

FCC FACT SHEET^{*}
Use of Spectrum Bands Above 24 GHz For Mobile Radio Services
Fifth Report and Order
GN Docket No. 14-177

Background: The Commission continues its efforts to make available millimeter wave spectrum for 5G, Internet of Things, and other advanced spectrum-based services, including satellite broadband services.

What the Fifth Report and Order Would Do:

- Establish a coordination process that accommodates the military’s potential need for additional sites in the Upper 37 GHz band (37.6-38.6) where the Lower 37 GHz band (37.0–37.6 GHz) is not sufficient, while protecting the interests of non-Federal licensees in the Upper 37 GHz band. FCC staff would review the military’s request to assess any potential impact on non-Federal licensees, contacting the potentially affected licensees and facilitating direct coordination with DoD.
 - Resolving this issue would be an integral step toward the auction of the Upper 37 GHz, 39 GHz (38.6–40 GHz), and 47 GHz (47.2–48.2 GHz) bands slated to begin later this year.
- Allow Fixed-Satellite Service earth stations to be individually licensed to transmit in the 50 GHz band (50.4-51.4 GHz) in order to provide faster and more advanced services to their customers.

^{*} This document is being released as part of a “permit-but-disclose” proceeding. Any presentations or views on the subject expressed to the Commission or its staff, including by email, must be filed in WT Docket No. 14-177, which may be accessed via the Electronic Comment Filing System (<https://www.fcc.gov/ecfs/>). Before filing, participants should familiarize themselves with the Commission’s ex parte rules, including the general prohibition on presentations (written and oral) on matters listed on the Sunshine Agenda, which is typically released a week prior to the Commission’s meeting. See 47 CFR § 1.1200 et seq.

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

In the Matter of
Use of Spectrum Bands Above 24 GHz For
Mobile Radio Services
GN Docket No. 14-177

FIFTH REPORT AND ORDER*

Adopted: []

Released: []

By the Commission:

I. INTRODUCTION

1. Today, we take two actions that continue our efforts to make available millimeter wave (mmW) spectrum, at or above 24 GHz, for fifth-generation (5G) wireless, Internet of Things, and other advanced spectrum-based services, including satellite broadband services. First, we establish rules to allow Fixed-Satellite Service (FSS) operators such as satellite broadband service operators, to operate with individually licensed earth stations transmitting in the 50.4-51.4 GHz band using criteria identical to those applicable in the 24.75-25.25 GHz band. This action will allow FSS operators to provide additional capacity that can be used to provide faster and more advanced services to their customers. Second, we establish a process for the Department of Defense to operate on a shared basis in the Upper 37 GHz band (37.6-38.6 GHz band) in limited circumstances. This action will provide certainty to potential applicants as we begin the auction for the Upper 37 GHz band, the 39 GHz band (38.6-40 GHz band), and the 47 GHz band (47.2-48.2 GHz) later this year.

II. BACKGROUND

2. On June 8, 2018, the Commission released the Third R&O, MO&O, and Third FNPRM in this proceeding. In relevant parts, the Third FNPRM proposed permitting the licensing of individual FSS earth stations in the 50.4-51.4 GHz band using criteria identical to those applicable in the 24.75-

* This document has been circulated for tentative consideration by the Commission at its April 2019 open meeting. The issues referenced in this document and the Commission’s ultimate resolution of those issues remain under consideration and subject to change. This document does not constitute any official action by the Commission. However, the Chairman has determined that, in the interest of promoting the public’s ability to understand the nature and scope of issues under consideration, the public interest would be served by making this document publicly available. The FCC’s ex parte rules apply and presentations are subject to “permit-but-disclose” ex parte rules. See, e.g., 47 C.F.R. §§ 1.1206, 1.1200(a). Participants in this proceeding should familiarize themselves with the Commission’s ex parte rules, including the general prohibition on presentations (written and oral) on matters listed on the Sunshine Agenda, which is typically released a week prior to the Commission’s meeting. See 47 CFR §§ 1.1200(a), 1.1203.

1 Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, et al., Fourth Report and Order, FCC 18-180 (rel. Dec. 12, 2018) (Fourth R&O).

