.fcc.gov/auction/73/factsheet. We note that in Auction 73, Upper 700 MHz Band C and D Blocks as well as Lower 700 MHz Band A, B, and E Blocks were auctioned.

[55] *See* U.S. Census Bureau, *2017 NAICS Definition, "517312 Wireless Telecommunications Carriers* (*except Satellite*)," https://www.census.gov/naics/?input=517312&year=2017&details=517312.

with a SBA small business size standard applicable to licenses providing services in these bands. The SBA small business size standard for this industry classifies a business as small if it has 1,500 or fewer employees.[56] U.S. Census Bureau data for 2017 show that there were 2,893 firms that operated in this industry for the entire year.[57] Of that number, 2,837 firms employed fewer than 250 employees.[58] Thus, under the SBA size standard, the Commission estimates that a majority of licensees in this industry can be considered small.

21. According to Commission data as of December 2021, there were approximately 152 active Upper 700 MHz Band licenses.[59] The Commission's small business size standards with respect to Upper 700 MHz Band licensees involve eligibility for bidding credits and installment payments in the auction of licenses. For the auction of these licenses, the Commission defined a "small business" as an entity that, together with its affiliates and controlling principals, has average gross revenues not exceeding $40 million for the preceding three years, and a "very small business" an entity that, together with its affiliates and controlling principals, has average gross revenues that are not more than $15 million for the preceding three years.[60] Pursuant to these definitions, three winning bidders claiming very small business status won five of the twelve available licenses.[61]

22. In frequency bands where licenses were subject to auction, the Commission notes that as a general matter, the number of winning bidders that qualify as small businesses at the close of an auction does not necessarily represent the number of small businesses currently in service. Further, the Commission does not generally track subsequent business size unless, in the context of assignments or transfers, unjust enrichment issues are implicated. Additionally, since the Commission does not collect data on the number of employees for licensees providing these services, at this time we are not able to estimate the number of licensees with active licenses that would qualify as small under the SBA's small business size standard.

23. *Cellular Radiotelephone Service.* This service is radio service in which licensees are authorized to offer and provide cellular service for hire to the general public and was formerly titled Domestic Public Cellular Radio Telecommunications Service.[62] Cellular Radiotelephone Service falls within the scope the Wireless Telecommunications Carriers (except Satellite)[63] industry, where the SBA small business size standard classifies a business as small if it has 1,500 or fewer employees.[64] U.S.

---

[56] *See* 13 CFR § 121.201, NAICS Code 517312 (as of 10/1/22, NAICS Code 517112).

[57] *See* U.S. Census Bureau, *2017 Economic Census of the United States*, *Employment Size of Firms for the U.S.: 2017,* Table ID: EC1700SIZEEMPFIRM, NAICS Code 517312, https://data.census.gov/cedsci/table?y=2017&n=517312&tid=ECNSIZE2017.EC1700SIZEEMPFIRM&hidePreview=false.

[58] *Id*. The available U.S. Census Bureau data does not provide a more precise estimate of the number of firms that meet the SBA size standard.

[59] Based on a FCC Universal Licensing System search on December 14, 2021, https://wireless2.fcc.gov/UlsApp/UlsSearch/searchAdvanced.jsp. Search parameters: Service Group = All, "Match only the following radio service(s)", Radio Service = WP, WU; Authorization Type = All; Status = Active. We note that the number of active licenses does not equate to the number of licensees. A licensee can have one or more licenses.

[60] *See* 47 CFR § 27.502(a).

[61] *See Auction of 700 MHz Band Licenses Closes; Winning Bidders Announced for Auction 73*, Public Notice, DA-08-595, Attachment A, Report No. AUC-08-73-I (Auction 73) (March 20, 2008). The results for Upper 700 MHz Band C Block can be found on pp. 62-63.

[62] *See* 47 CFR § 22.99.

[63] *See* U.S. Census Bureau, *2017 NAICS Definition, "517312 Wireless Telecommunications Carriers* (*except Satellite*)," https://www.census.gov/naics/?input=517312&year=2017&details=517312.

[64] *See* 13 CFR § 121.201, NAICS Code 517312 (as of 10/1/22, NAICS Code 517112).

Census Bureau data for 2017 show that there were 2,893 firms that operated in this industry for the entire year.[65] Of this number, 2,837 firms employed fewer than 250 employees.[66] Thus under the SBA size standard, the Commission estimates that a majority of licensees in this industry can be considered small.

