

to avoid additional fill associated with utility poles;

(b) Minimize the electrocution hazard by suspending electrical distribution lines from pipe racks or burying cables off pad instead of using overhead lines;

(c) Design pipelines to minimize redundant parallel pipelines;

(d) Use ice roads and pads to install vertical support members for pipelines;

(e) Construct pipelines above-ground to minimize permafrost impacts; and

(f) Use a muted (*i.e.*, non-reflective) coating on pipelines to avoid glare.

§ 3139.13 Spill prevention and remediation.

The applicant will comply with the following conditions and restrictions to mitigate adverse effects from spills.

(a) Build and operate pipelines with the best available technology for detecting and preventing corrosion or mechanical defects to minimize impacts related to point source pollution from oil spills or leaks;

(b) Install pipeline equipment to minimize spill risk at major stream crossings;

(c) Immediately and completely clean up all spills, recovering 100 percent of spilled material for recycling when possible;

(d) Equip and maintain oil-spill response equipment intended for use in winter conditions for effective use in Arctic conditions (*i.e.*, in a manner to prevent the freezing or icing of the equipment); and

(e) Designate a trained spill response team and hazardous-materials response team, consisting of trained volunteer spill and hazardous materials response personnel on site.

§ 3139.14 Operational conditions and restrictions.

The applicant will comply with the following conditions and restrictions to mitigate adverse effects during operations.

(a) Construct gravel roads, pads, and pipelines during the winter season, supported by access via ice roads;

(b) Use ice roads and pads to support construction, including using ice pads for construction camps, equipment staging, gravel stockpiles, and construction activities at bridge crossings;

(c) Inject produced water into the reservoir and do not discharge it to surface lands, surface waters, or marine waters;

(d) Ensure drill cuttings are temporarily stored on ice and removed prior to spring breakup;

(e) Align pipe racks adjacent to pipeline racks so vertical support

members are in line to reduce obstructions to caribou and subsistence user movements;

(f) Ensure current communications protocols for helicopters, fixed-wing aircraft, and marine-vessel traffic are adequate to address local community concerns about traffic-related impacts to subsistence activities;

(g) Equip vehicles with block heaters and plug-in vehicle engines when temperatures are -30°F or above to avoid idling, conserve fuel, and reduce emissions; and

(h) Use electric solenoids or instrument air driven pneumatics instead of natural gas driven pneumatics.

Lanny E. Erdos,

Director, Office of Surface Mining, Reclamation, and Enforcement, Exercising Authority of the Assistant Secretary—Land and Minerals Management.

[FR Doc. 2026-18261 Filed 9-4-26; 8:45 am]

BILLING CODE 4331-10-P

FEDERAL COMMUNICATIONS COMMISSION

47 CFR Part 2

[ET Docket No. 26-169; FCC 26-51; FR ID 364887]

Unleashing Unlicensed Spectrum for Direct-to-Device

AGENCY: Federal Communications Commission.

ACTION: Proposed rule.

SUMMARY: The Federal Communications Commission (Commission or FCC) issues a Notice of Proposed Rulemaking proposes to expand opportunities for direct-to-device (D2D) communications by permitting certain unlicensed devices to communicate with satellites on a non-interference basis. Building on recent market growth and new industry investment in D2D technologies, the NPRM explores adding satellite allocations in specific unlicensed bands, clarifying that equipment may operate within spacecraft, and establishing a flexible regulatory framework that preserves incumbent operations while enabling continued innovation. The Commission seeks comment on technical, licensing, and policy considerations to support expanded D2D connectivity and ensure coexistence with existing services.

DATES: Comments are due on or before November 9, 2026 and reply comments are due on or before December 7, 2026.

ADDRESSES: Pursuant to §§ 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 in the **DATES** section above. Comments may be filed using the Commission's Electronic Comment Filing System (ECFS). You may submit comments, identified by ET Docket No. 21-232, by any of the following methods:

- **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 hand or messenger delivery, by commercial courier, or by the U.S. Postal Service. All filings must be addressed to the Secretary, Federal Communications Commission.

- Hand-delivered or messenger-delivered paper filings for the Commission's Secretary are accepted between 8:00 a.m. and 4:00 p.m. by the FCC's mailing contractor at 9050 Junction Drive, Annapolis Junction, MD 20701. All hand deliveries must be held together with rubber bands or fasteners. Any envelopes and boxes must be disposed of before entering the building.

- Commercial courier deliveries (any deliveries not by the U.S. Postal Service) must be sent to 9050 Junction Drive, Annapolis Junction, MD 20701.

- Filings sent by U.S. Postal Service First-Class Mail, Priority Mail, and Priority Mail Express must be sent to 45 L Street NE, Washington, DC 20554.

- **People with Disabilities:** To request materials in accessible formats for people with disabilities (Braille, large print, electronic files, audio format), send an email to fcc504@fcc.gov or call the Consumer & Governmental Affairs Bureau at 202-418-0530.

FOR FURTHER INFORMATION CONTACT:

Hugh L. Van Tuyl of the Office of Engineering and Technology at Hugh.VanTuyl@fcc.gov or (202) 418-7506.

SUPPLEMENTARY INFORMATION: This is a summary of the Commission's *Notice of Proposed Rulemaking (NPRM)*, in ET Docket No. 26-169, FCC 26-51, adopted on August 6, 2026, and released on August 7, 2026. The full text of this document, is available for public inspection and can be downloaded at <https://docs.fcc.gov/public/attachments/FCC-26-51A1.pdf>. Alternative formats are available for people with disabilities (Braille, large print, electronic files, audio format) by sending an email to fcc504@fcc.gov or calling the Commission's Consumer and

Governmental Affairs Bureau at (202) 418–0530 (voice).

Ex Parte Presentations. The proceeding this document initiates shall be treated as a “permit-but-disclose” proceeding in accordance with the Commission’s *ex parte* rules. 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 the proceeding should familiarize themselves with the Commission’s *ex parte* rules.

Regulatory Flexibility Act. The Regulatory Flexibility Act of 1980, as amended (RFA), 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.” Accordingly, the Commission has prepared an Initial Regulatory Flexibility Analysis (IRFA) concerning the potential impact of the rule and policy proposals in this document on small entities. The IRFA is set forth in

Appendix B to the *Notice of Proposed Rulemaking*. The Commission invites the general public, particularly small businesses, to comment on the IRFA. Comments must be filed by the deadlines for comments on the Third Further Notice of Proposed Rulemaking indicated in the **DATES** section above and must have a separate and distinct heading designating them as responses to the IRFA.

Paperwork Reduction Act Analysis. This document does not contain proposed information collection(s) subject to the Paperwork Reduction Act of 1995 (PRA), 44 U.S.C. 3501 3521. In addition, therefore, it does not contain any new or modified information collection burden for small business concerns with fewer than 25 employees, pursuant to the Small Business Paperwork Relief Act of 2002, 44 U.S.C. 3506(c)(4).

Providing Accountability Through Transparency Act. Consistent with the Providing Accountability Through Transparency Act, Public Law 118–9, a summary of the *Notice of Proposed Rulemaking* will be available at <https://www.fcc.gov/proposed-rulemakings>.

OPEN Government Data Act. The OPEN Government Data Act requires agencies to make “public data assets” available under an open license and as “open Government data assets,” *i.e.*, in machine-readable, open format, unencumbered by use restrictions other than intellectual property rights, and based on an open standard that is maintained by a standards organization. This requirement is to be implemented “in accordance with guidance by the Director” of the OMB. The term “public data asset” means “a data asset, or part thereof, maintained by the Federal Government that has been, or may be, released to the public, including any data asset, or part thereof, subject to disclosure under [the Freedom of Information Act (FOIA)].” A “data asset” is “a collection of data elements or data sets that may be grouped together,” and “data” is “recorded information, regardless of form or the media on which the data is recorded.”

Synopsis

Introduction. Direct-to-device (D2D) technology has undergone a transformative wave of investment and innovation in recent years, with American companies leading the way yet again. Since the Commission adopted its pioneering framework to enable Supplemental Coverage from Space, consumers have benefitted from the ubiquitous—and often lifesaving—connectivity that D2D provides in areas with inadequate cellular coverage. And

as advances in D2D technology occur at a faster clip each day, innovators and entrepreneurs have adopted diverging theses on the likelihood of intermodal convergence and the need for predictable D2D spectrum access. Some analysts project more than \$100 billion in revenues across all D2D and IoT segments by 2034. Predictions like these have translated into frothy dealmaking over the last 18 months, as more than \$40 billion has coursed through the American space economy for D2D. In 2025, SpaceX acquired 65 megahertz of D2D spectrum from EchoStar for \$19.6 billion. AST announced a \$550 million agreement to use L-band spectrum licensed to Ligado. And most recently, Amazon and RocketLab struck separate deals collectively totaling nearly \$20 billion to acquire Globalstar and Iridium respectively, including their D2D spectrum portfolios. To enable healthy market discovery, the Space Bureau recently issued long-awaited legal clarity to reaffirm American innovators’ exclusively-held D2D spectrum rights.

The Commission intends to allow the current wave of D2D experimentation and dynamism to unfold, consistent with the principles of technological neutrality and regulatory humility. So, today the Commission take the next step to secure America’s leadership in D2D by exploring proposals that would allow devices operating in more than 200 megahertz of spectrum available for unlicensed devices to communicate with satellites authorized to provide service in the United States. In the *Notice of Proposed Rulemaking (NPRM)*, the Commission examines potential reforms to enable devices operating in some of the part 15 bands to communicate with FCC-authorized satellites, whether on an uplink or downlink basis. The Commission also proposes to clarify that using equipment authorized under the part 15 rules is permitted within FCC-authorized spacecraft. Unlicensed spectrum may be suitable to support the capacity requirements and complement other bands for D2D services. Devices operating under the part 15 rules are widely used by businesses and consumers and include Wi-Fi and Bluetooth transmitters for wireless local area connectivity, medical imaging devices, wireless microphones, automobile and garage door opener remote controls, and IoT sensors. By eliminating the burden and cost to obtain a Commission spectrum license, the Commission’s part 15 rules have spurred innovation in new devices and applications that successfully coexist with other licensed and unlicensed

services. Unlocking unlicensed bands for D2D promises to open up new services that seamlessly integrate devices across terrestrial and satellite platforms and provide consumers with another option for connectivity.

