

Dated: July 9, 2018.

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Regional Administrator Region 1.

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## FEDERAL COMMUNICATIONS COMMISSION

### 47 CFR Parts 2, 25 and 30

[GN Docket No. 14-177; WT Docket No. 10-112; FCC 18-73]

#### Use of Spectrum Bands Above 24 GHz for Mobile Radio Services

**AGENCY:** Federal Communications Commission.

**ACTION:** Proposed rule.

**SUMMARY:** In this document, the Federal Communications Commission (Commission or FCC) seeks comment on proposed service rules to allow flexible fixed and mobile uses in additional bands and on refinements to the adopted rules in this document. A Final rule document for the Third Report and Order (*3rd R&O*) related to this document for the Third Further Notice of Proposed Rulemaking (*3rd FNPRM*) is published in this issue of this **Federal Register**.

**DATES:** Comments are due on or before September 10, 2018; reply comments are due on or before September 28, 2018.

**ADDRESSES:** You may submit comments, identified by GN Docket No. 14-177, by any of the following methods:

- *Federal eRulemaking Portal:* <http://www.regulations.gov>. Follow the instructions for submitting comments.

- *Federal Communications Commission's Website:* <https://www.fcc.gov/ecfs/>. Follow the instructions for submitting comments.

- *People With Disabilities:* Contact the FCC to request reasonable accommodations (accessible format documents, sign language interpreters, CART, etc.) by email: [FCC504@fcc.gov](mailto:FCC504@fcc.gov), phone: 202-418-0530 or TTY: 202-418-0432.

For detailed instructions for submitting comments and additional information on the rulemaking process, see the **SUPPLEMENTARY INFORMATION** section of this document.

**FOR FURTHER INFORMATION CONTACT:** John Schauble of the Wireless Telecommunications Bureau, Broadband Division, at (202) 418-0797 or [John.Schauble@fcc.gov](mailto:John.Schauble@fcc.gov), Michael Ha of the Office of Engineering and Technology, Policy and Rules Division, at 202-418-2099 or [Michael.Ha@fcc.gov](mailto:Michael.Ha@fcc.gov), or Jose Albuquerque of the

International Bureau, Satellite Division, at 202-418-2288 or [Jose.Albuquerque@fcc.gov](mailto:Jose.Albuquerque@fcc.gov). For information regarding the PRA information collection requirements contained in this PRA, contact Cathy Williams, Office of Managing Director, at (202) 418-2918 or [Cathy.Williams@fcc.gov](mailto:Cathy.Williams@fcc.gov).

**SUPPLEMENTARY INFORMATION:** This is a summary of the Commission's Third Report and Order (*3rd FNPRM*), GN Docket No. 14-177, FCC 18-73, adopted on June 7, 2018 and released on June 8, 2018. The complete text of this document is available for public inspection and copying from 8 a.m. to 4:30 p.m. Eastern Time (ET) Monday through Thursday or from 8 a.m. to 11:30 a.m. ET on Fridays in the FCC Reference Information Center, 445 12th Street SW, Room CY-A257, Washington, DC 20554. The complete text is available on the Commission's website at <http://wireless.fcc.gov>, or by using the search function on the ECFS web page at <http://www.fcc.gov/cgb/ecfs/>. Alternative formats are available to persons with disabilities by sending an email to [fcc504@fcc.gov](mailto:fcc504@fcc.gov) or by calling the Consumer & Governmental Affairs Bureau at (202) 418-0530 (voice), (202) 418-0432 (tty).

#### Comment Filing Procedures

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 on the first page of this document. Comments may be filed using the Commission's Electronic Comment Filing System (ECFS). See Electronic Filing of Documents in Rulemaking Proceedings, 63 FR 24121 (1998).

- *Electronic Filers:* Comments may be filed electronically using the internet by accessing the ECFS: <https://www.fcc.gov/ecfs/filings>. Filers should follow the instructions provided on the website for submitting comments. In completing the transmittal screen, filers should include their full name, U.S. Postal Service mailing address, and the applicable docket number, GN Docket No. 14-177.

- *Paper Filers:* Parties who choose to file by paper must file an original and one copy of each filing. If more than one docket or rulemaking number appears in the caption of this proceeding, filers must submit two additional copies for each additional docket or rulemaking number.

Filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail. All filings must be addressed to the

Commission's Secretary, Office of the Secretary, Federal Communications Commission.

- All hand-delivered or messenger-delivered paper filings for the Commission's Secretary must be delivered to FCC Headquarters at 445 12th St. SW, Room TW-A325, Washington, DC 20554. The filing hours are 8:00 a.m. to 7:00 p.m. 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 overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9050 Junction Dr., Annapolis Junction, Annapolis MD 20701.

- U.S. Postal Service first-class, Express, and Priority mail must be addressed to 445 12th Street SW, 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](mailto:fcc504@fcc.gov) or call the Consumer & Governmental Affairs Bureau at 202-418-0530 (voice), 888-835-5322 (tty).

#### Ex Parte Rules—Permit-But-Disclose

Pursuant to § 1.1200(a) of the Commission's rules, this *3rd FNPRM* 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 § 1.1206(b). In proceedings governed by § 1.49(f) or for which the Commission has made available a method of electronic filing, written *ex parte* presentations and memoranda summarizing oral *ex parte* presentations, and all attachments thereto, must be filed through the electronic comment filing system available for that proceeding, and must be filed in their native format (e.g., .doc, .xml, .ppt, searchable .pdf). Participants in this proceeding should familiarize themselves with the Commission's *ex parte* rules.

### Initial Regulatory Flexibility Analysis

As required by the Regulatory Flexibility Act of 1980, as amended (RFA), the Commission has prepared this present Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on a substantial number of small entities by the policies and rules proposed in the attached *3rd FNPRM*. Written public comments are requested on this IRFA. Comments must be identified as responses to the IRFA and must be filed by the deadlines for comments as specified in the *3rd FNPRM*. The Commission will send a copy of this *3rd FNPRM*, including this IRFA, to the Chief Counsel for Advocacy of the Small Business Administration (SBA). In addition, the *3rd FNPRM* and IRFA (or summaries thereof) will be published in the **Federal Register**.

### Paperwork Reduction Act

The *3rd FNPRM* contains proposed information collection requirements subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104-13. OMB, the general public, and other Federal agencies are invited to comment on the proposed information collection requirements contained in this proceeding. In addition, pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198, *see* 44 U.S.C. 3506(c)(4), the Commission seeks specific comment on how it might further reduce the information collection burden for small business concerns with fewer than 25 employees.

### Synopsis

#### I. 42–42.5 GHz Band

##### A. Introduction

1. The 42–42.5 GHz band (42 GHz band) consists of 500 megahertz, allocated to non-Federal fixed and mobile services on a primary basis, and it contains no current Federal allocation or service rules. The adjacent 42.5–43.5

GHz band is allocated to the Radio Astronomy Service (RAS) on a primary basis for Federal and non-Federal use and to the Federal fixed, fixed-satellite (Earth-to-space), and mobile except aeronautical mobile services on a primary basis. The allocations footnote corresponding to the 42.5–43.5 GHz band also requires that any assignments to the stations of other services also allocated to the band take all practicable steps to protect the RAS from harmful interference. Out-of-band signals into allocated radio astronomy bands can cause interference to radio astronomy observations. The Commission also notes that radio astronomy as a service frequently makes use of observations (passive) in bands not allocated to the RAS. This practice is a result of scientifically valuable signals being subject to the Doppler Effect and shifted in frequency outside radio astronomy-allocated bands. In its *2016 FNPRM*, the Commission sought comment on a proposal to authorize flexible fixed and mobile operations in the band under the new part 30 Upper Microwave Flexible Use Service (UMFUS) rules, but only on the condition that adjacent channel RAS at 42.5–43.5 GHz could be protected. The *FNPRM* also sought specific comment and detailed study on what protections should be established for this adjacent band—for example, whether out-of-band emission limits into the 42.5–43.5 GHz band should be established or whether it was necessary or appropriate to create a guard band below 42.5 GHz. In addition to the appropriate licensing and technical rules, the Commission also sought comment on the appropriate band plan for the 42 GHz band—including whether the band should be licensed as a single channel, split into two channels, or split into multiple 100 megahertz channels—and whether to license the band geographically using Partial Economic Areas (PEAs). Although the Commission received comment on these various issues, in its *3rd FNPRM*, the Commission seeks further comment on several of these proposals and issues, in light of recently enacted legislation that addresses the 42 GHz band.

2. The MOBILE NOW Act, passed as part of the RAY BAUM'S Act of 2018 provides that, within two years of its enactment, the Commission shall publish an NPRM “to consider service rules to authorize mobile or fixed terrestrial wireless operations, including for advanced mobile service operations,” in the 42 GHz band. Section 604(b) of the MOBILE NOW Act provides that, in conducting this

rulemaking, the Commission shall: “(1) consider how the band described in subsection (a) may be used to provide commercial wireless broadband service, including whether — (A) such spectrum may be best used for licensed or unlicensed services, or some combination thereof; and (B) to permit additional licensed operations in such band on a shared basis; and (2) include technical characteristics under which the band described in subsection (a) may be employed for mobile or fixed terrestrial wireless operations, including any appropriate coexistence requirements.” Consistent with the MOBILE NOW Act, and out of an abundance of caution, the Commission issues this *3rd FNPRM* to seek further comment on how the 42 GHz band could be used to provide commercial wireless broadband service including possible opportunities for unlicensed and/or shared use of the 42 GHz band.

##### B. Suitability for Mobile and Fixed Use

3. *Background.* The Commission previously proposed to authorize fixed and mobile service operations in the 42 GHz band under the part 30 UMFUS rules. In response to the Commission's *FNPRM*, most commenters generally supported establishing service rules that would allow the band to be flexibly licensed for fixed and mobile operations under part 30. Qualcomm and T-Mobile argue that flexible use will allow individual licensees to shape the nature of the services they provide. Intel and Samsung argue that authorizing UMFUS expansion in the 42 GHz band would place it within the ‘tuning range’ of radio equipment designed for the 37–40 GHz bands, accelerating the deployment of technology capable of serving these bands. CTIA, Ericsson, Intel, and Samsung, among others, point to the International Telecommunication Union's (ITU) WRC-19 identification of the entire 37–42.5 GHz band as a candidate to study for mobile services, and they argue for similar treatment domestically. Commenters supporting geographic area licensing explained why they believe the alternatives of unlicensed or shared licensed use were not appropriate.