2 Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, et al., Third Report and Order, Memorandum Opinion and Order, and Third Further Notice of Proposed Rulemaking, 33 FCC Rcd 5576 (2018). When citing to the Third Report and Order portion of the 2018 document, we will refer to the Third R&O. When citing to the Memorandum Opinion and Order portion of the 2018 document, we will refer to the MO&O. When citing to the Third Further Notice of Proposed Rulemaking portion of the 2018 document, we will refer to the Third FNPRM.

(continued...)

25.25 GHz band.³ With respect to the 37 GHz band, the Commission noted that it had adopted rules that establish coordination zones for 14 military sites and three scientific sites identified by NTIA, and it sought comment on “on how best to accommodate coordination zones for future Federal operations at a limited number of additional sites.”⁴ In contrast, for the Lower 37 GHz band, the Commission sought comment on a proposed coordination mechanism and alternatives to facilitate co-equal shared use of the Lower 37 GHz band between Federal and non-Federal users, as well as among non-Federal users.⁵

3. 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.⁶ In 1998, the Commission designated the 50.4-51.4 GHz band for use by wireless (fixed and mobile) services.⁷ In the *Spectrum Frontiers FNPRM*, the Commission proposed to authorize fixed and mobile operations throughout the 50.4-52.6 GHz band in accordance with the Part 30 Upper Microwave Flexible Use Service (UMFUS) rules.⁸ The Commission also proposed to use geographic area licensing to license UMFUS stations in the band on a PEA basis and sought comment on sharing with satellite services.⁹ The Commission received ten satellite applications or market access requests¹⁰ and twenty earth station applications¹¹ seeking to use the existing FSS (Earth-to-space) allocation in the 50.4-51.4 GHz band for delivery of broadband services.

4. In the *Third FNPRM*, the Commission proposed rules that would permit licensing of individual FSS earth stations in the 50.4-51.4 GHz band using criteria identical to those applicable in the 24.75-25.25 GHz band. Specifically, we proposed 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, and to adopt constraints on the number of permitted earth stations on both a per county and a per PEA basis. To reflect these requirements, we proposed to modify Section 25.136 of the Commission’s rules to include the 50.4-51.4 GHz band. We also proposed to amend footnote NG65 to the U.S. Table of Allocations to include the 50.4-51.4 GHz band, making clear the relative interference protection obligations between the co-primary services.¹²

³ *Third FNPRM*, 33 FCC Rcd at 5610-12, paras. 92-94.

⁴ *Third FNPRM*, 33 FCC Rcd at 5605, para. 74.

⁵ *Third FNPRM* at paras. 58-73.

⁶ The Federal allocations are limited to military systems. See 47 CFR § 2.106 n.G117.

⁷ *Allocation and Designation of Spectrum for Fixed-Satellite Services in the 37.5-38.5 GHz, 40.5-41.5 GHz, and 48.2-50.2 GHz Frequency Bands; Allocation of Spectrum to Upgrade Fixed and Mobile Allocations in the 40.5-42.5 GHz Frequency Band; Allocation of Spectrum in the 46.9-47.0 GHz Frequency Band for Wireless Services; and Allocation of Spectrum in the 37.0-38.0 GHz and 40.0-40.5 GHz for Government Operations*, First Report and Order, 13 FCC Rcd 24649, 24651, para. 2 (1998).

⁸ *FNPRM*, 31 FCC Rcd at 8157, para. 420.

⁹ *Id.*

¹⁰ See IBFS File Nos. SAT-LOA-20160622-00058, as amended by IBFS File No. SAT-AMD-20170301-00030 (The Boeing Company); SAT-MOD-20160624-00060 and SAT-AMD-20170301-00026 (O3b Limited); SAT-LOI-20170301-00023 (Telesat Canada); SAT-LOI-20170301-00031 (WorldVu Satellites Limited (OneWeb)); SAT-LOA-20170301-00027 (Space Exploration Holdings, LLC (SpaceX)); SAT-LOA-20170301-00028 (The Boeing Company) (application for a separate system including both low-Earth orbit (LEO) and highly inclined orbit NGSO satellites); SAT-LOA-20161115-00112 and SAT-AMD-20170301-00029 (Theia Holdings A, Inc.); SAT-LOA-20161115-00117 (Audacy); SAT-LOA-20161115-00120 (ViaSat); and SAT-LOA-20170621-00092, as amended by SAT-AMD-20170908-00128 (Hughes Network Systems, LLC.).