In this document, technological neutrality and regulatory humility—principles that have long shaped the Commission's approach to unlicensed spectrum—will guide its analysis. As an initial matter, in considering new unlicensed services, the Commission intends to preserve the operational status quo of the spectral environment for incumbent and authorized services, as well as for the terrestrial part 15 devices that consumers and businesses rely upon every day. The Commission also recognizes that technical standards and coordination mechanisms for space-based use of these bands remain in an early and evolving stage, and the Commission does not believe it would be prudent to lock in prescriptive technical rules before the record and industry practice have had the opportunity to mature. And consistent with the Commission's history of light-touch regulation of unlicensed spectrum, the Commission intends to afford industry the breathing room to experiment within a regulatory sandbox, allowing new entrants and incumbents alike to develop and test new services under flexible, non-interference-based rules rather than a rigid licensing framework designed for a different era of satellite operations or even incumbent unlicensed protocols. The Commission believes that adherence to these principles may allow us to responsibly expand the universe of spectrum available for direct-to-device and other space-based applications while safeguarding the interference-free environment that has made part 15 spectrum such a valuable and productive resource for the American public.

Background. Part 15 of the Commission's rules contains technical specifications, administrative requirements, and other conditions relating to the marketing of radio frequency (RF) devices that may be operated without an individual license. Part 15 contains technical regulations for two broad categories of radio frequency devices: (1) intentional radiators, which intentionally generate and emit RF energy by radiation or induction, and (2) unintentional radiators, which intentionally generate RF energy for use within the device or send signals by conduction to associated equipment via connecting wiring, but which are not intended to emit RF energy by radiation or induction.

Intentional radiators may operate on an unlicensed basis under part 15 in almost any frequency band at very low power levels, with the exception of designated restricted bands where only spurious emissions are permitted. The restricted bands are designated to protect sensitive radio services, such as those that protect safety-of-life or those that use very low received signal levels, such as satellite downlinks or radio astronomy. The power levels permitted under part 15 in most frequency bands are suitable for communication only over very short ranges, such as a few meters, or with low data rates. In addition, part 15 specifies a number of frequency bands where intentional radiators may operate at significantly higher power levels, subject to technical requirements to protect authorized services from harmful interference, including the 2400–2483.5 MHz and 5725–5850 MHz bands. These bands, unlike many other bands where unlicensed devices can operate at higher power, do not have airborne restrictions or satellite allocations, with the exception of the 5830–5850 MHz band, which contains an amateur satellite downlink allocation. Unlicensed devices may generally transmit with up to 4 watts (36 dBm) EIRP in these bands. By taking advantage of this higher power, unlicensed devices can provide high data rate connectivity over substantial distances. These higher power part 15 bands are the home to vast numbers of consumer devices that successfully coexist without the need for licensing or frequency coordination.

Because unintentional radiators do not intentionally emit radiation, they do not have the same constraint as intentional radiators to avoid restricted frequency bands. In general, they must comply with radiated emission limits at frequencies of 30 MHz and above. Regardless of the type of device, e.g., intentional or unintentional radiator, part 15 device operations are subject to the conditions that they do not cause harmful interference to authorized services and must accept any interference that occurs. The operator of a radiofrequency device is required to cease operating it upon notification by a Commission representative that the device is causing harmful interference, and operation may not resume until the condition causing the harmful interference has been corrected.

Part 15 devices must generally be authorized under either the certification or the Suppliers Declaration of Conformity (SDoC) procedure prior to importation and marketing. Most intentional radiators require authorization under the certification

procedure, and most unintentional radiators may take advantage of the SDoC procedure, but may also use the certification procedure. Devices authorized under the certification procedure must be tested by an FCC-recognized accredited testing laboratory to demonstrate that they comply with the FCC rules.

Discussion. In this document, the Commission explores making frequency bands commonly used by devices operating under the part 15 unlicensed rules available for space-based communication applications. Specifically, the Commission proposes and seeks comment on rule modifications to enable devices operating consistent with the part 15 technical rules to communicate with satellites in the Earth-to-space and space-to-Earth directions that are United States-licensed or non-United States-licensed and have been granted market access by the Commission, as well as on the appropriate regulatory model and technical requirements necessary to prevent harmful interference to authorized services and adverse impacts on terrestrial part 15 devices. The Commission also proposes to clarify that the use of equipment authorized under the part 15 rules is permitted on board spacecraft, subject to any other applicable restrictions, such as those of federal agencies and international treaties. Additionally, the Commission seeks comment on other scenarios and types of applications in which devices operated under the part 15 rules could be used in space, including the specific frequency bands that would be suitable for their operation, and whether the current part 15 requirements would be appropriate for these applications.

Legal Authority. The Commission has maintained rules governing non-licensed operation of certain types of RF devices, such as receivers and low power transmitters, for more than 80 years. Such devices must adhere to the specifications found in part 15 of the Commission's rules, which do not explicitly address whether part 15 devices may be operated in space.

Under the Communications Act of 1934, as amended (the Act), the Commission has broad jurisdiction over “all interstate and foreign communication by wire or radio and all interstate and foreign transmissions of energy by radio, which originates and/or is received within the United States, and to all persons engaged within the United States in such communication or such transmission of energy by radio.” Furthermore, the Commission is charged with regulating radio spectrum across the United States in a manner

that serves the public interest. Section 301 of the Act provides the Commission with jurisdiction over radio-communication stations, including those operating “upon any . . . mobile stations within the jurisdiction of the United States.” The Commission has long held that its jurisdiction under these provisions is not affected when such radio activity involves a station, instrumentality, apparatus, or facility that happens to be in space. Indeed, the FCC has long exercised jurisdiction over apparatus used for radiocommunications in space under part 25 of the Commission’s rules governing satellite communications. Accordingly, the Commission has jurisdiction over apparatus otherwise regulated under part 15 of the Commission rules when such apparatus are operating in, or intended to be operated in, space.

Earth-to-Space and Space-to Earth Operations. The recent growth in the satellite, space, and AI industries is significantly increasing demand for spectrum to support new applications in space and between Earth and space, including traditional communications links, D2D services, as well as nascent applications, such as in-space servicing, assembly, and manufacturing (ISAM). The Space Bureau recently approved an application that uses satellite uplinks in the 2400–2483.5 MHz frequency band that is heavily used by part 15 devices, noting that these bands would only be used from specific gateway locations for these uplinks. It previously approved other applications for satellites to receive signals from terrestrial devices operating in frequency bands available under the part 15 rules, but for infrequent use from a single United States location. In the interest of making more intensive and efficient use of spectrum to satisfy growing industry needs, including D2D communication services, the Commission seeks comment on allowing new types of satellite operations under part 25, both downlinks (space-to-Earth) and uplinks (Earth-to-space), in the bands where the part 15 rules permit higher power operation.

The approach on which the Commission seeks comment is somewhat similar to what is being done in Europe, where a frequency band used for short range (unlicensed) devices is being used on a limited basis for communications between short range (unlicensed) devices and satellites. The Commission also seeks comment on how it could reduce unnecessary regulatory barriers to permit new types of satellite applications to operate under the part 15 framework.

Unlicensed access points operating under part 15 have become ubiquitous within buildings to provide connectivity to portable devices, such as smartphones, laptops, smartwatches, and IoT devices. Unlicensed access points are also often deployed to provide connectivity in outdoor locations and can have an outdoor range of several kilometers. Permitting Earth-to-space and space-to-Earth communications with space stations authorized under part 25 using devices operating consistent with the existing part 15 technical rules would allow consumer-grade equipment—such as smartphones, laptops, and IoT sensors—additional connectivity options where there is no terrestrial coverage. The Commission seeks comment on this assumption. This concept mirrors the Commission’s actions in providing for Supplemental Coverage from Space (SCS), in which satellites provide service on a secondary basis in spectrum bands that are licensed to terrestrial wireless carriers (600 MHz, 700 MHz, 800 MHz, Broadband PCS, and AWS–H Block), but without imposing additional licensing burdens on end-user equipment. By leveraging certain bands where higher power unlicensed device usage is permitted under part 15 (e.g., 2400–2483.5 MHz and 5725–5850 MHz), but which do not have airborne restrictions or satellite allocations, satellites could receive signals from devices operating under the current part 15 limits and transmit to these devices using similar signal levels.

The Commission seeks comment on whether satellite uplinks present a more manageable coexistence environment than satellite downlinks in the candidate bands. The Commission also asks whether unlicensed D2D services would be concentrated in rural, underserved, or unserved areas. The Commission believes, and seeks comment on whether, any change to the terrestrial radio environment could be at a level low enough so as to not increase the potential for harmful interference to authorized services or adversely impact terrestrial-based part 15 devices’ ability to successfully communicate. If possible, such an innovation could enable billions of existing devices that comply with the part 15 unlicensed rules using protocols such as Wi-Fi and Bluetooth to connect to satellites using existing communication protocols. The Commission seeks comment on the foregoing. Allowing part 15 devices to connect with satellites in these bands on a non-interference basis would promote effective and efficient spectrum utilization. The Commission therefore

proposes and seeks comment on satellite use of these two bands, *i.e.*, 2400–2483.5 MHz and 5725–5850 MHz and seek comment on whether there are any other bands that the Commission should consider. The Commission’s goal is to develop a record of how to enable such operations without adversely impacting other users in these or other bands, and a framework that might be used to authorize them.