24. Based on Commission data, as of November 2021, there were approximately 1,908 active licenses in this service.[67] The Commission's small business size standards with respect to Cellular Radiotelephone Services involve eligibility for bidding credits and installment payments in the auction of licenses for these services. For purposes of bidding credits, the Commission has defined "small business" as an entity that either (1) together with its affiliates and controlling interests has average gross revenues of not more than $3 million for each of the three preceding years, or (2) together with its affiliates and controlling interests has average gross revenues of not more $15 million for each of the three preceding years.[68]

25. In frequency bands where licenses were subject to auction, the Commission notes that as a general matter, the number of winning bidders that qualify as small businesses at the close of an auction does not necessarily represent the number of small businesses currently in service. Further, the Commission does not generally track subsequent business size unless, in the context of assignments or transfers, unjust enrichment issues are implicated. Additionally, since the Commission does not collect data on the number of employees for licensees providing these services, at this time we are not able to estimate the number of licensees with active licenses that would qualify as small under the SBA's small business size standard.

26. *Advanced Wireless Services (AWS) - (1710–1755 MHz and 2110–2155 MHz bands (AWS-1); 1915–1920 MHz, 1995–2000 MHz, 2020–2025 MHz and 2175–2180 MHz bands (AWS-2); 2155–2175 MHz band (AWS-3); 2000-2020 MHz and 2180-2200 MHz (AWS-4)).* Spectrum is made available and licensed in these bands for the provision of various wireless communications services.[69] Wireless Telecommunications Carriers (except Satellite)[70] is the closest industry with a SBA small business size standard applicable to these services. The SBA small business size standard for this industry classifies a business as small if it has 1,500 or fewer employees.[71] U.S. Census Bureau data for 2017 show that there were 2,893 firms that operated in this industry for the entire year.[72] Of this number,

---

[65] *See* U.S. Census Bureau, *2017 Economic Census of the United States*, *Employment Size of Firms for the U.S.: 2017,* Table ID: EC1700SIZEEMPFIRM, NAICS Code 517312, https://data.census.gov/cedsci/table?y=2017&n=517312&tid=ECNSIZE2017.EC1700SIZEEMPFIRM&hidePreview=false.

[66] *Id*. The available U.S. Census Bureau data does not provide a more precise estimate of the number of firms that meet the SBA size standard.

[67] Based on a FCC Universal Licensing System search on November 12, 2021, https://wireless2.fcc.gov/UlsApp/UlsSearch/searchAdvanced.jsp. Search parameters: Service Group = All, "Match only the following radio service(s)", Radio Service = CL; Authorization Type = All; Status = Active. We note that the number of active licenses does not equate to the number of licensees. A licensee can have one or more licenses.

[68] *See* 47 CFR § 22.223(b).

[69] *See* 47 CFR § 27.1(b).

[70] *See* U.S. Census Bureau, *2017 NAICS Definition, "517312 Wireless Telecommunications Carriers* (*except Satellite*)," https://www.census.gov/naics/?input=517312&year=2017&details=517312.

[71] *See* 13 CFR § 121.201, NAICS Code 517312 (as of 10/1/22, NAICS Code 517112).

[72] *See* U.S. Census Bureau, *2017 Economic Census of the United States*, *Employment Size of Firms for the U.S.: 2017,* Table ID: EC1700SIZEEMPFIRM, NAICS Code 517312, https://data.census.gov/cedsci/table?y=2017&n=517312&tid=ECNSIZE2017.EC1700SIZEEMPFIRM&hidePreview=false.

2,837 firms employed fewer than 250 employees.[73] Thus, under the SBA size standard, the Commission estimates that a majority of licensees in this industry can be considered small.

27. According to Commission data as of December 2021, there were approximately 4,472 active AWS licenses.[74] The Commission's small business size standards with respect to AWS involve eligibility for bidding credits and installment payments in the auction of licenses for these services. For the auction of AWS licenses, the Commission defined a "small business" as an entity with average annual gross revenues for the preceding three years not exceeding $40 million, and a "very small business" as an entity with average annual gross revenues for the preceding three years not exceeding $15 million.[75] Pursuant to these definitions, 57 winning bidders claiming status as small or very small businesses won 215 of 1,087 licenses.[76] In the most recent auction of AWS licenses 15 of 37 bidders qualifying for status as small or very small businesses won licenses.[77]

28. In frequency bands where licenses were subject to auction, the Commission notes that as a general matter, the number of winning bidders that qualify as small businesses at the close of an auction does not necessarily represent the number of small businesses currently in service. Further, the Commission does not generally track subsequent business size unless, in the context of assignments or transfers, unjust enrichment issues are implicated. Additionally, since the Commission does not collect data on the number of employees for licensees providing these services, at this time we are not able to estimate the number of licensees with active licenses that would qualify as small under the SBA's small business size standard.