¹¹ IBFS File Nos. SES-LIC-20170807-00876 through SES-LIC-20170807-00895.

¹² *Third FNPRM*, 33 FCC Rcd at 5610-12, paras. 92-94.

5. With respect to the Upper 37 GHz band, the entire 37 GHz band is allocated to the fixed and mobile services on a primary basis for Federal and non-Federal use.¹³ In the *Spectrum Frontiers R&O*, the Commission made five decisions addressing the Federal and non-Federal use of the band that are relevant here. First, it adopted service rules to permit non-Federal fixed and mobile terrestrial operation throughout the 37 GHz band.¹⁴ Second, it divided the band into two segments: a lower band segment from 37.0-37.6 GHz (Lower 37 GHz band) and an upper band segment from 37.6-38.6 GHz (Upper 37 GHz band).¹⁵ Third, it made the Lower 37 GHz band available for coordinated co-primary sharing between Federal and non-Federal users.¹⁶ Fourth, it adopted rules to license the upper 37 GHz band geographically by Partial Economic Areas (PEAs) in 200 megahertz channel blocks (but changed the band plan to 100 megahertz blocks in the *Spectrum Frontiers Fourth R&O*).¹⁷ Fifth, it established the coordination zones throughout the entire 37-38.6 GHz band for the 14 military sites and three scientific sites identified by NTIA.¹⁸ While the Commission noted that Federal agencies still had the ability to add future sites on a coordinated basis, it did not indicate how this could be done.¹⁹

6. In the *Third FNPRM*, the Commission sought comment on how best to accommodate coordination zones for future Federal operations at a limited number of additional sites. The Commission asked whether it should amend its rules to add more specific sites for Federal operations, or whether it should 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 asked whether the coordination zones previously established in its rules might be reduced to better accommodate nearby non-Federal operations without adversely impacting Federal operations at those sites.²⁰

7. We received 26 comments and 17 reply comments on the *Third FNPRM*. A list of commenters, reply commenters, and parties filing *ex parte* submissions relating to the issues addressed in this *Fifth Report and Order* is contained in Appendix C.²¹ No petitions for reconsideration of the *Third R&O* were filed.²²

III. DISCUSSION

A. 50.4-51.4 GHz Band

8. AT&T, Boeing, EchoStar, SES, SpaceX, Telesat, TIA, and Viasat, support licensing of

¹³ *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, et al.*, Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd 8014, 8057, para. 105 (2016) (*R&O*).

¹⁴ *R&O*, 31 FCC Rcd at 8057, para. 105.

¹⁵ *R&O*, 31 FCC Rcd at 8059, para. 111.

¹⁶ *R&O*, 31 FCC Rcd at 8059, para. 111.

¹⁷ *R&O*, 31 FCC Rcd at 8059, 8062, paras. 111, 123. See also *Fourth R&O* at paras. 11-14.

¹⁸ *Third FNPRM*, 33 FCC Rcd at 5605, para. 74 citing *R&O*, 31 FCC Rcd at 8070-71, para. 149; 47 CFR § 30.205.

¹⁹ *Third FNPRM*, 33 FCC Rcd at 5605, para. 74 citing *R&O*, 31 FCC Rcd at 8070-71, para. 149; 47 CFR § 30.205.

²⁰ *Third FNPRM*, 33 FCC Rcd at 5605, para. 74.

²¹ When citing comments, we will use the short name of the commenter contained in Appendix C, followed by the words “Comments” or “Reply Comments.” Similarly, for *ex parte* filings, we will use the name of the commenter along with the date the *ex parte* was filed as listed in ECFS (this date may be different from the date on the actual *ex parte* letter).