Allocation Matters. While the part 15 rules contain requirements for devices that can be operated without an individual license, part 15 is not a radio service. Thus, there are no allocations in the Table of Frequency Allocations for devices operating under the Commission’s part 15 rules. Rather, part 15 devices operate on a non-interference basis, meaning that they cannot cause interference to authorized services and must accept any interference received.

The part 15 rules do not prohibit using terrestrial-based equipment to transmit to satellites, but they also do not contain any provisions that explicitly permit this type of operation. Similarly, part 15 does not prohibit operation from satellites in the 2400–2483.5 MHz and 5725–5850 MHz bands, but for various reasons, *e.g.*, power limitations, satellite licensing requirements, and international regulations, no parties are operating satellite links under the part 15 rules. In addition, the technical parameters governing part 15 devices were devised assuming terrestrial operations, not operations in space or to devices in space. The Commission seeks comment on possible rule changes that would support satellite services in these three frequency bands, as well as other frequency bands where the part 15 rules permit higher power operations. In this Section III.B.1, the Commission considers the cases of Earth-to-space and space-to-Earth operations and what changes might be necessary to the Table of Frequency Allocations to accommodate both types of operation.

Earth-to-space. Recently, parties have developed systems that use transmitters operating in accordance with part 15 of the rules for transmissions from Earth-to-space. Specifically, Hubble Network, Inc. (Hubble) was granted a satellite license to receive signals from 100 milliwatt (20 dBm) terrestrial devices operating in the 2482.710675–2483.424 MHz portion of the 2400–2483.5 MHz band with technical parameters consistent with part 15 Bluetooth Low Energy device operations. Because there is no allocation for satellite operation in the 2400–2483.5 MHz band and Hubble’s operations were licensed as earth stations under the part 25 rules, a

waiver of the Table of Frequency Allocations was required. This waiver was granted for infrequent use from a single United States location.

The Commission believes that streamlining the rules to permit satellites to receive signals from terrestrial devices operating under the part 15 technical rules in certain bands would benefit the public by facilitating the development of new and innovative wireless communication products and services, such as those developed by Hubble. The Commission seeks comment on its tentative conclusion. As discussed below in the section on licensing requirements, the Commission is seeking comment on several alternatives for authorizing terrestrial devices operating consistent with the part 15 rules to transmit in the Earth-to-space direction, including licensing them by rule to communicate with FCC-licensed satellites or non-US-licensed satellites that have been granted market access by the Commission, or by licensing them as earth stations under part 25 of the Commission's rules.

Because satellite earth station and space station licenses require a satellite frequency allocation for each frequency band in which they operate, it is currently necessary to grant a waiver of the Table of Frequency Allocations for each license application that requests operation in any other band, including those available for higher powered part 15 operations, as was done for Hubble. A simpler long-term approach would be to modify the Table of Frequency Allocations to include satellite (Earth-to-space) frequency allocations in bands where the Commission would permit such uplinks to operate.

Accordingly, to provide the ability for earth and space stations to obtain operating authority (either on a licensed or unlicensed basis) in a more streamlined manner without the need for a waiver, the Commission proposes to add a new footnote to the Table of Frequency Allocations that will allow Earth-to-space operations in the 2400–2483.5 MHz band. Additionally, to make more spectrum available for uplink purposes, the Commission proposes to add a satellite uplink allocation via this new footnote in the 5725–5850 MHz band as well. The Commission limits its proposal to these two bands because part 15 devices are generally permitted to operate with power levels up to 4 watts (36 dBm) EIRP in these bands, which makes it potentially feasible to transmit to satellites. These bands, unlike other bands where higher power operation is permitted, also currently have no satellite uplink or downlink allocations,

with the exception of the 5830–5850 MHz band. The Commission further proposes that devices licensed to operate under these allocations would be on a non-interference basis to other authorized services in the bands, the same requirement that applies to part 15 unlicensed device operations for these bands whether transmitting between terrestrial stations or to a satellite. That is, they may not cause harmful interference to authorized services and must accept any interference received, including from devices operating under part 15 of the rules and ISM equipment. Further, as discussed in the technical requirements section below, the Commission proposes no change to the current part 15 power limit for devices transmitting to satellites whether the devices operate on a licensed or unlicensed basis, thus there will be no change to the interference environment as a result of this proposal. The Commission seeks comment on the proposals in this paragraph.

Is it necessary to add an allocation for satellite operations in the Earth-to-space direction to either or both of these bands, and if so, in which bands or portions of these bands? What type of satellite service allocations should be added, e.g., FSS, MSS, or other? Do commenters agree or disagree with the Commission's proposal that all satellite operations in the proposed bands would be on a non-interference basis; even if licensed? Commenters that advocate for a different allocation status—primary or secondary—should provide justification for their position, including analysis for how such communication links would operate vis-à-vis other links, both licensed and unlicensed, and what effect a higher allocation status might have on existing part 15 operations. What is the appropriate method for adding an allocation? The Commission proposes to add a footnote allocation, but seeks comment on whether a direct table allocation would be a better regulatory approach. How much operational and technical detail should be in any added footnote? What other factors should the Commission consider in deciding what changes are appropriate? The Commission seeks comment on these questions.

Space-to-Earth. Space-to-Earth transmissions can have a larger area of impact than terrestrial transmissions because the space-to-Earth signal can cover a much wider area than terrestrial-based equipment due to the higher altitudes of satellites compared with terrestrial devices. However, given the proper technical and operating parameters, it may be possible that frequency bands available for higher-

power operation under the part 15 rules could be used for satellite downlink operations while co-existing with authorized services and terrestrial part 15 users, similar to what was recently permitted in Europe. In that case, the Electronic Communications Committee (ECC) of the European Conference of Postal and Telecommunications Administrations released a decision document describing the conditions under which low power devices operating in the 862–870 MHz band may be authorized to communicate with satellites, and satellites may be authorized to communicate with terrestrial devices in this band. Since numerous unlicensed devices share spectrum on a non-interference basis, the Commission believes that any satellite downlink operations in the bands available under the part 15 rules should also be on a non-interference basis, consistent with these rules and the Commission's proposal for satellite uplinks. The Commission seeks comment on this conclusion. Under this approach, the Commission would establish technical rules for satellite operations (e.g., PFD limits, beamwidth limits, or other technical requirements) designed to minimize the potential for adverse impacts on terrestrial part 15 devices as discussed in more detail in the technical requirements section below.

The Commission seeks comment on whether the U-NII-3 band (5725–5850 MHz) could be used for satellite downlink operations because it has no existing satellite uplink or downlink allocations except as noted above. The Commission seeks comment on this particular band because the higher frequency and correspondingly shorter wavelengths, as compared to the 2400–2483.5 MHz band, would allow for the use of smaller, more directional satellite antennas that could help limit the satellite beam footprint on Earth. However, the Commission recognizes that other frequency bands could be useful for satellite downlinks as well and seeks comment below on whether there are other frequency bands that could be used for this purpose.

If the Commission were to allow space-to-Earth satellite operations in the U-NII-3 band, what type of amendments to the Table of Frequency Allocations would be necessary? Would FSS and/or MSS allocations in the space-to-Earth direction be appropriate? The Commission seeks comment on whether operation, including licensed operation, under a satellite allocation in this band would be on the same non-interference basis as part 15 devices, as the Commission proposed above for the

Earth-to-space links. Are there alternatives that the Commission should consider? Could the Commission make allocation changes through a new footnote, which could clearly state what services devices would have to protect, e.g., that satellite downlink operations are on a non-interference basis to other services and users that share the band with part 15 devices? Should the Commission also include an allocation for inter-satellite links, and if so, what allocation changes would be necessary to accommodate that use? What other factors should the Commission consider? Alternatively, could such operations be conducted on a purely part 15 unlicensed basis? If so, how could the Commission address foreign operators and compliance with other requirements such as ITU filings and orbital debris showings? If the Commission were to authorize inter-satellite links, should they be authorized under the same mechanism as the space-to-Earth links or is a different mechanism needed?

Other frequency bands. While the Commission proposes and seeks comment on making more spectrum available for D2D satellite operations in certain frequency bands where higher-power unlicensed part 15 operations are permitted, the Commission recognizes that these bands contain a finite amount of spectrum. Over time, as satellite use increases, these bands may not have enough spectrum to accommodate future satellite applications. The Commission therefore seeks comment on any additional frequency bands that could be used to accommodate expanded D2D satellite operations under an operational and technical framework consistent with part 15 technical rules.

Are there any other bands that are used by unlicensed devices where the Commission could add satellite allocations, either uplinks, downlinks, or both? For example, should the Commission add a satellite downlink allocation in the 2400–2483.5 MHz band? What would be the advantages and disadvantages of a satellite downlink allocation in that band as opposed to the U–NII–3 (5725–5850 MHz band)? Are there any other U–NII bands, i.e., in the 5 GHz and 6 GHz bands, where the Commission could possibly add either satellite uplink or downlink allocations? The Commission notes that other U–NII bands contain satellite allocations as well as other services that must be protected, so parties that suggest the use of additional frequency bands should provide an analysis of how communications with satellites could operate in those bands

without causing harmful interference to authorized services or adversely affecting the operation of terrestrial part 15 devices. Similarly, if the Commission were to authorize inter-satellite links, what other bands might be appropriate for such transmissions under the framework the Commission is proposing here?

Licensing Framework. The Commission seeks comment on whether devices designed consistent with existing part 15 technical requirements intending to operate under the allocations proposed above need to do so under a licensed approach and what would be an appropriate licensing framework. Specifically, the Commission seeks comment below on whether to modify its rules to permit equipment certified under the Commission's part 15 rules to communicate with certain categories of satellites through a "license by rule" framework under part 25 of the Commission's rules governing satellite communications. The Commission also seeks comment on whether to use a streamlined licensing approach for such equipment under the Commission's part 25 rules governing earth station blanket licensing. For an apparatus that is intended to transmit and/or receive radiocommunications in space, the Commission seeks comment on using its existing part 25 rules to license such operations, as well as on potential alternatives. The Commission discusses these potential licensing frameworks in detail below.