4. Various commenters view the global harmonization of this band, and 5G spectrum generally, as an important step towards greater manufacturing efficiencies and more rapid development and deployment of services. For example, Samsung notes that the Commission has frequently highlighted international harmonization of spectrum as a key policy goal and endorsed its benefits. Commenters present different views, however, on the

timing of U.S. action on the band relative to ITU action. One commenter argues the FCC's studying bands like 42 GHz will supplement and advance the study efforts of ITU study groups. Lockheed Martin, however, opposes taking action in bands currently subject to ITU study because the Commission allegedly has provided no evidence it will protect incumbent services in these bands or respect the outcome of these studies. Alternatively, T-Mobile argues the Commission must address domestic wireless capacity requirements and should not await input from the ITU given that the international process can be manipulated to delay the designation of spectrum for terrestrial use.

5. Certain FSS operators argue that the band should be licensed for satellite uses, and they raise arguments similar to those raised in petitions for reconsideration of the Commission's decision not to allocate the 42 GHz band for FSS. FWCC argues the band by itself is too narrow for fixed duplex operations and that, accordingly, the 42 GHz band should be combined with the adjacent 42.5–43.5 GHz band to create a single band with rules for fixed operations. The Commission notes that although in its *R&O*, the Commission deleted the broadcasting and broadcasting-satellite service allocations from the 42–42.5 GHz band (42 GHz band) and declined to allocate the band to the fixed-satellite service (space-to-Earth), the Commission again declines to reverse those decisions. The Commission also declines to revisit its decision to deny FWCC's prior request that it establish service rules to enable fixed service at 42 GHz under part 101 of its Rules.

6. *Discussion.* The Commission tentatively concludes that its part 30 UMFUS Rules provide the best opportunity to provide commercial wireless broadband service to the public in this band. The ability to use this band together with the existing 37 GHz and 39 GHz bands, the international consideration of this band for mobile use, and the availability of 500 megahertz of unassigned spectrum all support the Commission's conclusion that this band is suitable for flexible use. In view of the extensive support in the record, the Commission proposes to authorize fixed and mobile licensed operations in this band under part 30, and the Commission seeks comment on this tentative conclusion and on alternate proposals. In particular, consistent with the MOBILE NOW Act, the Commission seeks comment on whether unlicensed services should be permitted in the band under part 30, or whether licensed services, unlicensed

services, or other types of sharing besides unlicensed and licensed should be permitted under other rule parts as well. Proponents of unlicensed uses or sharing in the band between various types of operations should provide technical studies describing how such operations should coexist and share this band.

7. The Commission also seeks to refresh the record on the previous proposal in the 2016 *FNPRM* to add Federal fixed and mobile allocations in this band and a framework under which both Federal and non-Federal operations could share. Under this proposal, the Commission would add a Federal allocation to the fixed and mobile services on a primary basis for Federal use in addition to the current non-Federal allocation.

#### *C. Licensing, Technical, and Service Rules*

8. *Introduction.* In the *FNPRM*, the Commission previously sought comment on licensing the 42 GHz band under the part 30 UMFUS licensing and technical rules. The Commission sought comment on whether the 42 GHz band should be licensed for exclusive use by PEAs, and commenters have generally supported this proposal. The *FNPRM*'s proposal contemplated that licensing and operations in the 42 GHz band would be subject to the part 30 rules concerning permissible communications, initial authorizations, license term, construction requirements, partitioning and disaggregation, discontinuance of service, equipment authorization, power limits, emission limits, field strength limits, international coordination, RF safety, flexible duplexing, and competitive bidding procedures. Commenters have thus far generally supported applying the existing licensing and technical rules to the 42 GHz band. The Commission will consider those comments in resolving those issues, as well as additional comments. Further, as described below, the Commission seeks comment on additional considerations regarding protection of radio astronomy at 42.5–43.5 GHz, and the band plan for the 42 GHz band.

9. *Protecting RAS Services at 42.5–43.5 GHz.* As noted above, the Commission previously proposed to authorize flexible mobile and fixed operations in the 42 GHz band, as long as RAS could be protected in the adjacent 42.5–43.5 GHz band, and it sought comment on and invited detailed study of the forms that such protection should take given the location of RAS observatories. In response, The National Academy of Sciences' Committee on

Radio Frequencies (CORF) informed the Commission that RAS observations are currently made at a limited set of observatories around the U.S. These sites are the GBT in Green Bank, WV, the VLA at Socorro, NM, the Haystack Observatory in Westford, MA, and ten sites of the Very Long Baseline Array (VLBA), noted in the Table of Allocations footnote US 131. CORF asserted that frequency lines at 42.519, 42.821, 43.122, and 43.424 GHz are of the greatest importance for the detection of strong silicon monoxide maser emissions from stars and star forming regions—important for measuring stellar temperature, density, wind velocity and other parameters. The 42 GHz band also is one of the preferred bands for measuring continuum observations. Because of the very low signal levels being measured, RAS telescopes are particularly vulnerable to in-band emissions, spurious out-of-band emissions, and emissions producing harmonics, making protection all the more important. CORF stated that the detrimental levels for continuum and spectral line radio astronomy observations for single dishes are  $-227$  dBW/m<sup>2</sup>/Hz and  $-210$  dBW/m<sup>2</sup>/Hz, respectively, for the average across the full 1 gigahertz of the 42.5–43.5 GHz band and the peak level in any single 500 kHz channel, as based upon ITU-R RA.769, Tables 1 and 2, respectively. For observations using the entire VLBA, the corresponding limit is  $-175$  dBW/m<sup>2</sup>/Hz.

10. Proponents of using the 42 GHz band for flexible terrestrial wireless use generally agree that there are various effective means to protect RAS, including use of exclusion zones, coordination zones, and aggregate emissions limits—particularly since RAS sites are generally in remote locations. No commenter, however, provided studies or examples showing how these proposed methods would work in practice in this particular band. T-Mobile suggested that coordination with RAS should be required within a defined coordination distance. The Commission notes that CORF and T-Mobile agree that the relevant received power spectrum density at the RAS receiver should be the parameters established by ITU-R RA.769. The Commission agrees with CORF and T-Mobile that RAS bands can be protected by limiting UMFUS operations near a RAS. However, because no one has submitted technical studies regarding protection of RAS in this band, the Commission does not currently have sufficient information to propose specific rules to protect RAS facilities.

The Commission seeks comment on how it can protect RAS facilities in the 42.5–43.5 GHz band from UMFUS operations in 42–42.5 GHz. Should the Commission's rule be based on the ITUR RA.769 parameters or are there alternative protection criteria? The Commission also seeks comment on establishing coordination zones around the relevant RAS facilities, and on the appropriate distance at which coordination with RAS should be required.<sup>1</sup> Interested parties should provide detailed technical analysis of the coexistence of RAS with terrestrial mobile operations that fully supports any proposed distance or methodology. The Commission also seeks comment on other proposals for ensuring protection of RAS facilities in the 42.5–43.5 GHz band.

11. *Band Plan.* In the *FNPRM*, the Commission sought comment on whether the band's 500 megahertz of spectrum should be licensed as a single channel, split in two, or broken into various multiple sizes. In response, several commenters noted the value of 100 megahertz channels as an acceptable outcome, particularly in a band such as 42 GHz where less spectrum is available. The Commission proposes to license the 42 GHz band as 100 megahertz channels because this size would be consistent with developing industry standards that maximize spectral efficiency, all the while permitting interested parties to aggregate these channels should they desire larger bands. The Commission seeks comment on this proposal. Commenters seeking alternative-e band plans should justify why they believe other channel sizes would better serve future services they envision for this band.

## II. 37–37.6 GHz (Lower 37 GHz Band)—Licensing Frameworks

12. *Background.* The Federal and non-Federal allocations of the 37–38.6 GHz Band (37 GHz Band) are as follows: The entire 37 GHz band (37–38.6 GHz) is allocated to the fixed and mobile services on a primary basis for Federal and non-Federal use.<sup>2</sup> Portions of the 37

GHz band are also allocated to the Space Research Service (SRS) (space-to-Earth) on a primary basis for Federal use (37–38 GHz) and to the Fixed-Satellite Service (FSS) (space-to-Earth) on a primary basis for non-Federal use (37.5–38.6 GHz). The use of this FSS downlink allocation is limited to individually licensed earth stations and is also subject to other limitations. In addition, the 37 GHz band is adjacent to the 36–37 GHz band, where passive sensors in the Earth exploration satellite service (EESS) and SRS are located.

13. In the *R&O*, the Commission adopted rules to permit fixed and mobile terrestrial operation in the 37 GHz band. The Commission also adopted a licensing regime for the 37.6–38.6 GHz portion of the band (Upper 37 GHz Band), which would be licensed in five 200 megahertz blocks on a geographical area basis, and made the Lower 37 GHz band available for coordinated co-primary sharing between Federal and non-Federal users. The Commission identified non-Federal users as Shared Access Licensees (SAL) and decided that such users would be licensed by rule. The Commission explained that Federal and non-Federal users will access the Lower 37 GHz Band through a coordination mechanism, which it would develop more fully through government/industry collaboration. The Commission adopted the same technical rules for the Lower 37 GHz Band and the Upper 37 GHz Band.

14. In the *FNPRM*, the Commission stated that Federal and non-Federal fixed and mobile users would access the Lower 37 GHz Band by registering individual sites through a coordination mechanism. The Commission explained that the coordination mechanism is the regulatory, technical, or procedural tool necessary to actually facilitate coordinated access, will authorize a particular user to use a particular bandwidth of spectrum at a particular location. The Commission stated that the coordination mechanism must; (1) be able to obtain information about the type of equipment used, the signal contour from the coordinated location, and the bandwidth requested compared with the bandwidth available; (2) be capable of regularly updating the status of a coordinated location (on/off or authorized/unauthorized); and (3) be able to incorporate this type of information for both Federal and non-Federal fixed and mobile uses. The Commission sought comment on the coordination mechanism and the functions that it should be able to perform. The Commission also proposed that registered non-Federal sites must be

put into service within seven days of coordination and that registered and coordinated sites must reassert their registration every seven days. The Commission sought comment on: Whether a portion of the lower band segment should be made available for priority access by Federal users, whether an enforcement mechanism in the lower band segment is necessary to help identify and rectify interference events, and whether and how to apply secondary market rules to the lower band segment.