²² This *Fifth Report and Order* will not resolve issues concerning the 26 GHz band, the Lower 37 GHz band, the 42 GHz band, or terrestrial use of the 50.4-52.6 GHz band. Those issues will be addressed in the future in this proceeding.

individual FSS earth stations in the 50.4-51.4 GHz band.²³ Although not specifically opposed to the idea of allowing earth stations to operate in the 50.4-51.4 GHz band, CTIA, Nokia, and T-Mobile argue that it is premature to adopt rules for sharing between terrestrial and FSS operations before UMFUS service rules are adopted. They urge the Commission to adopt UMFUS service rules either first or simultaneously.²⁴ In contrast, most satellite operators, asserting that there is no need to delay adopting FSS earth station sharing rules, point to workability in other bands, imminent plans for 50.4-51.4 GHz band satellite deployment, and the need to alleviate the current regulatory uncertainty, which the operators describe as debilitating, particularly given the high cost and long lead time involved in designing and building next-generation satellites.²⁵ EchoStar and Boeing further encourage the Commission not only to swiftly adopt the proposed rules, but also to proceed with processing pending earth station applications in this band conditioned upon the outcome of the proceeding.²⁶

9. With respect to the terms under which the 50.4-51.4 GHz band would be made available for individually licensed earth stations, there is a split between commenters who support using the same criteria applicable in the 24.75-25.25 GHz band and those who ask the Commission to adopt more permissive criteria. EchoStar, TIA, and AT&T support the criteria contained in the *Third FNPRM*, which would allow up to three earth station locations in a given county and a maximum of 15 earth station locations in a given Partial Economic Area (PEA).²⁷ AT&T, in addition, expressly opposes any relaxation in sharing criteria proposed in the *Third FNPRM*, asserting a lack of evidence and justification for disturbing the existing balance between services achieved by the rules introduced in other bands.²⁸ T-Mobile similarly cautions that the Commission should go no further than the current sharing framework adopted for the 24 GHz band, which it characterizes as a consistent approach across already allocated bands.²⁹ In contrast, Boeing, SES, SpaceX, and Telesat ask the Commission to adopt more permissive or flexible sharing criteria than the Commission proposed, and they assert that the shorter propagation distances of the 50.4-51.4 GHz band make it suitable for more robust sharing.³⁰ Similarly, Viasat supports individual licensing of earth stations in the 50.4-51.4 GHz band consistent with the more liberal sharing framework applicable in the 47.2-48.2 GHz band,³¹ and it further asks us to clarify that smaller earth stations may be permitted to operate in the 47.2-48.2 GHz and 50.4-51.4 GHz bands on a secondary

²³ AT&T Comments at 15-16; Boeing Comments at 2-6; EchoStar Comments at 5-6; SES Comments at 2; Telesat Reply Comments at 2-3; TIA Comments at 6-7; Viasat Comments at 2-4; SpaceX Comments at 1-6.

²⁴ CTIA Comments at 14; Nokia Comments at 4; T-Mobile Reply Comments at 9-12.

²⁵ SES Reply Comments at 6-7; Boeing Reply Comments at 1-5; Viasat Reply Comments at 2; Telesat Reply Comments at 3; EchoStar Comments at 1-7.

²⁶ EchoStar Comments at 1-7; Boeing Reply Comments at 4.

²⁷ EchoStar Comments at 6; TIA Comments at 6-7.

²⁸ AT&T Comments at 15-16.

²⁹ T-Mobile Comments at 20.

³⁰ For instance, SES recommends that the “Commission eliminate the population coverage limits in areas with lower population density and remove the restriction on covering interstate highways and passenger railroads, which will permit deployment of services consistent with the propagation characteristics of this higher band.” SES Comments at 2. See also Boeing Comments at 2-5 (“[T]he Commission might retain the restrictions on affected populations that are maintained in Section 25.136(d)(ii) of the rules, but refrain from imposing the arguably redundant restriction of three earth stations per county and 15 earth stations per PEA.”); SpaceX Comments at 7 (“the Commission should recognize the different circumstances here and adopt the previous proposal by satellite operators to permit the PFD Contour of FSS earth stations in a given county to cover: (1) 0.1% of the population of a county with more than 600,000 residents, (2) 600 residents in a county with between 6,000 and 600,000 residents, and (3) 10% of the population in a county with fewer than 6,000 residents.”); Telesat Reply Comments at 4-5 (supporting SES proposal, or, in the alternative, the SpaceX proposal).