Background. As previously observed, section 301 of the Act requires a license from the FCC for radiocommunication stations, including "any mobile station within the jurisdiction of the United States." A device operating pursuant to part 15 of the Commission's rules is also a "station" under its rules, which define a station as "[o]ne or more transmitters or receivers or a combination of transmitters and receivers, including the accessory equipment, necessary at one location for carrying on a radiocommunication service, or the radio astronomy service." Although the Commission has long authorized users to operate radiocommunication stations under part 15 of its rules based on equipment certification rather than station licensing, devices either communicating with stations in space or communicating with stations on Earth from space themselves appear to fall within the definitions of "earth station" or "space station" under the Commission's rules and are required to be authorized under part 25 as satellite communications, which generally requires a license from the Commission.

The Commission has excepted certain categories of stations authorized under part 25 from having to obtain individual station licenses. For example, the Commission does not require licenses for receive-only earth stations communicating with U.S.-licensed space stations in the Fixed-Satellite Service (FSS), but instead permits voluntary registration of such stations in order to protect them from harmful interference in frequency bands shared co-equally with terrestrial fixed service. The Commission also permits a large number of technically-identical stations to be authorized under certain circumstances as part of a single "blanket license" that permits those stations to deploy anywhere within the geographic area specified in the license without site-specific coordination. In addition, under its Supplemental Coverage from Space (SCS) framework adopted in 2024, the Commission adopted a "license by rule" framework that permits terrestrial wireless equipment that meets the equipment certification requirements in other parts of the Commission's rules (e.g., part 24 or part 27) to communicate with satellites as a satellite earth station under part 25 of the Commission's rules, but without requiring an individual earth station license for the equipment.

User Equipment. The Commission seeks comment on whether to modify its part 25 rules to permit devices certified under the Commission's part 15 regulatory framework to communicate with certain categories of satellites on a licensed-by-rule basis. This "license by rule" framework would be similar to the approach taken for SCS, under which equipment meeting the equipment certification requirements under other parts of the Commission's rules are permitted to communicate with United States-licensed space stations or non-United States-licensed space stations that have received a grant of United States market access as satellite earth stations under part 25. Under this "license by rule" framework, a device operating consistent with the part 15 rules and within certain bands (e.g., 2400–2483.5 MHz or 5725–5850 MHz) would be also licensed as an earth station by rule without the need to file and receive approval for a part 25 earth station application for additional authority, provided that the device is operating within the technical parameters of its equipment authorization. As noted, the Commission's intent in seeking to permit devices that meet part 15 technical parameters to communicate with satellites is to expand such

devices' reach and scope without changing their regulatory status regarding harmful interference. Thus, all such devices would operate on a non-interference basis. The Commission seeks comment on this possible regulatory framework.

The Commission also seeks comment on whether, as an alternative to the "license by rule" framework, it would be appropriate to adopt a blanket license framework under part 25 for devices certified under the Commission's part 15 regulatory framework and operating in one of the designated bands to communicate with satellites. If so, the Commission seeks comment on what application and operational requirements should govern such blanket licenses. What information about the devices would be required to be provided in an application for such a blanket earth station license? Would the information provided need to be the same as currently required for earth station applications under part 25, or would a streamlined "light touch" approach be appropriate? What informational requirements under the Commission's current or proposed rules governing earth station applications is unnecessary under such a "light touch" approach to blanket licensing of earth stations? Who would be the license holder for the user equipment, and would such a license holder be required to have operational control over the devices, which is an essential characteristic of a licensee? Should there be a numerical limit on the number of user equipment devices that could be applied for under a single blanket earth station license? What would be the appropriate geographic area for deployment of user equipment? What are the comparative benefits and costs of each approach (*i.e.*, license by rule versus blanket licensing)? Finally, as with the license-by-rule approach, devices operating under a blanket license approach would similarly be required to operate on a non-interference basis. The Commission seeks comment on these questions. The Commission also seeks comment on whether any other alternative regulatory frameworks would be appropriate for permitting certified part 15 devices to communicate with certain categories of satellites. Could these devices be permitted to communicate with satellites under the part 15 rules without also requiring operators to obtain a license under a different rule part? For example, could the Commission develop a new license-by-rule construct under which equipment certified as compliant with the part 15

technical rules is automatically authorized as a part 25 earth station when communicating with Commission-authorized space stations? If so, what part 15 and part 25 rule modifications would be required to accomplish this? Could a lightweight licensing system satisfy national-security considerations? Are there any other licensing and sharing frameworks beyond pure part 15 or hybrid part 15/part 25 models that the Commission should consider, including fully licensed approaches, alternative secondary or opportunistic frameworks, and any other others that could accelerate investment and deployment for D2D? If so, commenters should describe suggested frameworks and their benefits.

The Commission also seeks comment on whether any build-out requirements would be necessary under the proposed framework. Because devices operating in the designated bands would operate on a non-interference basis and would not preclude use of the bands by other potential spectrum users, it may not be necessary to apply to any blanket license the build out requirements of § 25.133 of the Commission's rules. The Commission seeks comment on such an approach. Alternatively, the Commission seeks comment on whether it should apply a similar build-out period to ensure prompt use by the public. Commenters advocating an alternative approach should provide their thoughts on how the Commission would apply build-out requirements for part 15-compliant devices functioning as earth stations. The Commission seeks comment on these questions.

Satellites. The Commission seeks comment on using the part 25 licensing regime to authorize space stations to transmit and receive in frequency bands where part 15 unlicensed devices are permitted to operate at higher power levels. This licensing regime could follow the general framework for authorizing space stations to provide SCS. The Commission seeks comment on allowing applicants to apply for an initial geostationary-orbit (GSO) or NGSO space station authorization, or to modify an existing authorization, to include a space station operating in specific bands consistent with the Commission's proposals to update the Table of Frequency Allocations by including satellite allocations where none exist today. Relatedly, this would include space stations included in a petition for declaratory ruling to obtain United States market access for a non-United States-licensed space station. Further, consistent with the approach taken here, the Commission proposes

that any such operations would be on an unprotected, non-interference basis, consistent with part 15 operations. The Commission also expects that in most, if not all, instances satellites will not operate exclusively using these designated frequency bands, but rather they will operate primarily using frequencies allocated for the provision of other satellite services, such as FSS, mobile-satellite service (MSS), or Space Operation Service. As such, operations under the Commission's proposed framework would, similar to SCS, provide satellite operators and consumers with capacity where none may otherwise be available for devices designed for part 15 operations. The Commission seeks comment on these views and whether satellite operators would plan on taking advantage of this low cost connectivity alternative. Alternatively, the Commission seeks comment on whether it is possible to authorize any space station operations—for example, receive-only operations that downlink using frequency bands separately licensed by the FCC—through a license-by-rule provision, analogous to the framework envisioned for terrestrial devices above, without an individual license for the space station. Would such a license-by-rule framework for space station operations in bands used by unlicensed devices be applicable to requests for United States market access by non-US-licensed space stations in such bands? Would the Commission still be able to obtain information about orbital debris mitigation plans of the applicant, as required by the Commission's rules?

The Commission also seeks comment on what processing and service rules should be applied to space stations operating in the designated frequency bands. If such stations are required to operate on an unprotected, non-interference basis, the Commission seeks comment on whether such stations could be authorized outside of the Commission's processing frameworks for GSO-like and NSGO-like space stations, since neither first-come, first-served nor processing round procedures appear necessary to establish priority vis-à-vis other space station licensees. Proposed operations of the satellite in traditional satellite frequency bands, however, would still be subject to first-come, first-served or processing round requirements, as applicable. The Commission seeks comment on these processing frameworks. The Commission also seeks comment on whether it should adopt or modify any service rules in part 25 to take into account space stations

communicating with devices certified under part 15. For example, although § 25.289 of the Commission's rules protects GSO systems from NGSO systems, the Commission has pointed out that this provision only applies to FSS and Broadcasting-Satellite Service (BSS) operations and does not apply to satellite operations in MSS bands. Accordingly, because the operations the Commission proposes would be on an unprotected, non-interference basis, the Commission does not expect that any such provisions would apply. The Commission seeks comment on this approach to satellite licensing and on any alternative processing and service rules for space stations operating in the designated frequency bands.

The Commission also seeks comment on what technical information must be supplied as part of an application to operate a space station in the designated frequency bands. Because the Commission expects that these new frequency bands would be included in addition to traditional satellite bands, which would need to go through normal processing procedures, the Commission does not believe that any extra information beyond listing the bands and associated power levels and emissions are necessary, as any other requirements, such as orbital debris mitigation plans, should already be accounted for as part of any space station application to operate in traditional satellite bands. The Commission seeks comment on this view. However, should any satellite operator intend to launch a satellite that operates solely in the designated frequency bands, then the Commission believes full satellite-relevant information, as required under part 25, such as a plan for orbital debris mitigation, an ITU satellite network filing, and a brief description of the coverage areas that will be served, would be necessary. The Commission seeks comment on this view. What information would need to be provided to demonstrate compliance with the technical and service rules discussed below, and in what format should that information be provided? The Commission seeks comment on these questions.

In addition, the Commission seeks comment on whether any certifications need to be provided by an applicant as part of its application to operate in any of the designated frequency bands? Is it sufficient for the applicant to certify that the space station operations in the designated frequency bands will comport with any technical parameters that the Commission adopts for such operations? In addition, is it sufficient

for applicants to certify compliance with any technical and service rules adopted as part of this document, or is a demonstration of compliance necessary? The Commission seeks comment on these questions.