15. Two commenters, Starry and Intel, offer recommendations on the specific regulatory, technical, or procedural tool necessary to facilitate coordinated access in the Lower 37 GHz band. Starry proposes site-based registration through a third-party coordinator. Under its proposal, licensees would file "specific information about each site sufficient for a third-party coordinator to conduct an interference analysis," including its location, height above ground level, EIRP, transmitter azimuth, and channel size. In addition, "end points operating under the control of a registered transmitter" would not be registered individually, and would instead fall under the authorization of the transmitter." The third-party coordinator would conduct an interference analysis under which previously registered sites would be protected at a modeled receive signal strength of  $-79$  dBm/10 MHz assuming a test antenna at the end points with a gain of 25 dBi, at a height of 10 meters above ground. Also, under this proposal, licensees would be able to negotiate alternative sharing arrangements and sites would be required to be constructed and in operation within 120 days after the registration is accepted. Under Starry's proposal, there would be clear penalties for registering unused sites. Starry also offers additional ideas for an enhanced sharing framework that could be implemented over time. No party responded to Starry's proposal. Intel's proposal would use a database similar to the database used for the 70 GHz and 80 GHz bands, except that the database would also play a role in frequency coordination.

16. *Discussion.* The Commission concludes that it is appropriate to further develop the record regarding the coordination mechanism that it would expect to use, as between either two or more non-Federal entities or between Federal and non-Federal entities. In order to facilitate shared use of the Lower 37 GHz band between Federal and non-Federal users, as well as among non-Federal users, the Commission

<sup>1</sup> The National Radio Quiet Zone (NRQZ) has special protections afforded outside the allocated bands requiring coordination. The NRQZ does work with mobile radio providers, but coordination is required for operation of any mobile radio service above 24 GHz in the NRQZ. Also, as with the existing coordination requirements for the 37–38 GHz band, any coordination requirement would require licensees to coordinate all operations.

<sup>2</sup> The Commission has modified the mobile service allocation in the 37–38 GHz band to exclude the aeronautical mobile service, *i.e.*, the 37–38 GHz band is allocated to the mobile except aeronautical mobile service.

seeks comment on a proposed coordination mechanism and alternatives, as set forth below. The Commission anticipates that a sharing mechanism would facilitate quick access to spectrum without unreasonable processing delays and a predictable path for future coordination in the band among stakeholders. The Commission recognizes the importance of the Lower 37 GHz band to future Federal operations, and it will work in partnership with NTIA, DoD, and other Federal agencies to develop a sharing approach that allows for robust Federal and non-Federal use in this band.

17. In designing a licensing mechanism for the Lower 37 GHz Band, the Commission seeks to accommodate a variety of use cases that may develop for this band—in essence, the Commission envisions Lower 37 GHz as an innovation band in the mmW spectrum. In particular, the Commission anticipates that there will be at least four types of non-Federal deployments in the Lower 37 GHz Band: Point-to-point links (for example backhaul and backbone links); fixed wireless broadband systems (generally consisting of a fixed access point and fixed subscriber units); single base station IoT-type systems (for example, in a factory); and carrier-based deployments of mobile systems using the Lower 37 GHz Band as supplemental capacity tied to other bands that are licensed on a geographic area basis. The Commission seeks comment on whether there are additional types of deployments contemplated for this band. If so, what would those additional uses be, and how would they affect the licensing of the Lower 37 GHz Band?

18. As detailed above, Starry proposes a model in which proposed facilities would be registered with a third-party coordinator. Another possible model, under which the Commission would issue licenses authorizing operations, would be the coordination model used in part 101 point-to-point bands. In order to complete frequency coordination, an applicant must give prior notice to nearby licensees and other applicants for licenses of the proposed applicant's operations, make reasonable efforts to avoid interference and resolve conflicts, and certify to the Commission that the proposed operation has been coordinated. Once the applicant has completed frequency coordination, the applicant must file an application for authorization with the Commission, specifying the latitude and longitude of the transmitter to be used to an accuracy of one second. The applicant must coordinate each operation, including any change in the

location of the transmitter of more than five seconds in latitude or longitude or both, and must apply for a modification of their license. Similarly, if the applicant later seeks to deploy additional transmitters, the Commission's part 101 rules require coordination of those facilities and the applicant must apply for modification of the license. The Commission seeks comment on the relative merits of using these coordination models in the Lower 37 GHz band. The Commission also seeks comment on the criteria that it should use to determine whether predicted interference would be harmful. If actual harmful interference occurs after successful coordination, how should the interference be resolved? How will future Federal operations be accommodated in the sharing framework and what parameters will be used to develop a trigger for required coordination? Given that the Commission is proposing construction requirements for non-Federal licensees in this band, as discussed below, the Commission seeks comment on how best to enforce those requirements in an environment where registrations are not filed with the Commission.

19. For the four types of deployments, the Commission seeks comment on a first-come-first-served licensing or registration scheme, in which actual users have a right to interference protection, but no right to exclude other users. The Commission seeks comment on subsequent users being required to coordinate with previously registered non-Federal and Federal sites through part 101 notice and response rules or on the alternative of registering facilities with a third-party coordinator.

20. With regard to Federal sites, the Commission proposes to require non-Federal users to work with Federal users in good faith to coordinate any new system Federal users may seek to deploy. The Commission anticipates that non-Federal users would not be required to agree to coordination requests that would carry a significant risk of harmful interference. The Commission seeks comment on the criteria that it should use to determine whether interference is harmful. Is the coordination trigger that Starry proposes appropriate, or should the Commission use an alternative set of criteria? The Commission seeks comment on the best means of coordinating with Federal operations. The Commission intends to adopt as part of the rules a coordination methodology that will facilitate coordination for the kinds of cases that it anticipates may be typical. This will allow us to test the assumption that any coordination zone typically “can be

measured in meters rather than kilometers.” To do so, the Commission will work with NTIA, on behalf of Federal users, and with industry to identify those cases. DoD has expressed an interest in a possible aeronautical allocation in the Lower 37 GHz band, so the Commission anticipates including aeronautical cases in its consideration of coordination methodologies.

21. The Commission expects the identification and analysis of these cases to be a critical component to its understanding of the extent that the band can be shared dynamically. Commenters should address how to prevent “warehousing,” whereby a licensee preserves its rights without providing actual service. Should licensees receive any protection before they have completed construction and begun operations? How should “operation” be defined and how can the Commission plan to monitor compliance, including whether operations have been discontinued? Should the Commission put limits on the aggregate area, or amount of spectrum, that any one licensee or its affiliates can protect? These issues are critical to establishing the co-primary sharing rights that the Commission envisions for this band.

22. To the extent that the solution to preserving Federal entity's options may be to reserve a part of the band for their priority use, the Commission seeks comment on how to define such priority rights. Are there geographic areas where such priority rights would have little or no adverse impact on non-Federal operations and, if so, what should be the process for identifying those areas? The Commission seeks comment on alternative approaches that can be used to ensure Federal and non-Federal users will have access to the band to meet their needs.

23. Below, the Commission seeks comment on whether offering three types of non-Federal licenses—point-to-point licenses; base stations licenses; and site-cluster licenses—would facilitate deployment in the Lower 37 GHz band.

24. *Point-to-point licenses.* The Commission seeks comment on requiring individual point-to-point links to be coordinated with previously licensed or registered sites using part 101 notice and response rules. If it is determined that the proposed link would not interfere or could be modified not to interfere with previously licensed or registered sites, then a license would be issued for the specific point-to-point link in the Commission's Universal Licensing System (ULS) to establish future

interference protection rights. A point-to-point licensee would be required to construct its sites within 18 months from the date the site was registered. If the licensee fails to construct these sites within the 18 months, the licensee might be prohibited from reapplying for that specific link for 12 months. The Commission seeks comment on this approach, as well as alternatives. Are there other methods that would facilitate licensing of point-to-point links? The Commission also seeks comment on whether it should require licensees to file individual construction notices in order to facilitate enforcement of construction obligations. The Commission seeks comment on the relative costs and benefits of this licensing mechanism.

**25. Base station licenses.** The Commission seeks comment on permitting an applicant to select a point around which it would get a license for a specific site with either a 360 degree radius or a defined sector of a 360 degree radius. This license also would authorize any customer premises equipment (such as equipment used for point-to-multipoint networks) or mobile devices operating in conjunction with the licensed base station. The licensee would receive interference protection for a certain specified distance, for example one kilometer, that would then be a protection zone. The Commission proposes to require that individual base stations be coordinated with previously licensed or registered sites using part 101 notice and response rules. If it is determined that the proposed base station license would not interfere or could be modified to not interfere with a previously licensed or registered site, then a license would be issued in ULS to establish future interference protection rights. Under this licensing scheme, a subsequent licensee would not be precluded from licensing either a point-to-point link or a base station, or from registering a facility under a site-cluster license (discussed below) within a previously established protection zone, as long as it can be coordinated successfully with any previously licensed or registered facilities. The Commission proposes to require that a base station licensee must construct its site within 18 months from the date the site was licensed. If the licensee fails to construct its site within the 18 months, the Commission proposes that the licensee be prohibited from reapplying for a base station license covering any portion of the same area for 12 months. The Commission seeks comment on this approach, as well as alternatives commenters might propose. Are there

other means or requirements that would facilitate licensing of these types of deployments? The Commission seeks comment on whether it should require licensees to file individual construction notices. If so, should these construction notices be filed with the Commission or with a third-party database administrator? The Commission seeks comment on the relative costs and benefits of this licensing mechanism.