29. *All Other Telecommunications*. This industry is comprised of establishments primarily engaged in providing specialized telecommunications services, such as satellite tracking, communications telemetry, and radar station operation.[78] This industry also includes establishments primarily engaged in providing satellite terminal stations and associated facilities connected with one or more terrestrial systems and capable of transmitting telecommunications to, and receiving telecommunications from, satellite systems.[79] Providers of Internet services (e.g. dial-up ISPs) or voice over Internet protocol (VoIP) services, via client-supplied telecommunications connections are also included in this industry.[80] The SBA small business size standard for this industry classifies firms with annual receipts of $35 million or less as small.[81] U.S. Census Bureau data for 2017 show that there were 1,079 firms in this industry that

[73] *Id*. The available U.S. Census Bureau data does not provide a more precise estimate of the number of firms that meet the SBA size standard.

[74] Based on a FCC Universal Licensing System search on December 10, 2021, https://wireless2.fcc.gov/UlsApp/UlsSearch/searchAdvanced.jsp. Search parameters: Service Group = All, "Match only the following radio service(s)", Radio Service = AD, AH, AT, AW; Authorization Type = All; Status = Active. We note that the number of active licenses does not equate to the number of licensees. A licensee can have one or more licenses.

[75] *See* 47 CFR §§ 27.1002, 27.1102, 27.1104, 27.1106.

[76] *See* Federal Communications Commission, Economics and Analytics, Auctions, Auction 66: Advanced Wireless Services (AWS-1), Summary, Spreadsheets, https://www.fcc.gov/sites/default/files/wireless/auctions/66/charts/66cls2.pdf.

[77] *See Auction of Advanced Wireless Services (AWS-3) Licenses Closes; Winning Bidders Announced for Auction 97*, Public Notice, DA-15-131, Attachments A-B, (Auction No. 97) (January 30, 2015).

[78] *See* U.S. Census Bureau, *2017 NAICS Definition*, "*517919 All Other Telecommunications,*" https://www.census.gov/naics/?input=517919&year=2017&details=517919.

[79] *Id.*

[80] *Id*.

[81] *See* 13 CFR § 121.201, NAICS Code 517919 (as of 10/1/22, NAICS Code 517810).

operated for the entire year.[82] Of those firms, 1,039 had revenue of less than $25 million.[83] Based on this data, the Commission estimates that the majority of "All Other Telecommunications" firms can be considered small.

D. Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements for Small Entities

30. The *Further Notice* may impose new or additional reporting or recordkeeping and/or other compliance obligations on small entities if rules discussed therein are adopted. For example, small and other entities are likely to be subject to the requirement of routing SCS 911 voice calls and 911 text messages, including the use of location-based routing to route 911 SCS voice calls directly to an appropriate PSAP, if technically feasible. Additionally, those entities are also likely to be subject to compliance rules concerning the proposed requirement that all devices utilizing SCS should be able to determine their location. For Assisted GPS (A-GPS), SCS should be able to provide the needed assistance information for 911 calls and texts, if adopted. In addition, small and other entities could be subject to coordination requirements or required to submit additional technical information related to the protection of radio astronomy.

31. The Commission also seeks comment on questions regarding improvements in location-based routing, device-to-satellite connectivity, interconnectivity between terrestrial providers and satellite operators, network selection and roaming, and PSAP outreach. Because of the ongoing deployment and continued innovation of SCS, the Commission seeks any new and updated information regarding technological or other developments in routing SCS 911 voice calls since the last rounds of filing. Entities should report any additional information regarding routing SCS 911 voice calls since their last filings.

32. The Commission also seeks comment on whether there are additional ways to encourage and improve coordination among federal and non-federal stakeholders with respect to the coexistence of radio astronomy and SCS and whether the Commission should make any changes to its rules to facilitate this coordination. If such rules are adopted, operators could be required to provide reports regarding coordination efforts or additional technical information in addition to the existing underlying reporting, recordkeeping, and compliance requirements adopted in the *Report and Order*.