The Commission also seeks comment on allowing the satellite operator to choose its regulatory status as either a common carrier or non-common carrier, as is allowed under the Commission's part 25 rules and its SCS framework. Similar to the Commission's view regarding technical information, because the Commission expects that the proposed operations would be ancillary to traditional satellite frequency bands, the Commission believes that minimal conditions need be placed on satellites pursuant to such operation. The Commission seeks comment on this view. For example, such operation would automatically be extended for whatever license terms, including renewals and extensions, as approved for any other frequency bands on the satellite. However, if any satellite operator intends to launch a satellite that operates only in the designated bands, then the Commission would need to separately impose such requirements. In such cases, the Commission seeks comment on subjecting those space stations to its existing part 25 license term rules, as well as the Commission's part 25 rules governing renewals or extensions of license terms. Similarly, in such cases, the Commission seeks comment on whether the Commission's rules governing milestones and bonds for space stations should be applicable. Should any performance requirements be imposed to ensure that spectrum is intensely and efficiently used. Should milestones on when GSO and NGSO space stations must be launched and operated be imposed, and should the requirement to post a surety bond within a certain time period after grant of the license be imposed. The Commission seeks comment on these issues.

Finally, the Commission seeks comment on an alternative approach and ask whether it is feasible to create a framework for space stations authorized to communicate with devices certified under the Commission's part 15 regulatory framework similar to its "Permitted Space Station List." Under such a framework, a list could be maintained on the FCC website identifying all satellites authorized to include a space station offering communication links in any of the designated frequency bands. Similarly, the Commission also seeks comment on whether a viable approach

would be to adopt a rule that would permit any user equipment certified to part 15 requirements and licensed by rule to communicate with satellites on this list without further authorization from the Commission

Technical and Service Rules. In this Section III.B.3, the Commission proposes to amend its rules to permit devices to communicate with satellites in the Earth-to-space direction in the 2400–2483.5 MHz and 5725–5850 MHz bands under the same technical requirements that apply to part 15 intentional radiators. In addition, the Commission seeks comment on the general types of technical requirements that would be required for satellite communications to devices in the space-to-Earth direction in the 5725–5850 MHz band or any other frequency bands available where part 15 rules permit higher power. The Commission's intent is to enable new uses of these frequency bands without adversely impacting existing uses of the bands, both licensed and unlicensed.

Earth-to-Space. The Commission proposes to allow terrestrial devices certified as compliant with the part 15 technical requirements that operate in the 2400–2483.5 MHz and/or 5725–5850 MHz bands to communicate with satellites in the Earth-to-space direction. These rules protect authorized services from harmful interference and have enabled effective spectrum sharing between billions of unlicensed devices. The Commission proposes no increase in the maximum permissible power or antenna gain, and no changes to any of the other technical rules (*e.g.*, bandwidth, OOB) that apply to unlicensed devices in these bands.

The Commission seeks comment on this proposal. Would allowing devices operating under the part 15 technical rules to transmit from Earth-to-space increase the likelihood of harmful interference to authorized services or adversely affect spectrum sharing by unlicensed devices? Commenters should provide specific examples and analysis to support their position. In particular, the Commission seeks comment on whether this proposed change could impact radio astronomy observations, which are carried out in specific remote, low population density areas and currently use spectrum on an opportunistic basis? What would be the impact of expanded use of the 2400–2483.5 MHz band on S/X Celestial Reference Frame observations? Are there technical measures that could address concerns about radio astronomy, such as requiring devices to incorporate a geofencing system to facilitate compatibility with radio

astronomy receive sites? Are the current part 15 technical requirements suitable for communications with satellites in the Earth-to-space direction in these bands? If the Commission were to allow Earth-to-space transmissions in any frequency bands besides the three discussed above, would the current part 15 technical requirements be suitable in those bands? Should the requirements for frequency hopping and digital modulation techniques apply to devices transmitting to satellites in these bands, and if not, what requirements should apply? Are the current out-of-band emission limits adequate? How would part 15 devices determine whether they are communicating with another terrestrial device or a satellite? Would permitting communication with satellites encourage increased usage of devices at the highest permissible power level? Would this affect frequency reuse by part 15 operation and what would be the overall impact to the wide range of part 15 devices sharing these bands? Do the Commission needs to place any limitations on the operation of devices transmitting to space from high altitudes to avoid changing the interference environment, such as prohibiting operation on aircraft or unmanned aircraft systems? As the number of LEO satellites grows, what will be the expected impact on the large number of unlicensed part 15 terrestrial devices? Should the Commission require part 15 devices authorized to communicate with space stations to use a contention-based protocol, or implement other techniques to facilitate coexistence with existing and other terrestrial unlicensed devices? For example, in the Commission's 6 GHz rules, the Commission uses an automated frequency coordination (AFC) system to facilitate coexistence between low power unlicensed and higher power licensed services, including satellite earth stations. Would a similar sharing framework for coexistence between unlicensed terrestrial and NGSO earth stations facilitate a wider range of beneficial services than a framework limited to the current part 15 rules? The Commission seeks comment on these questions.

While the Commission proposes no changes to the part 15 technical requirements for devices used to communicate with satellites in the Earth-to-space direction, the Commission recognizes that there are certain tradeoffs regarding device design, simplicity, and performance for satellite communications. The current part 15 technical requirements could potentially limit or preclude certain

types of satellite-based services, *e.g.*, those that require high throughput such as video transmissions, or where satellites orbit at higher altitudes above the Earth. If there is a need to enhance communication performance to enable, for example, better uplink throughput, what changes should the Commission consider? What technical rules could the Commission develop that are more tailored to satellite D2D links and that could unlock higher-value services without compromising the non-interference character of the bands? For example, should the Commission permit higher power levels than 4 watts (36 dBm) EIRP in D2D applications? Should the Commission have specific antenna requirements such as gain and directivity limits in both the horizontal and vertical planes? Since it does not appear necessary for a device that transmits to satellites passing overhead to radiate full power at all angles above the horizon, is there a need to place limits on the radiated power at lower angles above the horizon to enable more efficient use of the spectrum? If so, what antenna gain or power limits, and at what angles above the horizon, are necessary, and would such limits be practical for non-fixed devices? Could requiring devices to direct more of their energy upward potentially impact aviation or other transportation operations? Should the Commission place any additional requirements on such devices to avoid adversely affecting spectrum sharing between unlicensed devices? Could devices be designed such that they are able to use additional power or different antennas for D2D satellite communications, but revert to current part 15 limits for communicating with other terrestrial-based part 15 devices? In all cases, the Commission proposes that such operations are on an unprotected, non-interference basis. The Commission seeks comment on these questions.

Space-to-Earth. The Commission seeks comment on the types of technical parameters that would be necessary to facilitate the sharing of spectrum between space stations communicating in the space-to-Earth direction and terrestrial operations, both licensed and unlicensed, when communicating in the designated bands (*e.g.*, the 5725–5850 MHz or other bands contemplated above) with devices that operate consistent with part 15 technical rules. Satellite downlink communications present unique characteristics that are not fully addressed by the existing part 15 rules. For instance, terrestrial devices are generally designed to receive communications from a horizontal

direction with a relatively smaller footprint. Because satellites illuminate larger geographical areas than terrestrial devices, sharing between satellite downlink and terrestrial devices involves additional sharing considerations. The Commission therefore seeks comment on a number of issues to develop a record on how to enable space-to-Earth operations without causing harmful interference to authorized services or adversely affecting part 15 device operations. To develop a complete record on these issues, the Commission seeks comment with regard to all of the frequency bands contemplated above for Earth-to-space operations.

Terrestrial part 15 device coexistence with satellite operations. As evidenced by their prevalence in all facets of the Commission's lives, terrestrial devices operating under the part 15 rules provide many benefits to businesses and for personal use. The Commission's intent here is to provide more opportunities for connectivity without adversely affecting their use and ask commenters to provide analysis and data regarding the best way to achieve such coexistence. As noted in the *NPRM*, the Commission proposes to develop rules that would enable terrestrial part 15 devices to coexist with new satellite services without adverse impacts. Satellite operators could implement various methods to enable coexistence, including limiting the maximum PFD on the ground, limiting the size of the satellite beam on Earth, adhering to aggregate emission limits, and other technical limits or requirements, such as using a contention-based protocol (*e.g.*, listen-before-talk) requirement. Each of these methods is discussed in greater detail below. In considering the potential impact of satellite operations on terrestrial part 15 devices, parties should consider two important points. First, many part 15 devices are used indoors where satellite signals are significantly attenuated by buildings, so the likelihood of adverse impacts on them from new satellite operations appears low. Second, in densely populated areas there are likely to be multiple communication services available through either licensed or unlicensed access and in many cases buildings and other structures will block signals from reaching the ground, so new satellite services are unlikely to be competitive or cost effective in those areas. Thus, the Commission expects that any new satellite services in frequency bands proposed here would

be used primarily outside of densely populated areas.

Power Flux Density and Antenna Beam Limits. Power flux density (PFD) limits are often used as a mechanism to facilitate spectrum sharing between satellite downlink and terrestrial services. These limits restrict the signal power a satellite is permitted to project onto the Earth's surface per unit area and bandwidth. Under part 15 of the Commission's rules, all unlicensed devices operate on non-interference basis, meaning that these devices may not cause harmful interference and must accept any interference received, including interference that may cause undesired operations. The Commission seeks comment on how this non-interference status should shape the formulation of PFD limits for satellite downlinks transmitting in the designated frequency bands.