³¹ Viasat Comments at 5.

basis with respect to terrestrial services.³² Other parties request that the Commission add an allocation for FSS in the 51.4-52.4 GHz band.³³ CCA contends that we should not adopt rules that could prejudice future mobile use.³⁴

10. We adopt our proposal to permit licensing of individual FSS earth stations in the 50.4-51.4 GHz band using the criteria we adopted for the 24.75-25.25 GHz band. This action will allow FSS operators to provide faster and more advanced services to their customers. Under those criteria, there may be no more than three earth stations in the 50.4-51.4 GHz band in a county and no more than 15 earth stations in any PEA. 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 dBm/m²/MHz, together with the similar area of any other earth station operating in the 50.4-51.4 GHz band in the same county, may not cover, in the aggregate, more than the amount of population specified below:

Population within the County where earth station is located	Maximum permitted aggregate population within -77.6 dBm/m²/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.

Furthermore, the area in which the earth station generates a PFD, at 10 meters above ground level, of greater than or equal to -77.6 dBm/m²/MHz may not contain any major event venue, urban mass transit route, passenger railroad, or cruise ship port. In addition, that area shall not cross any of the following types of roads, as defined in functional classification guidelines issued by the Federal Highway Administration: Interstate, Other Freeways and Expressways, or Other Principal Arterial.

11. Although the 50.4-52.6 GHz band remains under consideration for UMFUS licensing, establishing UMFUS service rules will require us to address issues concerning sharing with co-primary Federal services in the 50.4-52.6 GHz band, as well as protection of passive services in the adjacent 50.2-50.4 GHz and 52.6-54.25 GHz bands.³⁵ In the meantime, we note that a significant number of FSS operators seek to license space stations and earth stations in the band. 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), we find that, where an FSS allocation already exists in the 50.4-51.4 GHz band, a limited number of individually licensed FSS earth stations can share the 50.4-51.4 GHz band with minimal impact on terrestrial operations in this band. Both the 24 GHz and 50 GHz bands are satellite uplink bands. As in the 24 GHz band, the limits we will impose on FSS earth stations in the 50 GHz band will “better provide FSS with additional capacity for satellite services while permitting substantial terrestrial use of the band.”³⁶ Throughout this proceeding, the Commission has sought to promote spectrum efficiency by permitting spectrum made available for UMFUS to be shared with other allocated services when possible. We recognize there are a significant number of pending FSS earth station applications for the 50.4-51.4 GHz band. We agree that operators in this co-primary service seeking to proceed with system development need this degree of regulatory certainty and should not have to wait while the more complex issues associated with UMFUS licensing are addressed and resolved. Thus, we

³² Viasat Reply Comments at 4.

³³ Boeing Comments at 6; Viasat Comments at 5-6. In the *Third FNPRM* we noted that Boeing had petitioned for FSS access the 51.4-52.4 GHz band. We made clear however, that our proposal applied only to the 50.4-51.4 GHz band. *Third FNPRM*, 33 FCC Rcd at 5611-12, para. 94 & n.290.

³⁴ CCA Comments at 7.

³⁵ *FNPRM*, 31 FCC Rcd at 8158, para. 422.

³⁶ *Third R&O*, 33 FCC Rcd at 5585, para. 22.

adopt the proposed rules, which will facilitate sharing between FSS and UMFUS, while we continue to consider the rules for terrestrial operations in the band.

12. At this time, we will not adopt any of the various proposals for increased flexibility for FSS earth station licensing.³⁷ We recognize the differences in propagation characteristics between the 50 GHz band and lower frequency bands,³⁸ but we conclude that, prior to the adoption of UMFUS licensing rules, it would be premature to extend FSS earth station flexibility beyond the more conservative limits adopted in the 24.75-25.25 GHz band. Accordingly, we modify Section 25.136 of our rules to include the 50.4-51.4 GHz band, thereby applying the identical licensing criteria to these FSS earth stations as are applicable to those in the 24.75-25.25 GHz band. We also make a minor conforming modification to Section 25.130(b)(4) to include this newly modified rule section in the list of rule sections with which FSS transmitting earth station applicants must comply when seeking authorization in bands shared with UMFUS.³⁹ In addition, we amend footnote NG65 to the U.S. Table of Allocations as proposed to include the 50.4-51.4 GHz band, making clear the relative interference protection obligations between the co-primary services.