**26. Site-cluster licenses.** The Commission recognizes that operators proposing 5G deployments may have difficulties determining the precise locations of their facilities, particularly in instances where they are deploying a large number of facilities. Requiring licensees to identify specific locations, file applications for each individual facility, and then wait 30 days for each application to undergo the mandatory public notice period may not promote efficient deployment of 5G services. Accordingly, the Commission seeks comment on the use of a novel concept to address this issue: The site-cluster license. Under a site-cluster license, instead of licensing individual base stations or point-to-point links, the applicant would license a larger (e.g., 5 km) non-exclusive point-radius license within which it could register individual base stations and/or point-to-point links. Much like the licensing paradigm for the 70–80 GHz band, a non-exclusive point and radius license would not authorize operation, but rather would authorize the licensee to register individual base stations and/or point-to-point links within its non-exclusive site cluster area. A site-cluster licensee would not have the right to preclude facilities proposed by other licensees. To receive interference protection for specific facilities within the site-cluster, the applicant would have to coordinate those facilities with other Federal and non-Federal Lower 37 GHz licensees (point-to-point, base station, or site-cluster) within the radius of its site cluster area, and register each specific facility. First-in-time rights would be triggered only for those facilities that are successfully registered. The Commission proposes that applicants for site-cluster licenses would file in ULS and would be issued a non-exclusive site-cluster license for a specific radius. Should individual base stations or point-to-point links registered under the umbrella of the site cluster license be registered either in ULS or, alternatively in a third-party database? The Commission seeks comment on the relative costs and benefits of either approach. Is this

concept an effective means of facilitating large deployments?

**27. The Commission seeks comment on two buildout requirements for site-cluster licenses.** First, a buildout period by which an applicant with a site-cluster license must register and construct a minimum of one specific facility within its site cluster area. Second, a buildout period for each specific site that the applicant registers, which would require the applicant to build that site within a specified period after registration. The Commission seeks comment on what those buildout periods should be. The Commission proposes that failure to meet its buildout requirement would preclude the applicant from reapplying for a non-exclusive license in that area for a certain period. The Commission seeks comment on what that period of time should be. The Commission also seeks comment on whether it should require licensees to file individual construction notices. If so, should these construction notices be filed with the Commission or with a third-party database administrator? The Commission also seeks comment on alternative means of enforcing construction requirements. As mentioned above, the Commission seeks comment on what rights a registrant should have before it actually constructs its facility and begins operations.

### III. 37.0–38.6 GHz (37 GHz Band)

**28. With regard to Federal co-primary access to the 37 GHz band, the R&O adopted rules that establish the coordination zones for the 14 military sites and three scientific sites identified by NTIA, and noted the ability for Federal agencies to add future sites on a coordinated basis.** The Commission seeks comment on how best to accommodate coordination zones for future Federal operations at a limited number of additional sites. For instance, should the Commission supplement § 30.205 to add more specific sites for Federal operations, or should it establish a process that would permit Federal entities in the future to identify a limited number of additional sites on an as-needed basis? The Commission also seeks comment on whether the coordination zones previously established in § 30.205 might be reduced to better accommodate nearby non-Federal operations without adversely impacting Federal operations at those sites.

#### IV. 25.25–27.5 GHz Band (26 GHz Band)

##### A. Suitability for Mobile Use

29. *Background.* In this proceeding, the Commission has authorized mobile services in the 700 megahertz of spectrum in the 24 GHz band and 850 megahertz of spectrum in the 28 GHz band). In the U.S., the 25.25–27.5 GHz (“26 GHz”) band is allocated primarily for Federal government services, but Commenters in this proceeding note that there is a growing international consensus that terrestrial mobile services should be authorized in the broader 24.25–27.5 GHz band. This year the European Conference of Postal and Telecommunications Administrations (CEPT) has adopted a preliminary determination to make the 24.25–27.5 GHz band a “clear priority” for harmonization of 5G services throughout Europe and to promote it for worldwide harmonization at WRC-19. In addition, at least eight countries in other parts of the world are also preparing to authorize terrestrial mobile services in that range. In February, 2018, ITU-R Task Group 5/1 issued a set of preliminary technical analyses concluding that the band can be shared among terrestrial mobile and incumbent services. Most of the contributors represented national governments, including the U.S.

30. *Discussion.* As noted above, in regional and international forums leading to the World Radiocommunication Conference 2019 (WRC-19), the frequency range from 24.25–27.5 GHz has emerged as the leading candidate for 5G services, referred to in ITU parlance as “International Mobile Telecommunication 2020” (IMT-2020). The international momentum presents the Commission with an opportunity to consider whether the 26 GHz band would be suitable for flexible fixed and mobile use. The Commission notes that in the U.S., the 25.25–27.5 GHz (“26 GHz”) band is allocated primarily for Federal government services.

31. Equipment manufacturers indicate that they can readily integrate the 26 GHz band into a tuning range that includes two bands that the United States has already authorized for mobile services, the 24 GHz band (24.25–24.45 GHz and 24.75–25.25 GHz) and the 28 GHz band (27.5–28.35 GHz). That presents three opportunities—first, to achieve manufacturing economies by covering several bands with a single radio; second, to provide international roaming capability in affordable user devices, and third, to accelerate the availability of equipment in newly

authorized bands that share a tuning range with early-deployed bands. Some commenters also contend that the 26 GHz band has better coverage characteristics than other bands that might potentially be available at higher frequencies.

32. The Commission will continue to actively support the 24 GHz and 28 GHz bands. At the same time, the Commission believes the 26 GHz band could be suitable for flexible fixed and mobile use. It is relatively near to the 24 GHz and 28 GHz bands, which the Commission has already found suitable for fixed and mobile use. The amount of spectrum potentially available (over two gigahertz) could make this band a useful addition to UMFUS. The Commission recognizes that it would need to work out suitable sharing or protection arrangements with Federal incumbents in the band. Accordingly, the Commission seeks comment on whether the 26 GHz band could be made available for non-Federal fixed and mobile use.

##### B. Spectrum Sharing and Compatibility

33. Existing allocations for the 26 GHz band in this country are mostly Federal. While Federal use of the 26 GHz band to this point has been fairly limited, the Commission recognizes that Federal agencies may aspire to make heavier use of that band in the future. Any exploration of private sector opportunities in the band must therefore address the potential for spectrum sharing and compatibility among diverse participants.

##### 1. Protection of Incumbents

34. *Background.* The Federal allocations for the 25.25–27.5 GHz bands in this country generally follow the ITU’s international allocations. In the Federal column of the U.S. Table of Allocations, the entire 25.25–27.5 GHz band has primary allocations for Fixed (FS), Mobile (MS), and Inter-Satellite (ISS) services, with Inter-Satellite limited to space research and Earth exploration-satellite applications, along with transmissions of data originating from industrial and medical activities in space. The 25.5–27 GHz band has a primary allocation for both Federal and non-Federal Space Research service (SRS) (space-to-Earth), with non-Federal Earth exploration-satellite service (EESS) subject to case-by-case electromagnetic compatibility analysis.

35. Consistent with the international community’s focus on making the 24.25–27.5 GHz band available for terrestrial mobile services, a.k.a. IMT, ITU-R’s Study Group 5 Task Group 5/1 (TG 5/1) has been conducting

extensive studies to evaluate the potential for sharing and compatibility in that range between mobile and EESS, SRS, FS, FSS, and ISS. As directed by WRC-15 Resolution 238, TG 5/1 has focused on ensuring the protection of EESS and SRS earth stations operating in the 25.5–27 GHz band segment. The U.S. contribution to the EESS/SRS Study found that the coordination distances necessary to prevent IMT from causing interference is 52 km for SRS and 7 km for EESS.

36. *Discussion.* The Commission seeks comment on the best ways to protect existing incumbent operations and systems that Federal agencies might choose to deploy in the future, including identifying appropriate separation distances. The Commission invites comment on steps it could take to facilitate sharing now and in the future. For example, should the Commission give priority to Federal operations at certain locations such as military bases and test ranges? Alternatively, can the Commission strike an appropriate balance by ensuring deployment of Federal operations provided they do not affect more than a certain amount of population? Or might the Commission provide priority to non-Federal operations in a certain number of markets, with priority to Federal operations elsewhere? To what extent would it be possible to develop coordination mechanisms between licensees and Federal operations?

37. The Commission notes that the United States and other governments have submitted detailed sharing and compatibility studies for a frequency range that includes the 26 GHz band, which are being evaluated by that group. In general, it appears that protection zones around existing EESS and SRS earth stations would affect only small percentages of the overall U.S. population, though their impact on specific localities could be significant for the affected populations. The protection radii being considered by TG 5/1 are generally intended to serve only as triggers to begin a coordination process. The final definitions of exclusion zones around particular earth stations will need to take into account a variety of local factors, including terrain, clutter, and network design features that could mitigate the effect of IMT deployment inside coordination zones. The Commission also seeks comment on the best means of protecting existing fixed links in the band. The Commission notes that there are well-established protocols for coordinating Federal and non-Federal point-to-point services.

38. The 26 GHz band currently has Federal fixed and mobile allocations in addition to the EESS, ISS, and SRS allocations. While Federal use of the 26 GHz band appears to be fairly limited to this point, the Commission recognizes that Federal agencies may be considering various potential uses for this spectrum in the future. It is difficult to predict what those services might be, their characteristics, and where they may be deployed. Nevertheless, the Commission believes that the nature of the technology apt to be used in this region of the spectrum is likely to enable sharing using such techniques as geographic separation, highly directional antennas, and taking advantage of the relatively high path losses to enable operation in close proximity. This should make sharing between Federal and non-Federal systems easier than it has been at lower frequencies. Nevertheless, sharing the 26 GHz band between Federal and non-Federal systems will still require a carefully developed framework. The Commission intends to work closely with NTIA to enable UMFUS use of the 26 GHz band while preserving the ability of Federal users to develop and deploy new technologies and services in the 26 GHz band. The Commission intends to explore a number of different approaches for sharing the band. For example, this may involve sharing the band using a framework similar to what the Commission is proposing for the lower 37 GHz band. Alternately, the Commission may set aside portions of the 26 GHz band for exclusively Federal use while making other portions available exclusively for non-Federal use. The Commission may limit non-Federal use of the band to certain geographic areas while reserving use of the band in other areas for Federal use. The Commission request comments on various approaches to sharing the 26 GHz band between UMFUS licensees and both existing and future Federal operations.