What PFD limits would be necessary to maintain the continued operational utility of the part 15 ecosystem while protecting authorized users in the designated bands? For example, would PFD limits similar to those in part 25 be appropriate? Would these limits be sufficient to protect the incumbent federal radiolocation operations in the 5725–5850 MHz band? Could the Commission require PFD limits similar to those that the ECC specifies for space-to-Earth transmissions in the 862–870 MHz band? Would those limits be appropriate, considering that they were designed for a lower frequency range with a smaller amount of available spectrum and to protect different incumbent spectrum users? Given that the PFD on the ground varies as a function of angle above the horizon (elevation angle), and considering that the antenna gain of terrestrial devices also exhibits angular dependencies, should the PFD limit be expressed as a function of elevation angle? Would a PFD limit that is low enough to prevent harmful interference to authorized users and enable coexistence with terrestrial users be sufficient to close a link with targeted terrestrial devices, and if so, with what expected data rates? How many devices would be within a satellite downlink spot beam and how will desired communications with targeted devices impact other operators in the band? What would be the impact on frequency reuse in the band of operation and how would equipment operating under a listen-before-talk protocol be affected by satellite signals? What would be the impact on sharing protocols that have been implemented in part 15 equipment that was designed to accommodate low power short range terrestrial operations? Given that

terrestrial receivers typically have antenna nulls directed toward space, could this factor allow for higher PFD limits? Should the Commission mandate specific operational requirements for satellite transmissions, such as a minimum elevation angle of operation? If the Commission were to adopt PFD limits, should those limits be codified in part 25 as with other satellite operations or in part 15? Is there an advantage to using either rule part?

As the PFD is related to a specific antenna beam or combination of beams, the Commission also seeks comment on whether the on-the-ground footprint for any given beam should be limited. Because a satellite beam illuminates much more area than a terrestrial-based antenna, the Commission seeks comment on whether it should set a maximum limit either for single entry or aggregate PFD levels from the satellite. Such a requirement could help protect terrestrial unlicensed operations from any adverse impact by limiting the level of in-band noise received by unlicensed devices. Commenters in favor of such limits should provide details both on the size and technical justification for any requested limits. Similarly, the Commission seeks comment on whether such satellite transmissions should be restricted to certain geographic areas. For example, because the Commission believes that such operations would extend the reach of devices certified to part 15 limits to areas with little or no terrestrial infrastructure, should only those areas be served by satellites operating in the designated bands? If so, how would the Commission determine those areas (e.g., by population density)? The Commission seeks comment on these issues.

Aggregate Emission Limits. The Commission seeks comment on how it could address issues arising from multiple satellite constellations operated by different operators. In the Commission's recently adopted framework governing SCS, the Commission established limits in certain frequency bands on the aggregate field strength at the Earth's surface produced by all visible beams and satellites within a single constellation. The Commission notes that SCS involves communications in bands that are fully licensed, while the Commission is focusing on other options such as a licensed-by-rule approach, which may result in the need for differing requirements due to factors such as the number of satellite operators and constellation sizes. Is there a need for an aggregate field strength or PFD limit to maintain the continued operational utility of the part 15

ecosystem and protect authorized users in the designated bands? If so, what should that limit be and what specific technical factors should determine it? Should there be any limit on the number of beams allowed to illuminate the same geographical area simultaneously, and what factors should be included in an aggregate calculation? Should an aggregate limit apply to each satellite system individually or to the combined energy of all satellite systems? If a limit applies collectively, how should the calculation account for multiple independent operators? How could compliance with a limit be enforced, and would this require a real-time coordination mechanism?

Out-of-Band Emission (OOBE) Limits. The Commission seeks comment on what OOBE limits would be necessary for devices operated in space-to-Earth applications in the designated bands. Should devices be required to meet the existing part 15 OOBE limits, which specify a limit of -27 dBm/MHz EIRP at 75 MHz above or below the edge of the 5725–5850 MHz band, with higher levels permitted closer to the band edge? Alternatively, should the Commission establish a limit consistent with the part 25 rules which require specific levels of attenuation below the mean output power of the transmitter at specific frequency separations from the assigned frequency of operation? Should the Commission establish OOBE limits in terms of PFD, and if so, how could a PFD limit be derived from the current part 15 or part 25 limit? What factors should the Commission consider in determining the appropriate emission limit? The Commission also seeks comment on whether there is a need to establish an aggregate OOBE limit as the Commission did for SCS, e.g., a PFD limit of -120 dBW/m²/MHz at 1.5 meters above ground level? In seeking comment on this issue, the Commission notes that SCS is a fully licensed service, whereas in this document the Commission have been focusing on other options such as a licensed-by-rule approach. Parties that believe that an aggregate OOBE limit is necessary should consider this distinction and should also address the issues described above concerning aggregate in-band limits.

Other Technical Requirements. The Commission seeks comment on whether all of the technical limits that currently apply to terrestrial operations under the part 15 rules should apply to devices used for space-to-Earth transmissions. For example, should the Commission apply the existing minimum bandwidth, frequency hopping, and

power spectral density rules to devices operated on satellites? Are there provisions in the existing technical rules that could hinder satellite uses? Are there any additional requirements that would be necessary to prevent harmful interference to authorized services such as radio astronomy observations as discussed above or to better enable coexistence with existing unlicensed applications? For example, is there a need for limits on frequency stability, transmit duty cycle, or maximum bandwidth? Should the Commission require a contention-based protocol mechanism whereby a satellite contends for terrestrial spectrum usage before transmission and possibly limits or modifies its transmissions based on the amount of available spectrum? Noting the longer transmission paths to satellites compared to terrestrial-only operations, advocates for using a contention-based-protocol should address what requirements would be necessary and how it could work given that disparity. Could terrestrial devices implement the contention-based-protocol sensing and relay that information to a satellite? In such a scenario, do the protocols support any scheduling mechanisms which can account for the differences in transmission time to avoid packet collisions? If multiple parties develop satellite systems that share spectrum, is there a need for time synchronization between time division duplex (TDD) systems, or frequency usage between frequency division duplex (FDD) systems, and if so, how could that be accomplished? If existing technical limits are insufficient or additional requirements appear necessary, commenters should offer specific suggestions for modifications, including a justification for why those changes are needed.

Equipment Authorization. Part 15 intentional radiators must generally be approved under the equipment certification procedure. This procedure requires that equipment be tested at an FCC-recognized accredited laboratory to demonstrate that it complies with the requirements in the rules, and then approved by an FCC-designated Telecommunication Certification Body. A certification requirement also applies to terrestrial transmitting devices under the part 22, 24, and 27 rules, as well as portable earth station transceivers under the part 25 rules. Equipment used on satellites for space-to-Earth transmissions must be licensed by the Commission under part 25 and must comply with all requirements and conditions of the license, but it does not

go through an equipment certification process.

Under the SCS framework, the Commission requires that terrestrial wireless equipment operating under at least one of parts 22, 24, or 27 that also communicates with a satellite must be certified as a satellite earth station under part 25. The Commission also established a streamlined process for applicants to expand existing part 22, 24, and 27 equipment certifications to include part 25.

The Commission does not propose any changes to the existing requirement that intentional radiators operating under the part 15 rules must generally be certified before they can be imported, marketed and operated, nor do the Commission proposes any changes concerning equipment it has included on the Covered List of equipment it has determined to pose an unacceptable risk to the national security of the United States or the security and safety of United States persons. However, the Commission seeks comment on whether there is a need to adopt any additional requirements for terrestrial devices that comply with the part 15 rules and are intended to communicate with satellites. Specifically, is there any need for devices that are designed to comply with part 15 technical requirements, but also intended to communicate with satellites under the framework proposed herein, to also be certified under part 25? If the Commission were to require a part 25 certification in addition to a part 15 certification, the Commission proposes that it would be applied only to new equipment authorizations or authorizations being updated through the permissive change process. Equipment already certified for part 15 would be permitted to communicate with satellites under their existing equipment authorizations. What would be the benefits of that requirement to consumers and the Commission, and would these benefits outweigh the burdens of requiring an additional certification? In this context, to simplify the certification process the Commission proposes that no additional device testing would be necessary to obtain the part 25 certification in addition to the part 15 certification, and that simply meeting the part 15 technical rules would render the device also eligible for the part 25 certification. The Commission seeks comment on this proposal. In particular, the Commission seeks comment on how such an approach might or might not work if the Commission were to modify certain rules either for terrestrial or space-based equipment (e.g., power, out-of-band-emissions, and antenna gain) to

facilitate communications between these terrestrial devices and satellites. Are there options for permitting or requiring different approaches based on the authorization framework—i.e., fully licensed versus licensed by rule versus unlicensed? In addition, the Commission seeks comment on how various equipment certification requirements combined with different authorization requirements and the Commission's prospective application of the certification requirements have implications for currently certified equipment that also meets the criteria for covered equipment on the Commission's Covered List as such equipment is not eligible for new certifications or permissive changes. Are there alternative approaches that would be simpler, and if so, what would they be? Are any specific requirements necessary beyond the existing part 15 certification requirements, and if so, how could the Commission make these the least burdensome possible?

International Issues. The Commission seeks comment on how the framework discussed in this document for permitting devices that meet part 15 technical parameters to communicate with satellites could be implemented consistent with international obligations of the United States as a Member State of the International Telecommunication Union (ITU).