33. At this time, the record does not include a detailed cost/benefit analysis that would allow us to quantify the costs of compliance for small entities, including whether it will be necessary for small entities to hire professionals in order for them to comply with the rules proposed in the *Further Notice*, should they be adopted. The Commission invites comment on the costs and burdens of the proposals in the *Further Notice* and expects the information received in comments including, where requested, cost and benefit analyses, to help the Commission identify and evaluate relevant compliance matters for small entities, including compliance costs and other burdens that may result if the proposals and associated requirements discussed in the *Further Notice* are adopted.

E. Steps Taken to Minimize the Significant Economic Impact on Small Entities, and Significant Alternatives Considered

34. The RFA requires an agency to describe any significant, specifically small business, alternatives that it has considered in reaching its proposed approach, which may include the following four alternatives (among others): "(1) the establishment of differing compliance or reporting requirements

---

[82] *See* U.S. Census Bureau, *2017 Economic Census of the United States*, *Selected Sectors: Sales, Value of Shipments, or Revenue Size of Firms for the U.S.: 2017,* Table ID: EC1700SIZEREVFIRM, NAICS Code 517919, https://data.census.gov/cedsci/table?y=2017&n=517919&tid=ECNSIZE2017.EC1700SIZEREVFIRM&hidePreview=false.

[83] *Id.* The available U.S. Census Bureau data does not provide a more precise estimate of the number of firms that meet the SBA size standard. We also note that according to the U.S. Census Bureau glossary, the terms receipts and revenues are used interchangeably, *see* https://www.census.gov/glossary/#term_ReceiptsRevenueServices.

or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance and reporting requirements under the rule for such small entities; (3) the use of performance rather than design standards; and (4) an exemption from coverage of the rule, or any part thereof, for such small entities."[84]

35. In the initial *Notice*, the Commission took steps to minimize significant economic impact to small and other entities by obtaining information from interested parties on a number of technical issues relating to extending E911 rules to SCS, and it expands upon those actions in the *Further Notice*. In the *Further Notice*, the Commission considered how best to improve our 911 rules that apply to terrestrial providers when using SCS to extend their coverage. The Commission also considered whether it should require terrestrial providers to use location-based routing for SCS 911 voice calls when information about the location of the device is available to the CMRS provider's network at the time of routing. Alternatively, the Commission considered whether it should require terrestrial providers to use location-based routing for SCS 911 voice calls only when location information meets certain thresholds for accuracy and timeliness. The information obtained from commenters could provide the Commission with opportunities to ultimately adopt threshold-related rules that serve to lessen the burden on small providers.

36. The Commission also considered whether threshold requirements should be changed when requiring location-based routing, beyond accuracy and timeliness of available location information and, if changes are needed, what form they should take. Given the nature of SCS to extend coverage, cell tower information is unlikely to be available as a fallback when location-based routing does not meet whatever threshold requirements should be in place for using location-based routing. Therefore, the Commission requests comment on several questions involving what threshold requirements should be considered for SCS 911. In considering changes to the threshold requirements, we will consider the potential economic impact to small entities.

37. Additionally, in the *Further Notice*, the Commission seeks comment on ways to establish rules around interconnectivity between terrestrial providers and satellite operators within the context of SCS 911 connections. The rules that are ultimately adopted could lessen the compliance requirements for small and other entities. The *Further Notice* requests information involving both the current standards and anticipated future standards. These standards will be important to consider for informing discussions of future advances to SCS 911 connections and requires consideration of alternatives that take into account the potential impact of the adopted rules on small entities. Lastly, the Commission asked how long the network selection should take before a 911 call is eventually attempted via SCS. The Commission acknowledges that SCS is to be supplemental to terrestrial networks, including traditional terrestrial call paths, such as roaming, and additional technologies, such as Wi-Fi. The Commission seeks comment on ways to minimize the economic burden on small providers

38. Furthermore, the Commission seeks comment on what, if any, coordination requirements should be adopted. In the alternative, to possibly lessen the compliance burdens on entities, the Commission asks if there are other incentives the Commission could implement to encourage coordination and coexistence of radio astronomy operations and SCS. Likewise, the Commission asks about the effectiveness of early coordination efforts when considering whether to adopt additional requirements and whether the submission of additional technical information would be helpful in these coordination efforts. While the Commission does not explicitly propose that additional coordination requirements be adopted, the Commission inquires as to whether additional requirements would be necessary given existing coordination efforts and the unique nature of SCS as the information obtained from commenters could provide the Commission with opportunities to ultimately adopt threshold-related rules that serve to lessen the burden on small providers.