## 2. Spectrum Sharing and Compatibility With Other New Services

39. *Background.* Elefante proposes to deploy what it calls “persistent stratospheric-based communications infrastructure” at altitudes below 20 km in the 26 GHz band, and it says that ITU study groups are conducting studies for stations that would operate at altitudes between 20 and 50 km. Having analyzed the band with Lockheed Martin, Elefante concludes that spectrum sharing between unaffiliated mobile deployments and persistent stratospheric communications systems may not be possible absent an extremely

high degree of dynamic coordination and information sharing. On that basis, Elefante recommends that UMFUS not be authorized in the 26 GHz band.

40. *Discussion.* Where a high-altitude platform stations (HAPS) or Elefante-style platform is deployed above the center of an urban area, ground stations in the urban core would presumably communicate with the airborne station at relatively high elevation angles, which would allow shorter separation distances from terrestrial mobile equipment. By contrast, ground stations in the periphery of the urban area would likely require lower elevation angles to communicate with the airborne platform and would therefore require larger separation distances. A HAPS operator or Elefante might also choose to deploy some of their airborne platforms away from urban cores, which would enable some ground stations in exurban or rural areas to communicate at high elevation angles and with limited separation from terrestrial systems.

41. In light of the above, the Commission invites comment on Elefante’s conclusion that spectrum sharing between airborne platform services (*i.e.*, both HAPS and systems such as Elefante’s that would operate at lower altitudes) and unaffiliated UMFUS operators would be infeasible, and that UMFUS should therefore not be authorized in the 26 GHz band.<sup>3</sup> Alternatively, the Commission inquires whether it should prohibit airborne platform systems in the band, or authorize airborne platform services only if they are affiliated with UMFUS licensees. The Commission also invites comment on any additional spectrum-sharing techniques that might reduce the required separation distances between UMFUS equipment and ground stations communicating with airborne platforms. Finally, the Commission invites comment on any other new or proposed services, Federal or non-Federal, that should be given priority over UMFUS in the band or, alternatively, would be compatible with UMFUS and with incumbent services.

## C. Licensing the 26 GHz Band

42. *Background.* In the *R&O*, the Commission noted that in recent years it has sought greater consistency in its approach to geographic license area sizes in order to help providers

aggregate licenses in a more targeted and efficient manner, and that it has gravitated toward license areas that are derived from Economic Area (EA) units. Because Partial Economic Areas (PEAs) nest into EAs but can also be broken down into counties, the Commission found that choosing them would strike the right balance by facilitating access to spectrum by large and small providers, simplifying frequency coordination, and incentivizing investment. By contrast, the Commission decided to license the 28 GHz band by counties, primarily because the band was already licensed by Basic Trading Areas (BTAs), which could not readily be reformed into either EAs or PEAs. In the *Second Report and Order*, the Commission selected PEAs as the geographic unit for UMFUS licenses in two other bands, the 24 GHz and 47 GHz.

43. *Discussion.* The Commission seeks comment on using geographic area licensing and adopting PEAs as the geographic license area size for UMFUS licenses in the 26 GHz band. The Commission also seeks comment on site-based licensing, as well as other licensing mechanisms. Geographic area licensing may provide licensees with the flexibility to provide a variety of services, and will foster innovation and investment and thereby spur deployment. Will geographic area licensing facilitate coexistence between Federal and non-Federal uses? If the Commission decides to use geographic area licensing, PEAs also appear to provide a balance between the larger areas that can encourage more investment, and the smaller areas that can more efficiently accommodate mmW propagation characteristics. To the extent licensees are interested in smaller areas, partitioning is an available option. Commenters favoring site-based licensing or other licensing methods should set forth specific proposals for licensing the 26 GHz band. Given the amount of spectrum available, should the Commission consider using different licensing approaches in different parts of the band?

## D. Band Plan

44. *Background.* In the *Second Report and Order*, the Commission acknowledged that most millimeter-wave mobile design work is being built around 100-megahertz building blocks. It chose to license the 700 megahertz in the 24 GHz band as seven 100-megahertz channels and to license the 1,000 megahertz in the 47.2–48.2 GHz band as five 200-megahertz channels. In the *R&O*, the Commission decided to issue new licenses for the 28 GHz band in two 450-megahertz blocks, and it

<sup>3</sup> On May 31, 2018, Elefante filed a petition for rulemaking to establish the Stratospheric-Based Communications Services (SBCS). This petition is pending, and the Commission has not initiated the requested rulemaking proceeding at this time. The Commission sees no basis for deferring initial consideration of flexible fixed and mobile use of the 26 GHz band, as Elefante requests.

divided the 39 GHz band into seven 200-megahertz channels.

45. *Discussion.* If carriers will eventually require 200 megahertz bandwidths to meet their customers' needs, the Commission recognizes that the necessity of combining smaller channels to achieve the requisite scale could involve transaction costs that might eventually be passed on to consumers. On the other hand, 100 megahertz channels would increase the opportunity for competitive entry into the band and provide flexibility for uses that might require less spectrum. With those countervailing considerations in mind, the Commission seeks comment on adopting channel bandwidths of 100 megahertz or, in the alternative, 200 megahertz for the 26 GHz band.

#### V. 50.4–51.4 GHz Band

46. *Background.* The 50.4–51.4 GHz band includes primary Federal and non-Federal allocations for fixed and mobile services, as well as primary Federal and non-Federal allocations for fixed-satellite (Earth-to-space) and mobile satellite (Earth-to-space) services. In 1998, in the *V-Band First Report and Order*, the Commission designated the 50.4–51.4 GHz band for use by wireless (fixed and mobile) services. In the *FNPRM* in the Spectrum Frontiers proceeding, the Commission proposed to authorize fixed and mobile operations throughout the 50.4–52.6 GHz band in accordance with the part 30 UMFUS rules. The Commission also proposed to use geographic area licensing to license UMFUS stations on a PEA basis and sought comment on sharing with satellite services. The Commission has received eight satellite applications or market access requests and twenty earth station applications seeking to use the existing FSS (Earth-to-space) allocation in the 50.4–51.4 GHz band for delivery of broadband services.

47. In response to the *FNPRM*, certain satellite companies request that the Commission designate satellite services in the 50.4–52.4 GHz band currently allocated to FSS. Echostar supports preserving the co-primary status of FSS and terrestrial fixed/mobile services in the 50.4–52.4 GHz band and recommends adopting spectrum sharing rules that recognize likely deployment scenarios by the different services. CTIA asserts that any technical requirements should be equivalent to the Commission's part 30 rules for other shared bands. To the extent the Commission decides to adopt a sharing framework in the band, Viasat urges the Commission to consider broader and more balanced sharing between the services on a true co-primary basis at

50.4–52.4 GHz instead of imposing the "three earth stations per license area" framework adopted for the 28 GHz Band.

48. *Discussion.* Although the 50.4–52.6 GHz band remains under consideration for UMFUS licensing, the Commission has throughout this proceeding sought to promote spectrum efficiency by permitting spectrum made available for UMFUS to be shared with other allocated services when possible. As in the case of other bands shared between co-primary terrestrial and fixed-satellite services, (e.g., 24.75–25.25 GHz, 37.5–40 GHz and 47.2–48.2 GHz), the Commission believes that in the 50.4–51.4 GHz band, where an FSS allocation already exists, that a limited number of individually licensed FSS earth stations can share the 50.4–51.4 GHz band with minimal impact on terrestrial operations. Therefore, the Commission proposes to adopt rules permitting licensing of individual FSS earth stations in the 50.4–51.4 GHz band using the criteria identical to those applicable in the 24.75–25.25 GHz band. Specifically, the Commission proposes to apply the permitted aggregate population limits within the specified earth station PFD contour on a per-county basis, similar to the requirement in the 27.5–28.35 GHz band. Additionally, as in the 47.2–48.2 GHz band, the Commission proposes to adopt constraints on the number of permitted earth stations, not only per county, but also per PEA in which the earth stations are located. To reflect these requirements, the Commission proposes to modify § 25.136(g) of the Commission's rules to include the 50.4–51.4 GHz band. The Commission also proposes to amend footnote NG65 to the U.S. Table to include the 50.4–51.4 GHz band, making clear the relative interference protection obligations between the co-primary services. The Commission seeks comment on these proposals.

#### VI. Mobile Spectrum Holdings Policies in the 26 GHz and 42 GHz Bands

49. In this *3rd R&O*, the Commission adopted its proposal to eliminate the pre-auction limit for the *R&O* bands, finding that entities bidding for licenses in the 24 GHz, 28 GHz, 37 GHz, 39 GHz, and 47 GHz bands will not be subject to bright-line, pre-auction limits on the amount of spectrum they may acquire at an auction of these bands. Similarly, to the extent that the Commission adopts UMFUS rules for some portion or all of the 26 GHz and 42 GHz bands, it proposes to have no pre-auction limit on the amount of spectrum in these bands (or portions thereof) that an entity may

acquire through competitive bidding. The Commission believes that the reasons for eliminating the pre-auction limit for these five bands would apply equally to the 26 GHz and 42 GHz bands, given their technical characteristics relative to these other bands. The Commission seeks comment on this proposal.

50. To the extent that the Commission adopts UMFUS rules for some portion or all of the 26 GHz and 42 GHz bands, it proposes to include those bands (or portions thereof) in the mmW spectrum threshold for reviewing proposed secondary market transactions. The Commission notes that these bands share similar technical characteristics to the 24 GHz, 28 GHz, 37 GHz, 39 GHz, and 47 GHz bands. The Commission seeks comment on this proposal.

#### VII. Initial Regulatory Flexibility Analysis

51. As required by the Regulatory Flexibility Act of 1980, as amended (RFA), the Commission has prepared this present Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on a substantial number of small entities by the policies and rules proposed in the attached *3rd FNPRM*. Written public comments are requested on this IRFA. Comments must be identified as responses to the IRFA and must be filed by the deadlines for comments as specified in the *3rd FNPRM*. The Commission will send a copy of this *3rd FNPRM*, including this IRFA, to the Chief Counsel for Advocacy of the Small Business Administration (SBA). In addition, the *3rd FNPRM* and IRFA (or summaries thereof) will be published in the *Federal Register*.