ITU. The United States is a Member State of the ITU. As an ITU Member State, the United States adheres to the ITU Radio Regulations. Under the framework discussed above, the Commission seeks comment on authorizing space stations and earth stations to operate in certain frequency bands where part 15 devices are permitted to operate with higher power pursuant to a satellite allocation in the United States, but also on an unprotected, non-interference basis. While adding a satellite allocation to the designated bands would render such operations consistent with the United States Table, these operations would not conform with the International Table which does not currently include such satellite allocations, and operation, particularly with respect to the potential for harmful interference to or from cross-border stations, would 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 operating in accordance with the provisions of the Constitution, the Convention and these Regulations.” Accordingly, the Commission seeks comment on what steps should be taken to ensure that any frequency assignments that are made as a result of this document that are not consistent with the International Table do not cause harmful interference to, or result in claims of protection from harmful interference from, stations that are operating in accordance with ITU provisions, including the International Table. The framework discussed above includes requiring that operations be conducted on an unprotected, non-interference basis, in both the Earth-to-space and space-to-Earth directions. In addition, it envisions requiring that appropriate materials be submitted to the ITU as part of any space station application that seeks to operate in bands available for unlicensed devices in addition to operations in bands licensed for traditional satellite services. The Commission seeks comment on how these requirements can be implemented consistent with the Commission’s obligations under the ITU Constitution and Convention, including those pertaining to the ITU Radio Regulations, particularly ITU Radio Regulation No. 4.4. The Commission also seeks comment on what analyses or other showings could be required as part of a space station application to demonstrate that the operations would not cause harmful interference to stations operating in accordance with the ITU Radio Regulations. In addition, to the extent that space station applicants licensed under part 25 of the Commission’s rules plan to communicate with areas outside of the United States, pursuant to a market access authorization issued by another jurisdiction, the Commission seeks comment on what measures should be disclosed as part of the application to eliminate immediately any harmful interference concerns. Should the authorization include a condition that communications with areas outside of the United States are only permitted if the governing administration has authorized such communications and must be subject to that authorization? Should documentation of such authorization be provided to the Commission prior to when a United States-licensed space station begins operations in an area outside of the United States?

International Harmonization. We also seek comment on what measures could be taken to promote international harmonization, particularly with Canada and Mexico. Although the framework discussed in this document would authorize satellite communications in the United States only, a United States satellite license includes all operations of that United States-licensed space station—including authorization of transmission or reception at the space station to/from stations located outside of the United States. As observed in the SCS proceeding, such communications are subject to the laws, regulations, and requirements of any country in connection with communications in that country, including but not limited to, authorization to communicate with earth stations in that jurisdiction. The Commission seeks comment on whether United States-authorized space stations that can be used to communicate with equipment meeting part 15 technical parameters (or the foreign equivalent) outside of the United States should require a licensee to 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, as was adopted for SCS.

National Security Issues. The Secure Networks Act is designed to protect the nation’s communications infrastructure from foreign security threats. It established a comprehensive framework to identify, block, and remove untrusted equipment from American networks. The Secure Networks Act requires the Commission to publish a list of equipment and services that pose “an unacceptable risk to the national security of the United States or the security and safety of United States persons” based on specific determinations made by certain enumerated sources (Covered List). Through the Secure Equipment Act, Congress directed the Commission to “no longer review or approve any application for equipment authorization for equipment that is on the [Covered List].” In the *EA Security R&O and FNPRM* (insert FR cite, date publish), the Commission established several new rules to prohibit authorization of equipment identified on the Commission’s Covered List developed pursuant to the Secure Networks Act. In the *EA Security Second R&O and FNPRM*, the Commission provided further guidance on the prohibition on authorization of covered equipment, prohibited the authorization of devices

that contain certain component parts identified on the Covered List, and adopted a procedure to implement prohibitions on the continued importation and marketing of previously authorized covered equipment.

The Commission seeks comment on national security concerns associated with any of the proposals above. Would permitting satellites that can transmit and/or receive in frequency bands available under the part 15 rules pose any national security concerns? As discussed above, any proposed new satellite operations would fall under a part 25 authorization framework. Would the part 25 space station licensing framework sufficiently address potential national security concerns? If not, what new types of concerns would be raised? Would allowing satellite uplink or downlink operations in frequency bands that are widely used by part 15 unlicensed devices provide any new openings for bad actors to exploit or state sponsored espionage? Are there devices (including modules) or classes of devices that should be prohibited from communicating with satellites? Would there be national security risks posed by such communication with devices that have already been granted equipment authorizations? What steps could the Commission take to address any potential new national security concerns?

Similarly, the Commission seeks comment on whether allowing terrestrial equipment that communicates with satellites in frequency bands available under part 15 raises any new national security issues that the Commission needs to address. Is there a need to require manufacturers to take any additional steps to secure their equipment, and if so, what steps would be necessary? Would the Commission need to place additional requirements on certain types of equipment or certain manufacturers to address any national security concerns?

The Commission notes it has acknowledged that Covered List entities could operate in a manner analogous to blanket domestic section 214 authority by offering non-common carrier service without advance review by the Commission if they use equipment that meets the technical criteria of the Commission’s Part 15 rules. Could expanding the Part 15 rules to allow for satellite D2D as discussed herein inadvertently facilitate Covered List entities’ ability to offer non-common carrier service by means of satellite technology? Should the Commission explicitly exclude entities identified on the Covered List from, by default, being able to offer service to the public or

other third parties by utilizing unlicensed operations enabled by satellite? Should Covered List entities be explicitly prohibited from any non-Part 15 licensing framework discussed above, such as license-by-rule or blanket licenses for earth stations or receive-only space stations?

Within Spacecraft. Various devices that operate under part 15 of the rules, particularly those containing transmitters such as Wi-Fi or Bluetooth, can prove useful for essential functions on the growing number of crewed missions. For example, laptop computers can be used in scientific experiments, for communication with other personnel, and for entertainment purposes on long missions. Smartphones can be used for taking pictures and also for communicating with families on earth and smart watches can monitor the health of the space crews while using Wi-Fi or Bluetooth protocols. The part 15 rules do not specifically prohibit or allow the use of these devices within spacecraft. Today, these devices are allowed to be used by astronauts in the ISS via close coordination with NASA. A list of devices that will be brought onto the ISS is provided to the FCC before each mission and the Office of Engineering and Technology of the FCC confirms that these devices are certified and compliant to the part 15 rules. NASA administers the overall process for the electronic devices that can be brought into the ISS.

To provide clarity on the requirements for unlicensed devices aboard spacecraft, the Commission proposes to modify the part 15 rules to confirm that the operation of certified unlicensed devices within spacecraft is a permissible use, subject to any other applicable restrictions, such as those of federal agencies and international treaties. The Commission is limiting this proposal to operation within spacecraft because the Commission believes that there are a number of factors that make the potential interference from part 15 devices within spacecraft to authorized users of the spectrum on earth extremely unlikely. For example, the distance separation from Earth will significantly attenuate any signals from a spacecraft, thus significantly reducing the potential to cause harmful interference to authorized services on Earth. Also, the spacecraft shielding that protects occupants and equipment inside from radiation and temperature extremes will also act as RF shielding to severely attenuate signals radiating outside of the spacecraft. The Commission seeks comment on these views.

Operation of part 15 devices on board spacecraft would be subject to the same non-interference requirement in section 15.5 as terrestrial devices. Unintentional radiators emit significantly lower signal levels than intentional radiators, so unintentional radiators used within spacecraft will have an even lower potential for causing harmful interference than intentional radiators. The Commission is therefore proposing to confirm that the use of unintentional radiators within spacecraft is also a permissible use under part 15 of the rules. The proposed changes would benefit crew members and passengers by making clear that both intentional and unintentional radiators, such as smartphones, smart watches, notebooks and tablets, could be operated within spacecraft, subject to any other applicable restrictions, such as those of federal agencies and international treaties. The Commission emphasizes that this proposal applies solely to operation within a spacecraft, such as a wireless connection from a portable device to a wireless access point within a spacecraft.

The Commission proposes to add a new section to part 15 confirming that the operation of intentional and unintentional radiators that comply with the technical and authorization requirements is permissible within spacecraft (*i.e.*, within a fully shielded environment, but remains subject to any other requirements for equipment used in space. For example, the Commission could as part of its part 25 licensing process impose requirements, such as specific limitations on the types of equipment or operating frequencies that can be used on board spacecraft. Does the Commission's proposal sufficiently limit the likelihood of harmful interference to authorized services on Earth? Are the current part 15 rules sufficiently protective in this scenario? Should the Commission limit the types of devices that can be operated on spacecraft? Do the Commission needs to place restrictions on the frequency bands in which they can operate, and if so, in which bands? Conversely, does the fact that devices would operate within an enclosed spacecraft mean that the Commission could in some cases permit higher power or other types of operations not currently permitted under the part 15 rules? If so, what particular technical requirements could be modified? Should the Commission consider a different interference management policy for part 15 devices operating within spacecraft than for terrestrial operation? If so, how can such processes be managed? How could the

Commission ensures that equipment specifically designated for use within a spacecraft which might have different operating parameters from terrestrial based devices are not used on Earth where the potential for causing harmful interference might be much greater than within a controlled spacecraft environment?

Extravehicular Activity (EVA) and Communications Between Spacecraft. The Commission seeks comment on what rule changes it could make to facilitate extravehicular activity (EVA) and communications between spacecraft or other space-based devices (*e.g.*, equipment used for in-space servicing, assembly, and manufacturing (ISAM) applications) to support developing space industries. The types of applications that might be used in EVA and communications between spacecraft could include voice, video, and data communications, especially for use of robotic arms and other apertures, and could also include radars and field disturbance sensors to help locate and position personnel, spacecraft, satellites, or other objects. The Commission seeks comment on this assessment and what other types of applications for EVA and communications between spacecraft could use equipment operating in the bands available for part 15 devices.

The Commission believes that unlicensed devices could play a pivotal role in unleashing new applications related to ISAM. The Commission seeks comment on this view. The Commission, in 2024, issued a Notice of Proposed Rulemaking that proposed a new framework for licensing space stations engaged in ISAM. ISAM refers to a set of capabilities used in-orbit, on the surface of space objects and celestial bodies, and in transit between these regimes. The Commission seeks comment on the potential use of devices operating under the part 15 technical requirements for various uses, including EVA and communications between spacecraft, that may be considered as part of ISAM capabilities.