39. The Commission is hopeful that the comments it receives will specifically address matters impacting small entities and include data and analyses relating to these matters. Further, while

[84] 5 U.S.C. § 603(c)(1)-(4).

the Commission believes the rules that are eventually adopted in this proceeding should benefit small entities, the Commission expects to more fully consider the economic impact and alternatives for small entities following the review of comments filed in response to the *Further Notice.* The Commission's evaluation of this information will shape the final alternatives it considers, the final conclusions it reaches, and any final actions it ultimately takes in this proceeding to minimize any significant economic impact that may occur on small entities.

F. Federal Rules that May Duplicate, Overlap, or Conflict with the Proposed Rules

40. None.

STATEMENT OF
CHAIRWOMAN JESSICA ROSENWORCEL

Re: *In the Matter of Single Network Future: Supplemental Coverage from Space*, *Space Innovation*, GN Docket No. 23-65, IB Docket No. 22-271, Report and Order and Further Notice of Proposed Rulemaking (March 14, 2024)

We are fast heading to a world where next-generation wireless networks will connect everyone and everything around us. They will open up possibilities for communications that we cannot even fully imagine today. But we will not be successful in our effort to make this always-on connectivity available everywhere if we limit ourselves to using only one technology. We are going to need it all—fiber networks, licensed terrestrial wireless systems, next-generation unlicensed technology, and satellite broadband. But if we do this right, these networks will seamlessly interact in a way that is invisible to the user. We won't need to think about what network, where, and what services are available. Connections will just work everywhere, all the time.

That vision is what we call the Single Network Future—and the opportunities are vast. But the path to this future is going to require many steps—and we take a huge step forward today.

In this decision, we bring satellite and wireless communications together. We do this because their convergence can accomplish more than either network can do on its own. Together they can end dead zones. It means when disaster strikes and destroys ground-based systems, we will have a back-up in space. If that sounds out there, it is because direct satellite-to-smartphone communication is moving from sci-fi fantasy to reality.

One year ago, I spoke about this vision of the Single Network Future at Mobile World Congress. When I returned for this year's event, my counterparts from across the world told me they are watching United States closely. There is good reason for that—because today at the Federal Communications Commission, we become the first regulator in the world to shape this future. We are the first country to adopt a framework that combines satellite and wireless service through supplemental coverage from space.

Here's what it looks like. We have developed a framework that allows a satellite operator to partner with a terrestrial mobile carrier to get access to their terrestrial spectrum. Then the satellite system can provide service directly to the subscribers of the wireless carrier in areas where the carrier lacks coverage. So there is no need to wait for new spectrum or a new generation of devices. Satellite operators and their carrier collaborators can use terrestrial spectrum that is already in the market to bring these services to the phones that we have today. Even better, we accomplish all of this while protecting existing networks from harmful interference by ensuring that the new supplemental satellite operations are secondary to mobile network operations and requiring that one or more carriers hold all co-channel licenses throughout a defined geographically independent area.

To further safely grow these opportunities, we also have a rulemaking. Recognizing that this new connectivity is powerful when it comes to calling 911 for emergency help, especially in places where terrestrial signals are scarce, we seek comment on how to enable automatic location-based routing of emergency communications.

This is what the future looks like—a Single Network Future. Thank you to the many staff responsible for this latest entry in our Space Innovation Agenda, including Melissa Conway, Kamran Etemad, Stacy Ferraro, Garnet Hanly, Kari Hicks, Joyce Jones, Alice Koethe, Susannah Larson, John Lockwood, Jon Markman, Andrew McArdell, Roger Noel, Charles Oliver, Christine Parola, Halie Peacher, Paul Powell, Jessica Quinley, Jeremy Reynolds, Jennifer Salhus, John Schauble, Blaise Scinto, Joel Taubenblatt, and Janet Young, from the Wireless Telecommunications Bureau; Greg Boren, Greg Coutros, Jennifer Gilsenan, Franco Hinojosa, Julie Kearney, Jeanette Kennedy, Whitney Lohmeyer, Kathyrn Medley, Stephanie Neville, Sankar Persaud, Jeanine Poltronieri, and Merissa Velez from the Space Bureau; Bahman Badipour, Jamie Coleman, Martin Doczkat, Michael Ha, Ira Keltz, Nick Oros,