##### A. Need for, and Objectives of, the Proposed Rules

52. In the *3rd FNPRM*, the Commission proposes to increase the Nation's supply of spectrum for mobile broadband by adopting rules for fixed and mobile services in the 25.25–27.5 GHz and 42–42.5 GHz band. The Commission proposes to include this band in the part 30 UMFUS. This additional spectrum for mobile use will help ensure that the speed, capacity, and ubiquity of the nation's wireless networks keeps pace with the skyrocketing demand for mobile service. It will also make possible new types of services for consumers and businesses. The Commission proposes to award Partial Economic Area-based licenses for these bands to best balance the needs of large and small carriers. The *3rd FNPRM* also proposes to include these bands, or portions of these bands, in the

mmW spectrum threshold for reviewing proposed secondary market transactions.

53. Until recently, the mmW bands were generally considered unsuitable for mobile applications because of propagation losses at such high frequencies and the inability of mmW signals to propagate around obstacles. As increasing congestion has begun to fill the lower bands and carriers have resorted to smaller and smaller microcells in order to re-use the available spectrum, however, the industry is taking another look at the mmW bands and beginning to realize that at least some of its presumed disadvantages can be turned to advantage. For example, short transmission paths and high propagation losses can facilitate spectrum re-use in microcellular deployments by limiting the amount of interference between adjacent cells. Furthermore, where longer paths are desired, the extremely short wavelengths of mmW signals make it feasible for very small antennas to concentrate signals into highly focused beams with enough gain to overcome propagation losses. The short wavelengths of mmW signals also make it possible to build multi-element, dynamic beam-forming antennas that will be small enough to fit into handsets—a feat that might never be possible at the lower, longer-wavelength frequencies below 6 GHz where cell phones operate today.

54. In the *3rd FNPRM*, the Commission also seeks comment on developing the licensing framework it has adopted for the 37–37.6 GHz band. That framework creates an innovative shared space that can be used by a wide variety of Federal and non-Federal users, by new entrants and by established operators—and smaller businesses in particular—to experiment with new technologies in the mmW space. The Commission seeks comment on a first-come-first-served licensing or registration scheme, in which actual users have a right to interference protection, but no right to exclude other users. The Commission seeks comment on subsequent users being required to coordinate with previously registered non-Federal and Federal sites through part 101 notice and response rules or on the alternative of registering facilities with a third-party coordinator.

55. The *3rd FNPRM* also proposes to adopt rules permitting licensing of individual FSS earth stations in the 50.4–51.4 GHz band using the criteria identical to those applicable in the 24.75–25.25 GHz band. Although the 50.4–52.6 GHz band remains under

consideration for UMFUS licensing, the Commission has throughout this proceeding sought to promote spectrum efficiency by permitting spectrum made available for UMFUS to be shared with other allocated services when possible. The Commission believes that in the 50.4–51.4 GHz band, where an FSS allocation already exists, that a limited number of individually licensed FSS earth stations can share the 50.4–51.4 GHz band with minimal impact on terrestrial operations.

56. Overall, this proposal is designed to provide for flexible use of this spectrum by allowing licensees to choose their type of service offerings, to encourage innovation and investment in mobile broadband use in this spectrum, and to provide a stable regulatory environment in which fixed, mobile, and satellite deployment would be able to develop through the application of flexible rules. The market-oriented licensing framework for these bands would ensure that this spectrum is efficiently utilized and will foster the development of new and innovative technologies and services, as well as encourage the growth and development of a wide variety of services, ultimately leading to greater benefits to consumers.

#### *B. Legal Basis*

57. The proposed action is authorized pursuant to sections 1, 2, 3, 4, 5, 7, 301, 302, 302a, 303, 304, 307, 309, and 310 of the Communications Act of 1934, as amended, 47 U.S.C. 151, 152, 153, 154, 155, 157, 301, 302, 302a, 303, 304, 307, 309, and 310, section 706 of the Telecommunications Act of 1996, as amended, 47 U.S.C. 1302.

#### *C. Description and Estimate of the Number of Small Entities to Which the Proposed Rules Will Apply*

58. The RFA directs agencies to provide a description of and, where feasible, an estimate of the number of small entities that may be affected by the proposed rules, if adopted. The RFA generally defines the term “small entity” as having the same meaning as the terms “small business,” “small organization,” and “small governmental jurisdiction.” In addition, the term “small business” has the same meaning as the term “small business concern” under the Small Business Act.” A “small business concern” is one which: (1) Is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the SBA.

59. Small Businesses, Small Organizations, Small Governmental Jurisdictions. The Commission’s

actions, over time, may affect small entities that are not easily categorized at present. The Commission therefore describes here, at the outset, three broad groups of small entities that could be directly affected herein. First, while there are industry specific size standards for small businesses that are used in the regulatory flexibility analysis, according to data from the SBA’s Office of Advocacy, in general a small business is an independent business having fewer than 500 employees. These types of small businesses represent 99.9% of all businesses in the United States which translates to 28.8 million businesses.

60. Next, the type of small entity described as a “small organization” is generally “any not-for-profit enterprise which is independently owned and operated and is not dominant in its field.” Nationwide, as of August 2016, there were approximately 356,494 small organizations based on registration and tax data filed by nonprofits with the Internal Revenue Service (IRS).

61. Finally, the small entity described as a “small governmental jurisdiction” is defined generally as “governments of cities, counties, towns, townships, villages, school districts, or special districts, with a population of less than fifty thousand.” U.S. Census Bureau data from the 2012 Census of Governments indicate that there were 90,056 local governmental jurisdictions consisting of general purpose governments and special purpose governments in the United States. Of this number there were 37,132 General purpose governments (county, municipal and town or township) with populations of less than 50,000 and 12,184 Special purpose governments (independent school districts and special districts) with populations of less than 50,000. The 2012 U.S. Census Bureau data for most types of governments in the local government category show that the majority of these governments have populations of less than 50,000. Based on this data the Commission estimates that at least 49,316 local government jurisdictions fall in the category of “small governmental jurisdictions.”

62. *Wireless Telecommunications Carriers (except Satellite).* This industry comprises establishments engaged in operating and maintaining switching and transmission facilities to provide communications via the airwaves. Establishments in this industry have spectrum licenses and provide services using that spectrum, such as cellular services, paging services, wireless internet access, and wireless video services. The appropriate size standard

under SBA rules is that such a business is small if it has 1,500 or fewer employees. For this industry, U.S. Census Bureau data for 2012 show that there were 967 firms that operated for the entire year. Of this total, 955 firms had employment of 999 or fewer employees and 12 had employment of 1,000 employees or more. Thus under this category and the associated size standard, the Commission estimates that the majority of wireless telecommunications carriers (except satellite) are small entities.

#### 63. Fixed Microwave Services.

Microwave services include common carrier, private-operational fixed, and broadcast auxiliary radio services. They also include the UMFUS the Millimeter Wave Service, Local Multipoint Distribution Service (LMDS), the Digital Electronic Message Service (DEMS), and the 24 GHz Service, where licensees can choose between common carrier and non-common carrier status. At present, there are approximately 66,680 common carrier fixed licensees, 69,360 private and public safety operational-fixed licensees, 20,150 broadcast auxiliary radio licensees, 411 LMDS licenses, 33 24 GHz DEMS licenses, 777 39 GHz licenses, and five 24 GHz licensees, and 467 Millimeter Wave licenses in the microwave services. The Commission has not yet defined a small business with respect to microwave services. The closest applicable SBA category is Wireless Telecommunications Carriers (except Satellite) and the appropriate size standard for this category under SBA rules is that such a business is small if it has 1,500 or fewer employees. For this industry, U.S. Census Bureau data for 2012 shows that there were 967 firms that operated for the entire year. Of this total, 955 had employment of 999 or fewer, and 12 firms had employment of 1,000 employees or more. Thus under this SBA category and the associated standard, the Commission estimates that the majority of fixed microwave service licensees can be considered small.

64. The Commission does not have data specifying the number of these licensees that have more than 1,500 employees, and thus is unable at this time to estimate with greater precision the number of fixed microwave service licensees that would qualify as small business concerns under the SBA's small business size standard. Consequently, the Commission estimates that there are up to 36,708 common carrier fixed licensees and up to 59,291 private operational-fixed licensees and broadcast auxiliary radio licensees in the microwave services that may be small and may be affected by the

rules and policies adopted herein. The Commission notes, however, that both the common carrier microwave fixed and the private operational microwave fixed licensee categories includes some large entities.

#### 65. Satellite Telecommunications.

This category comprises firms "primarily engaged in providing telecommunications services to other establishments in the telecommunications and broadcasting industries by forwarding and receiving communications signals via a system of satellites or reselling satellite telecommunications." Satellite telecommunications service providers include satellite and earth station operators. The category has a small business size standard of \$32.5 million or less in average annual receipts, under SBA rules. For this category, U.S. Census Bureau data for 2012 shows that there were a total of 333 firms that operated for the entire year. Of this total, 299 firms had annual receipts of less than \$25 million. Consequently, the Commission estimates that the majority of satellite telecommunications providers are small entities.

#### 66. All Other Telecommunications.

The "All Other Telecommunications" category is comprised of establishments primarily engaged in providing specialized telecommunications services, such as satellite tracking, communications telemetry, and radar station operation. This industry also includes establishments primarily engaged in providing satellite terminal stations and associated facilities connected with one or more terrestrial systems and capable of transmitting telecommunications to, and receiving telecommunications from, satellite systems. Establishments providing internet services or voice over internet protocol (VoIP) services via client-supplied telecommunications connections are also included in this industry." The SBA has developed a small business size standard for "All Other Telecommunications," which consists of all such firms with gross annual receipts of \$32.5 million or less. For this category, U.S. Census Bureau data for 2012 shows that there were a total of 1,442 firms that operated for the entire year. Of these firms, a total of 1400 firms had gross annual receipts of under \$25 million and 42 firms had gross annual receipts of \$25 million to \$49, 999,999. Thus, the Commission estimates that a majority of "All Other Telecommunications" firms potentially affected by its actions can be considered small.