While the Commission recognizes the potential benefits of making more spectrum available for EVA and communications between spacecraft, the Commission will not at this time propose specific rule changes to facilitate these applications for devices operating under the part 15 rules. Devices must operate under the part 15 rules on a non-interference basis, and transmissions from space can potentially impact terrestrial operations over a wide area. However, to build a record on the possibility of using frequencies available under part 15 for EVA and communications between

spacecraft, the Commission is seeking comment on a number of issues, including potential frequency bands, power levels, antenna requirements, and other technical issues. The Commission also seeks comment on whether there are any international treaties or agreements that must be considered in permitting communications in space in these frequency bands, as discussed above in the context of Earth-to-space and space-to-Earth transmissions in these bands.

The Commission seeks comment on the frequency bands that could be used for communications or other transmissions (e.g., field disturbance sensors, radars, Ultra-Wideband devices) in EVA and between spacecraft. Would any of the currently available frequency bands described above be suitable? Are there other frequency bands that could be used for these purposes? Are there certain frequency bands that should be excluded, such as the current part 15 restricted bands or bands with satellite allocations, and why? What is the potential for harmful interference to authorized services or adverse impacts to other part 15 intentional radiators, either in space or on Earth? Could potential interference be mitigated through appropriate antenna pattern design or other approaches? If so, what specific antenna characteristics are necessary? With respect to power levels and OOB limits, the Commission notes that the current part 15 rules were developed for a terrestrial environment that has significantly more clutter losses than the space environment, as well as significant temperature and other differences. With that in mind, the Commission seeks comment on whether the current power and antenna gain limits are suitable. Are the current OOB limits adequate to prevent harmful interference? Do any of these parameters need to be adjusted for operation in the space environment? Commenters should provide specific technical proposals as well as reasoning for each to justify any recommended changes. Would enough devices operate in this scenario such that the Commission should consider an aggregate interference limit for them? Would any additional requirements for devices operated in EVA or communications between spacecraft be necessary to limit the likelihood of harmful interference, such as antenna directivity requirements or limits on the operational time in orbit?

Unintentional Radiators. While many commonly used part 15 devices are intentional radiators, part 15 also requires unintentional radiators to

comply with emission limits. Unintentional radiators include computers and other devices with digital circuitry that generate and use high frequency timing signals, power supplies associated with computers and digital devices, as well as radio receivers that generate radio frequency signals used in their tuning circuitry. The Commission is aware of reports of satellites emitting signals that are impacting ground based receivers, and may possibly be impacting other satellites as well. For example, some parties state that they have detected both wideband and narrowband signals from a satellite constellation at frequencies between 40 and 70 MHz and between 110 and 188 MHz. These reports suggest that the signals in question are being generated unintentionally, such as through power supplies or digital circuitry. The International Telecommunication Union (ITU) Working Party 7D is currently studying this issue. Depending on the source of the signals that various parties have observed, it is possible that they are of a type that would be subject to the part 15 unintentional radiator limits in terrestrial-based equipment.

The Commission seeks comment on the issue of unintentional emissions generated by satellites or other spacecraft. What is the extent of the observed problems? What types of ground-based services are being impacted and where? Are unintentional emissions from satellites and spacecraft affecting radio astronomy observations? Are there also concerns about effects to satellite systems in orbit and if so, which ones? What is the likely source of the unintentional emissions in question? Are there any observed problems that seem to be worsening over time? Does there appear to be a need for actions to reduce unintentional emissions from satellites or other spacecraft? If so, what actions could be taken? As noted above, the environmental differences create disparities in signal attenuation between those emanating from space and those being transmitted from terrestrial-based stations. If the Commission were to require unintentional radiators operating in space to comply with emission limits, would the current part 15 unintentional radiator limits be appropriate? Do they cover the required frequency range, or would the Commission needs higher or lower frequency cutoffs for measuring radiated emissions, e.g., at frequencies below 30 MHz? Are the part 15 emission limits sufficiently protective to prevent harmful interference to potentially

impacted services or would the Commission needs tighter limits in any frequency ranges? If so, in what instances and frequency bands would this be necessary, and what limits should apply? Due to the potentially large number of devices that could be emitting simultaneously, would the Commission needs to consider aggregate interference from unintentional radiators in space? If so, how could the Commission set and enforce aggregate interference limits?

Costs and Benefits. The Commission estimates that the economic benefits of the proposed rule changes to enhance space-based communications for part 15 devices will substantially outweigh the costs, which the Commission expects to be minimal. The Commission seeks comment on this view. The expanded ability to use part 15 devices for Earth-to-space applications could result in new and innovative wireless communication products and services by lowering barriers to entry. For example, Hubble and Spire were granted satellite licenses in the 2400–2483.5 MHz band through the grant of a waiver of the Commission's rules, whereas the proposed rules changes could eliminate the need for such waivers and lower entry barriers for new technologies. The Commission lacks information to precisely estimate the economic value of these yet-to-be developed new products and services, but the Commission expects that such uplinking capabilities could be valuable for IoT services, especially in rural areas. The Commission seeks comment on this expectation. In addition, the Commission's proposal to formally allow part 15 devices to communicate within spacecraft could eliminate the current practice of ad hoc approvals for each within-space vehicle use of devices like laptops. The Commission judges the cost of these approvals to be modest given that allowing earth-to-space communications in these bands are not expected to change the interference environment for other licensed or unlicensed users of these bands. The Commission seeks comment on this assumption. The proposed rule changes allowing EVA and communications between spacecraft could foster innovation and encourage the development of new services, including in-space servicing, assembly, and manufacturing. Finally, the proposed rules might aid in managing interference from unintentional radiators either withing spacecraft or more broadly. While the Commission lacks information to precisely quantify each of these benefits, in terms of relative

magnitudes, the Commission expects the most benefits to flow from Earth-to-space applications, since the user base of part 15 Earth-based devices is larger than the user base of devices in spaces. The Commission seeks comment on this judgment, in addition to data and quantitative estimates on the magnitude of benefits. The Commission seeks information about potential new applications in Earth-to-space, within spacecraft, for EVA, and between spacecraft communications that may generate such benefits. Of particular interest would be estimates of the potential number of users and devices impacted and the magnitudes of use of these new applications.

The Commission recognizes that rule changes to allow part 15 space-to-Earth communications may have substantial benefits due to the large number of terrestrial part 15 devices that could benefit from such communications without the requirement for new hardware. However, the Commission also recognizes there are potentially significant technical challenges in minimizing interference issues with other licensed and unlicensed devices for any new space-based communications in these bands. Implementation will require careful consideration of technical safeguards, including power flux density limits, out-of-band emission controls, and potentially aggregate interference limits to ensure coexistence with incumbent services and terrestrial part 15 operations. In addition, coordination with international obligations under the ITU Radio Regulations and the Outer Space Treaty will be necessary to avoid creating harmful interference for devices authorized in other countries and to ensure space station operators conform with all relevant international requirements. Benefits of any part 15 rule change for space-to-Earth communications will therefore be dependent on their exact technical implementation and whether the potential interference issues with terrestrial devices can be resolved. As the Commission proposes no rule changes for part 15 space-to-Earth communications here and lack information on how part 15 space-to-

Earth communications would be implemented, the Commission does not estimate expected benefits at this time. However, the Commission seeks information on how part 15 space-to-Earth communications would be implemented and estimates of the potential number of users and devices impacted and the benefits that may flow from these new applications.

The Commission estimates costs of the proposed part 15 rule changes to be minimal or non-existent. The Commission seeks comment on this view. The Commission expects that the proposed rule changes here and in any future proposal will not disturb incumbent use of the associated spectrum and that frequency interference will be minimal to non-existent. The Commission seeks comment on this expectation. The rule changes for Earth-to-space and within spacecraft communication simply remove a purely regulatory ban on a technical capability to receive signals that satellites have always had. The Commission expects final rules changes for EVA and between spacecraft communications to minimize interference with incumbent users. Costs may increase with compliance obligations may also increase for some stakeholders. For example, the Commission seeks comment on whether part 15 devices intended to communicate with satellites should also obtain certification under the Commission's part 25 licensing rules. However, the Commission expects that these compliance costs would be relatively small and invoked on a largely voluntary basis. As voluntary actions, the compliance costs would then be outweighed by private value-added from the newly certified uses. The Commission seeks comment on the expectation of minimal or no cost impact, especially with regards to expanded Space-to-Earth interference and potential interference concerns. The Commission also seek information on costs of these proposed rule changes in the form of data and quantitative estimates.

Ordering Clauses

It is ordered, pursuant to the authority found in sections 4(i), 301, 302, 303,

and 307 of the Communications Act of 1934, as amended, 47 U.S.C. 154(i), 301, 302a, 303, 307, that the Notice of Proposed Rulemaking is hereby adopted.

It is further ordered that the Commission's Office of the Secretary, shall send a copy of the Notice of Proposed Rulemaking, including the Initial Regulatory Flexibility Analysis, to the Chief Counsel for the Small Business Administration (SBA) Office of Advocacy.

List of Subjects in 47 CFR Part 2

Communications, Communications equipment, Satellites, Telecommunications.

Federal Communications Commission.

Marlene Dortch, Secretary.

Appendix A Proposed Rules

For the reasons discussed in the document above, the Federal Communications Commission proposes to amend part 2 of Title 47 of the Code of Federal Regulations as follows:

PART 2—FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

- 1. The authority citation for part 2 continues to read as follows:
Authority: 47 U.S.C. 154, 302a, 303, and 336, unless otherwise noted.
- 2. Amend § 2.106 by adding paragraph (d)(36) to read as follows:

§ 2.106 Table of Frequency Allocations.

* * * * *

(d) * * *

(36) NG36 The bands 2400–2483.5 MHz and 5725–5850 MHz may be used by non-Federal stations in the mobile-satellite service (Earth-to-space) on an unprotected and non-interference basis and subject to the Commission's rules in part 25 of this chapter.

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[FR Doc. 2026–18282 Filed 9–4–26; 8:45 am]

BILLING CODE 6712–01–P