B. Federal Sites in 37-38.6 GHz

13. In response to the *Third FNPRM*, we have not received any record information on specific additional Federal sites in the Upper 37 GHz band beyond the 14 sites identified in Section 30.205 of the Commission's rules.⁴⁰ The Department of Defense has informed us, however, that it expects to deploy at additional sites in the future, and that the lower 37 GHz band (37.0–37.6 GHz) may not be sufficient. Because of our forthcoming plans to auction spectrum in this band before the end of the year and because failure to address possible coordination with Federal users could create uncertainty for potential non-Federal bidders in the auction for spectrum in the Upper 37 GHz band, we believe it critical to address the need for coordination here.

14. We recognize that 5G technology will support a wide variety of applications, including applications that can be used by Federal users. Although the Department previously identified 14 sites where licensees would be required to coordinate within a distance of 30 miles, the Department has since advised that there likely will be additional sites where it will need to use the band but these other locations cannot be specifically identified at this time. Unlike the 14 sites where non-Federal licensees must coordinate with the Department of Defense, the Department seeks to coordinate its use of these additional sites with non-Federal licensees.

15. Accordingly, we establish a process that accommodates the military's needs, while protecting the interests of non-Federal licensees in the Upper 37 GHz spectrum band. The Department may submit requests for access to the Upper 37 GHz band for specific additional military sites, such as military bases and ranges. Such requests would be made only when the proposed operations could not be accommodated in the Lower 37 GHz band. FCC staff would review the request to assess any potential impact on non-Federal licensees, contacting the potentially affected licensees and facilitating direct coordination with the Department. We believe this presents a viable process because: (1) military use, if it cannot be accommodated in the Lower 37 GHz band, will most likely be in remote areas; (2) such

³⁷ Nor do we address Viasat's request with regard to smaller earth station operation as this issue is beyond the scope of our proposal in the *Third FNPRM*.

³⁸ Radio signals in the 50 GHz band are more subject to attenuation from oxygen and water vapor than signals in the 24 GHz band. Thus, all other things being equal, radio signals in the 50 GHz band will not travel as far as signals in the 24 GHz band.

³⁹ We made a similar change to this rule in the *3rd R&O* to add the 24 GHz band. In the *Third FNPRM*, we proposed to adopt rules based on the rules adopted for the 24 GHz band. *Third FNPRM*, 33 FCC Rcd at 5611-12, para. 94.

⁴⁰ See 47 C.F.R. § 30.205.

requests are likely to be relatively rare, as we anticipate that most such operations can be accommodated in the Lower 37 GHz band;⁴¹ and (3) the technical characteristics of operations in this region of the spectrum, marked by high path losses and use of advanced antennas and adaptive power control, can minimize any significant impact on licensees' operations. We find that this strikes a reasonable balance among the stakeholders.

16. We recognize the concerns of commenters that increasing the number of Federal sites in the Upper 37 GHz band would negatively affect an auction of the Upper 37 GHz band and the value of the spectrum.⁴² We nonetheless find that the process we adopt here addresses the need for certainty for bidders in an auction, especially given the technical characteristics and expected deployments in the Upper 37 GHz band. For example, Ericsson suggests that, if the Commission decides to accommodate additional Federal use in the Upper 37 GHz band, it should establish a process that would permit Federal entities to identify a limited number of additional sites on an as-needed basis and coordinate those facilities with pre-existing non-Federal operations, but that non-Federal users would be under no obligation to agree to coordination requests that would carry a significant risk of harmful interference.⁴³ Similarly, T-Mobile suggests that potential future Federal operations in the Upper 37 GHz band could be coordinated between the non-Federal licensee and the relevant Federal agency.⁴⁴ That is precisely what we are doing here—establishing a process that protects bidders from harmful interference while enabling the Department of Defense to carry out operations in the Upper 37 GHz band for specific additional military sites on a limited basis.