Bob Pavlak, Ron Repasi, Tony Serafini, Dana Shaffer, Jim Szeliga, George Tannahill, Dusmantha Tennakoon, Krista Witanowski, and Sean Yun from the Office of Engineering and Technology; Brenda Boykin, Steven Carpenter, Jill Coogan, Gerald English, John Evanoff, David Furth, Shabbir Hamid, Timothy Hoseth, Debra Jordan, David Kirschner, Barbara Kunkel, Brian Marenco, Nicole McGinnis, Erika Olsen, Renee Roland, Rasoul Safavian, David Sieradzki, Rachel Wehr, and James Wiley from the Public Safety and Homeland Security Bureau; Edward Carlson, Jared Carlson, Nese Guendelsberger, David Hu, Dante Ibarra, Ethan Lucarelli, James McLuckie, and Brandon Moss from the Office of International Affairs; Kim Cook, Kathy Harvey, Jeremy Marcus, Ryan McDonald, and Josh Zeldis from the Enforcement Bureau; Deborah Broderson, Michele Ellison, Michael Janson, Doug Klein, David Konczal, Anjali Singh, and Chin Yoo from the Office of General Counsel; Michael Gussow and Joy Ragsdale from the Office of Communications Business Opportunities; and Judith Dempsey, Catherine Matraves, Giulia McHenry, and Cher Li from the Office of Economics and Analytics.

STATEMENT OF
COMMISSIONER GEOFFREY STARKS

Re: *In the Matter of Single Network Future: Supplemental Coverage from Space*, *Space Innovation*, GN Docket No. 23-65, IB Docket No. 22-271, Report and Order and Further Notice of Proposed Rulemaking (March 14, 2024)

Just about a year has passed since we proposed a framework for launching cell towers in space. During that time, we've seen greater promise. More rescues of hikers, stranded motorists, and crash victims who reached emergency services with a satellite text. More testing of capabilities that go beyond texting, including the first two-way satellite-to-cell phone calls, the first 5G satellite-to-cell phone call, and satellite-to-cell data downloads peaking at 14 and 17 Mbps. We've also seen more investment to bring those capabilities out of the lab and into the hands of consumers. Not to mention much greater international interest and focus, much of it galvanized at last year's World Radio Conference.

Where we've seen promise, we've also seen pivots. We've seen partners end work on a proprietary satellite-to-cell solution. We've seen analysts and executives shift away from the hype in favor of a more measured debate about the satellite-to-cell business plan. We've also seen companies fill-in connectivity gaps the old fashioned way—by pairing purpose-built satellite terminals with cellular devices instead of combining them into a direct-to-cell solution. Promises and pivots. Those are the hallmarks of a technology that is as exciting as it is fluid.

That's why I'm glad we're pursuing what this Order calls a "hybrid approach" to authorizing SCS. That approach creates an enduring, rules-based framework for less complicated SCS deployments. At the same time, it doesn't limit SCS to proposals that fit its mold. It commits to taking a serious, evidence-based look at any reasonable proposal that deserves our attention, whether that proposal meets the criteria set forth in our rules or charts a different course. In other words, it commits to keeping up not just with the promise, but with the pivots as well. And in doing so, it gives every innovator—large and small, old and new—a path to see their promise reached. This was an important aspect of the framework to me, and I'm thankful that we tweaked the item to put all SCS players on firm footing.

I thank the Chairwoman for her leadership on this item and for forging new ground so quickly in an area as novel as SCS. I'd also like to thank everyone on our staff who worked on this challenging item. It's terrific work, and it has my full support.

STATEMENT OF
COMMISSIONER ANNA M. GOMEZ

Re: *Single Network Future: Supplemental Coverage from Space*, GN Docket No. 23-65, IB Docket No. 22-271, Report and Order and Further Notice of Proposed Rulemaking (Mar. 14, 2024).

Today, we continue to support the United States's rapidly expanding space economy by adopting rules to enable hybrid satellite-terrestrial networks to connect everyone, everywhere. These hybrid networks work together to provide coverage that neither can achieve alone. They will provide life-saving connections in emergencies—we've already seen this in Hawaii and California. But, these networks will also promote innovation that benefits consumers, unlock economic opportunities for industries like precision agriculture, and connect the most remote, hard to reach areas.

This framework is groundbreaking, and continues to chart the path forward for U.S. leadership in the space economy. I am proud to support this item, and look forward to the innovation that will unfold in a single network future.

Thank you to the Commission staff who worked on this item, including the Space Bureau, Wireless Telecommunications Bureau, and the Office of Engineering and Technology.