#### 67. Radio and Television Broadcasting and Wireless

#### Communications Equipment

*Manufacturing.* This industry comprises establishments primarily engaged in manufacturing radio and television broadcast and wireless communications equipment. Examples of products made by these establishments are: Transmitting and receiving antennas, cable television equipment, GPS equipment, pagers, cellular phones, mobile communications equipment, and radio and television studio and broadcasting equipment." The SBA has established a size standard for this industry of 1,250 employees or less. U.S. Census Bureau data for 2012 shows that 841 establishments operated in this industry in that year. Of that number, 828 establishments operated with fewer than 1,000 employees, 7 establishments operated with between 1,000 and 2,499 employees and 6 establishments operated with 2,500 or more employees. Based on this data, the Commission concludes that a majority of manufacturers in this industry is small.

#### D. Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements

68. The Commission expects the rules proposed in the 3rd FNPRM will impose new or additional reporting or recordkeeping and/or other compliance obligations on small entities as well as other licensees and applicants.

69. Applicants in the Lower 37 GHz band will be required to coordinate their proposed operations with other licensees and applicants. Such coordination is necessary to ensure that neighboring operations will not interfere with each other. Potential applicants will also be required to coordinate their operations with any Federal agencies with operations in the areas.

70. Small entities and other applicants in 26 GHz, 42 GHz, and Lower 37 GHz UMFUS will be required to meet buildout requirements. In doing so, they will be required to provide information to the Commission on the facilities they have constructed, the nature of the service they are providing, and the extent to which they are providing coverage in their license area. With respect to the 26 GHz performance requirements, the Commission believes such requirements are necessary to ensure that spectrum is being put into use and has proposed a variety of metrics to provide small entities as well as other licensees with a variety of means by which they may demonstrate compliance. The Commission anticipates the performance requirements will encourage rapid deployment of next generation wireless services, including 5G, which will

benefit small entities and the industry as a whole.

**E. Steps Taken To Minimize Significant Economic Impact on Small Entities, and Significant Alternatives Considered**

71. The RFA requires an agency to describe any significant alternatives for small businesses that it has considered in reaching its proposed approach, which may include the following four alternatives (among others): (1) The establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance and reporting requirements under the rule for such small entities; (3) the use of performance rather than design standards; and (4) an exemption from coverage of the rule, or any part thereof, for such small entities.

72. The Commission does not believe that its proposed changes will have a significant economic impact on small entities. The Commission believes the proposed site-based licensing scheme for the Lower 37 GHz band would facilitate access to spectrum by small businesses and a wide variety of other entities. However, to get a better understanding of costs and any burdens, the Commission seeks comment on whether any of burdens associated the filing, recordkeeping and reporting requirements described above can be minimized for small businesses. In particular, the Commission seeks comment on whether any of the costs associated with its construction or

performance requirements in the 26 GHz and Lower 37 GHz bands can be alleviated for small businesses. The Commission expects to more fully consider the economic impact and alternatives for small entities following the review of comments filed in response to the 3rd FNPRM.

*F. Federal Rules That May Duplicate, Overlap, or Conflict With the Proposed Rules*

73. None.

**VIII. Ordering Clauses**

74. *It is ordered*, pursuant to the authority found in sections 1, 2, 3, 4, 5, 7, 301, 302, 302a, 303, 304, 307, 309, and 310 of the Communications Act of 1934, 47 U.S.C. 151, 152, 153, 154, 155, 157, 301, 302, 302a, 303, 304, 307, 309, and 310, section 706 of the Telecommunications Act of 1996, as amended, 47 U.S.C. 1302, and § 1.411 of the Commission's rules, 47 CFR 1.411, that this Third Report and Order, Third Further Notice of Proposed Rulemaking, and Memorandum Opinion and Order is hereby adopted.

75. *It is further ordered* that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, *shall send* a copy of this Third Report and Order, Third Further Notice of Proposed Rulemaking, and Memorandum Opinion and Order, including the Final, Supplemental Final, and Initial Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration.

76. *It is further ordered* that the Commission *shall send* a copy of this Report and Order to Congress and the Government Accountability Office pursuant to the Congressional Review Act, see 5 U.S.C. 801(a)(1)(A).

**List of Subjects in 47 CFR Parts 2, 25 and 30**

Communications common carriers, Reporting and recordkeeping requirements, Communications equipment.

Federal Communications Commission.

**Marlene Dortch,**

*Secretary, Office of the Secretary.*

**Proposed Rules**

For the reasons discussed in the preamble, the Federal Communications Commission proposes to amend 47 CFR parts 2, 25, and 30 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. In § 2.106, the Table of Frequency Allocations is amended as follows:

- a. Revise pages 54, 55, 58, and 60.
- b. In the list of non-Federal Government (NG) Footnotes, footnote NG65 is revised.

**§ 2.106 Table of Frequency Allocations.**

The revisions read as follows:

\* \* \* \* \*

24-24.05 AMATEUR AMATEUR-SATELLITE	5.150	24-24.05 AMATEUR AMATEUR-SATELLITE	5.150 US211	24-24.05 AMATEUR AMATEUR-SATELLITE	5.150 US211	ISM Equipment (18) Amateur Radio (97)
24.05-24.25 RADIOLOCATION Amateur Earth exploration-satellite (active)	24.05-24.25 RADIOLOCATION G59 Earth exploration-satellite (active)	24.05-24.25 RADIOLOCATION G59 Earth exploration-satellite (active)	24.05-24.25 Amateur Earth exploration-satellite (active) Radiolocation	24.05-24.25 RADIOLOCATION G59 Earth exploration-satellite (active)	24.05-24.25 Amateur Earth exploration-satellite (active) Radiolocation	RF Devices (15) ISM Equipment (18) Private Land Mobile (90) Amateur Radio (97)
5.150	5.150	5.150	5.150	5.150	5.150	
24.25-24.45 FIXED	24.25-24.45 RADIONAVIGATION	24.25-24.45 FIXED MOBILE RADIONAVIGATION	24.25-24.45	24.25-24.45 FIXED MOBILE	24.25-24.45 FIXED MOBILE	RF Devices (15) Upper Microwave Flexible Use (30)
24.45-24.65 FIXED INTER-SATELLITE	24.45-24.65 INTER-SATELLITE RADIONAVIGATION	24.45-24.65 FIXED INTER-SATELLITE MOBILE RADIONAVIGATION	24.45-24.65 INTER-SATELLITE RADIONAVIGATION	24.45-24.65 INTER-SATELLITE RADIONAVIGATION	24.45-24.65 INTER-SATELLITE RADIONAVIGATION	RF Devices (15) Satellite Communications (25)
5.533	5.533	5.533	5.533	5.533	5.533	
24.65-24.75 FIXED FIXED-SATELLITE (Earth-to-space) 5.532B INTER-SATELLITE	24.65-24.75 INTER-SATELLITE RADIOLOCATION-SATELLITE (Earth-to-space)	24.65-24.75 FIXED FIXED-SATELLITE (Earth-to-space) 5.532B INTER-SATELLITE MOBILE	24.65-24.75 INTER-SATELLITE RADIOLOCATION-SATELLITE (Earth-to-space)	24.65-24.75 INTER-SATELLITE RADIOLOCATION-SATELLITE (Earth-to-space)	24.65-24.75 INTER-SATELLITE RADIOLOCATION-SATELLITE (Earth-to-space)	
5.533		5.533				
24.75-25.25 FIXED FIXED-SATELLITE (Earth-to-space) 5.532B	24.75-25.25 FIXED-SATELLITE (Earth-to-space) 5.535	24.75-25.25 FIXED FIXED-SATELLITE (Earth-to-space) 5.535 MOBILE	24.75-25.25	24.75-25.25 FIXED FIXED-SATELLITE (Earth-to-space) NG65 MOBILE	24.75-25.25 FIXED FIXED-SATELLITE (Earth-to-space) NG65 MOBILE	RF Devices (15) Satellite Communications (25) Upper Microwave Flexible Use (30)
25.25-25.5 FIXED INTER-SATELLITE 5.536 MOBILE Standard frequency and time signal-satellite (Earth-to-space)		25.25-25.5 FIXED INTER-SATELLITE 5.536 MOBILE Standard frequency and time signal-satellite (Earth-to-space)	RF Devices (15) Upper Microwave Flexible Use (30)			
25.5-27 EARTH EXPLORATION-SATELLITE (space-to-Earth) 5.536B FIXED INTER-SATELLITE 5.536 MOBILE SPACE RESEARCH (space-to-Earth) 5.536C Standard frequency and time signal-satellite (Earth-to-space)		25.5-27 EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED INTER-SATELLITE 5.536 MOBILE SPACE RESEARCH (space-to-Earth) Standard frequency and time signal-satellite (Earth-to-space)	25.5-27 EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED INTER-SATELLITE 5.536 MOBILE SPACE RESEARCH (space-to-Earth) Standard frequency and time signal-satellite (Earth-to-space)	25.5-27 EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED INTER-SATELLITE 5.536 MOBILE SPACE RESEARCH (space-to-Earth) Standard frequency and time signal-satellite (Earth-to-space)	25.5-27 EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED INTER-SATELLITE 5.536 MOBILE SPACE RESEARCH (space-to-Earth) Standard frequency and time signal-satellite (Earth-to-space)	RF Devices (15) Upper Microwave Flexible Use (30)
5.536A		5.536A US258	5.536A US258	5.536A US258	5.536A US258	

Table of Frequency Allocations			27-34.7 GHz (SHF/EHF)		FCC Rule Part(s)
International Table			United States Table		
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
27-27.5 FIXED INTER-SATELLITE 5.536 MOBILE	27-27.5 FIXED FIXED-SATELLITE (Earth-to-space) INTER-SATELLITE 5.536 5.537 MOBILE		27-27.5 FIXED INTER-SATELLITE 5.536 MOBILE	27-27.5 FIXED MOBILE Inter-satellite 5.536	Upper Microwave Flexible Use (30) RF Devices (15)
27.5-28.5 FIXED 5.537A FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.539 MOBILE			27.5-30	27.5-28.35 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE	RF Devices (15) Satellite Communications (25) Upper Microwave Flexible Use (30) Fixed Microwave (101)
5.538 5.540				28.35-29.1 FIXED-SATELLITE (Earth-to-space) NG165	Satellite Communications (25)
28.5-29.1 FIXED FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.523A 5.539 MOBILE Earth exploration-satellite (Earth-to-space) 5.541				NG62	
5.540				29.1-29.25 FIXED FIXED-SATELLITE (Earth-to-space) NG166 MOBILE	RF Devices (15) Satellite Communications (25) Fixed Microwave (101)
29.1-29.5 FIXED FIXED-SATELLITE (Earth-to-space) 5.516B 5.523C 5.523E 5.535A 5.539 5.541A MOBILE Earth exploration-satellite (Earth-to-space) 5.541				29.25-29.5 FIXED-SATELLITE (Earth-to-space) NG535A NG62	Satellite Communications (25)
5.540				29.5-30 FIXED-SATELLITE (Earth-to-space) MOBILE-SATELLITE (Earth-to-space)	
29.5-29.9 FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.539 Earth exploration-satellite (Earth-to-space) 5.541 Mobile-satellite (Earth-to-space)	29.5-29.9 FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.539 MOBILE-SATELLITE (Earth-to-space) Earth exploration-satellite (Earth-to-space) 5.541 Mobile-satellite (Earth-to-space)	29.5-29.9 FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.539 Earth exploration-satellite (Earth-to-space) 5.541 Mobile-satellite (Earth-to-space)		5.525 5.526 5.527 5.529 5.543	
5.540 5.542	5.542	5.540 5.542			
29.9-30 FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.539 MOBILE-SATELLITE (Earth-to-space) Earth exploration-satellite (Earth-to-space) 5.541 5.543					
5.525 5.526 5.527 5.538 5.540 5.542					
30-31 FIXED-SATELLITE (Earth-to-space) 5.338A MOBILE-SATELLITE (Earth-to-space) Standard frequency and time signal-satellite (space-to-Earth)			30-31 FIXED-SATELLITE (Earth-to-space) MOBILE-SATELLITE (Earth-to-space) Standard frequency and time signal-satellite (space-to-Earth) G117	30-31 Standard frequency and time signal-satellite (space-to-Earth)	
5.542					

40-40.5 EARTH EXPLORATION-SATELLITE (Earth-to-space) FIXED FIXED-SATELLITE (space-to-Earth) 5.516B MOBILE MOBILE-SATELLITE (space-to-Earth) SPACE RESEARCH (Earth-to-space) Earth exploration-satellite (space-to-Earth)			40-40.5 EARTH EXPLORATION-SATELLITE (Earth-to-space) FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) SPACE RESEARCH (Earth-to-space) Earth exploration-satellite (space-to-Earth)	40-40.5 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth)	Satellite Communications (25)
40.5-41 FIXED FIXED-SATELLITE (space-to-Earth) BROADCASTING BROADCASTING-SATELLITE Mobile	40.5-41 FIXED FIXED-SATELLITE (space-to-Earth) 5.516B BROADCASTING BROADCASTING-SATELLITE Mobile Mobile-satellite (space-to-Earth)	40.5-41 FIXED FIXED-SATELLITE (space-to-Earth) BROADCASTING BROADCASTING-SATELLITE Mobile	40.5-41 FIXED-SATELLITE (space-to-Earth) Mobile-satellite (space-to-Earth)	40.5-41 FIXED-SATELLITE (space-to-Earth) BROADCASTING BROADCASTING-SATELLITE Fixed Mobile Mobile-satellite (space-to-Earth)	
5.547	5.547	5.547	US211 G117	US211	
41-42.5 FIXED FIXED-SATELLITE (space-to-Earth) 5.516B BROADCASTING BROADCASTING-SATELLITE Mobile		41-42.5		41-42 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE BROADCASTING BROADCASTING-SATELLITE	
			US211	US211	
5.547 5.551F 5.551H 5.551I		US211	US211	42-42.5 FIXED MOBILE	Upper Microwave Flexible Use (30)
42.5-43.5 FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE except aeronautical mobile RADIO ASTRONOMY		42.5-43.5 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE except aeronautical mobile RADIO ASTRONOMY		42.5-43.5 RADIO ASTRONOMY	
5.149 5.547		US342	US342		
43.5-47 MOBILE 5.553 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE		43.5-45.5 FIXED-SATELLITE (Earth-to-space) MOBILE-SATELLITE (Earth-to-space)	43.5-45.5		
		G117			
5.554		45.5-46.9 MOBILE MOBILE-SATELLITE (Earth-to-space) RADIONAVIGATION-SATELLITE			RF Devices (15)

\* \* \* \* \*

**Non-Federal Government (NG) Footnotes**

\* \* \* \* \*

NG65 In the bands 24.75–25.25 GHz, 47.2–48.2 GHz and 50.4–51.4 GHz, stations in the fixed and mobile services may not claim protection from individually licensed earth stations authorized pursuant to 47 CFR 25.136. However, nothing in this footnote shall limit the right of UMFUS licensees to operate in conformance with the technical rules contained in 47 CFR part 30. The Commission reserves the right to monitor developments and to undertake further action concerning interference between UMFUS and FSS, including aggregate interference to satellite receivers, if appropriate.

\* \* \* \* \*

**PART 25—SATELLITE COMMUNICATIONS**

- 3. The authority citation for part 25 continues to read as follows:

**Authority:** 47 U.S.C. 154, 301, 302, 303, 307, 309, 310, 319, 332, 605, and 721, unless otherwise noted.

- 4. Amend § 25.136 by revising the section heading and paragraph (g), and adding paragraph (h) to read as follows:

**§ 25.136 Earth Stations in the 24.75–25.25 GHz, 27.5–28.35 GHz, 37.5–40 GHz, 47.2–48.2 GHz and 50.4–51.4 GHz bands.**

\* \* \* \* \*

(g) Notwithstanding that FSS is co-primary with the Upper Microwave Flexible Use Service in the 24.75–25.25 GHz and 50.4–51.4 GHz bands, earth stations in these bands shall be limited to individually licensed earth stations. An applicant for a license for a transmitting earth station in the 24.75–25.25 GHz or 50.4–51.4 GHz band must meet one of the following criteria to be authorized to operate without providing any additional interference protection to stations in the Upper Microwave Flexible Use Service:

(1) The FSS licensee also holds the relevant Upper Microwave Flexible Use Service license(s) for the area in which the earth station generates a power flux density (PFD), at 10 meters above ground level, of greater than or equal to  $-77.6 \text{ dBm/m}^2/\text{MHz}$ ;

(2) The earth station in the 24.75–25.25 GHz band was authorized prior to August 20, 2018; or the earth station in the 50.4–51.4 GHz band was authorized prior to [effective date of this rule]; or

(3) The application for the earth station in the 24.75–25.25 GHz band was filed prior to August 20, 2018; or the application for the earth station in

the 50.4–51.4 GHz band was filed prior to [effective date for this rule]; or

(4) The applicant demonstrates compliance with all of the following criteria in its application:

(i) There are no more than two other authorized earth stations operating in the same frequency band within the county where the proposed earth station is located that meet the criteria contained in either paragraphs (g)(1) (g)(2), (g)(3) or (g)(4) of this section, and there are no more than 14 other authorized earth stations operating in the same frequency band within the Partial Economic Area where the proposed earth station is located that meet the criteria contained in paragraphs (g)(1) (g)(2), (g)(3) or (g)(4) of this section. For purposes of this requirement, multiple earth stations that are collocated with or at a location contiguous to each other shall be considered as one earth station;

(ii) The area in which the earth station generates a power flux density (PFD), at 10 meters above ground level, of greater than or equal to  $-77.6 \text{ dBm/m}^2/\text{MHz}$ , together with the similar area of any other earth station operating in the same frequency band authorized pursuant to paragraph (e) of this section, does not cover, in the aggregate, more than the amount of population of the county within which the earth station is located as noted below:

TABLE 1 TO PARAGRAPH (g)(4)(ii)

Population within the County where earth station is located	Maximum permitted aggregate population within $-77.6 \text{ dBm/m}^2/\text{MHz}$ PFD contour of earth stations
Greater than 450,000 .....	0.1 percent of population in county.
Between 6,000 and 450,000 .....	450 people.
Fewer than 6,000 .....	7.5 percent of population in county.

(h) If an earth station applicant or licensee in the 24.75–25.25 GHz, 27.5–28.35 GHz, 37.5–40 GHz, 47.2–48.2 GHz and/or 50.4–51.4 GHz bands enters into an agreement with an UMFUS licensee, their operations shall be governed by that agreement, except to the extent that the agreement is inconsistent with the Commission's rules or the Communications Act.

\* \* \* \* \*

**PART 30—UPPER MICROWAVE FLEXIBLE USE SERVICE**

- 5. The authority citation for part 30 continues to read as follows:

**Authority:** 47 U.S.C. 151, 152, 153, 154, 301, 303, 304, 307, 309, 310, 316, 332, 1302.

- 6. Amend § 30.4 by:

- a. Redesignating paragraphs (b) through (e) as paragraphs (c), (d), (f), and (g), and

- b. Adding a new paragraph (b) and (e). The additions read as follows:

**§ 30.4 Frequencies.**

\* \* \* \* \*

(b) 25.25–27.5 GHz band—25.25–25.45 GHz; 25.45–25.65 GHz; 25.65–25.85 GHz; 25.85–26.05 GHz; 26.05–26.25 GHz; 26.25–26.45 GHz; 26.45–26.65 GHz; 26.65–26.85 GHz; 26.85–27.05 GHz; 27.05–27.25 GHz; 27.25–27.45 GHz; 27.45–27.5 GHz.

\* \* \* \* \*

(e) 42–42.5 GHz band—42–42.1 GHz; 42.1–42.2 GHz; 42.2–42.3 GHz; 42.3–42.4 GHz; 42.4–42.5 GHz.

\* \* \* \* \*

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