17. Finally, we note that the coordinates for the Socorro and White Sands coordination zones contained in Tables 2 and 3 of Section 30.205(a) of the Commission's Rules were not correctly published in the *Federal Register*,⁴⁵ and as such were inconsistent with the coordinates adopted by the Commission in the *R&O*. This decision in the *R&O* was subject to prior notice and comment. We amend Tables 2 and 3 of Section 30.205(a) to correct the coordinates to the coordinates contained in the *R&O*. To the extent necessary, we observe that we forego an additional notice-and-comment period as "impracticable, unnecessary, or contrary to the public interest."⁴⁶

IV. PROCEDURAL MATTERS

18. *Final Regulatory Flexibility Analysis.* The Regulatory Flexibility Act (RFA)⁴⁷ requires that an agency prepare a regulatory flexibility analysis for notice and comment rulemakings, unless the agency certifies that "the rule will not, if promulgated, have a significant economic impact on a substantial number of small entities."⁴⁸ Accordingly, we have prepared a Final Regulatory Flexibility Analysis concerning the possible impact of the rule changes contained in this *Fifth Report and Order* on small entities. The Final Regulatory Flexibility Analysis is set forth in Appendix B.

19. *Paperwork Reduction Act.* The requirements in revised section 25.136 (e), (f), and (g) constitute new or modified collections subject to the Paperwork Reduction Act of 1995 (PRA), Public

⁴¹ We are continuing discussions with the Department of Defense on how to effectuate usage of the Lower 37 GHz band, and we intend to take steps towards specifying rules for sharing the band within three months, including exploring whether giving priority access to military use of the 37.0-37.2 GHz band would facilitate usage of the Lower 37 GHz band.

⁴² AT&T Comments at 10-11; CTIA Comments at 14-16; T-Mobile Comments at 15-16; Ericsson Comments at 13.

⁴³ Ericsson Comments at 13.

⁴⁴ T-Mobile Comments at 15-16.

⁴⁵ 47 CFR § 30.205(a), Tables 2 and 3.

⁴⁶ 5 U.S.C. § 553(b)(3)(B).

⁴⁷ See 5 U.S.C. § 601-612. The RFA has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), Pub. L. No. 104-121, Title II, 110 Stat. 857 (1996).

⁴⁸ 5 U.S.C. § 605(b).

Law 104-13. They will be submitted to the Office of Management and Budget (OMB) for review under section 3507(d) of the PRA. OMB, the general public, and other Federal agencies are invited to comment on the new information collection requirements contained in this proceeding. This document will be submitted to OMB for review under section 3507(d) of the PRA. In addition, we note that, pursuant to the Small Business Paperwork Relief Act of 2002, we previously sought, but did not receive, specific comment on how the Commission might further reduce the information collection burden for small business concerns with fewer than 25 employees. We describe impacts that might affect small businesses, which includes more businesses with fewer than 25 employees, in the Final Regulatory Flexibility Analysis in Appendix B.

20. In this present document, we have assessed the effects of our filing requirements on satellite providers and find that these requirements will not impose undue burdens on businesses with fewer than 25 employees. The filing requirements we are imposing are necessary to ensure that the proposed operations will comply with the technical rules we have established and not unduly preclude possible future terrestrial operation in the band.

21. *Further Information.* For further information, contact John Schauble of the Wireless Telecommunications Bureau, Broadband Division, at 202-418-0797 or 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, or Jose Albuquerque of the International Bureau, Satellite Division, at 202-418-2288 or Jose.Albuquerque@fcc.gov.

V. ORDERING CLAUSES

22. Accordingly, IT IS ORDERED, pursuant to 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 Section 1.411 of the Commission's Rules, 47 CFR § 1.411, that this *Fifth Report and Order* IS HEREBY ADOPTED.

23. IT IS FURTHER ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, SHALL SEND a copy of this *Fifth Report and Order*, including the Final Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration.

24. IT IS FURTHER ORDERED that the amendments of the Commission's rules as set forth in Appendix A ARE ADOPTED, effective thirty days from the date of publication in the Federal Register. Section 25.136, paragraphs (e), (f), and (g) contain new or modified information collection requirements that require review by OMB under the PRA. The Commission directs the Bureau to announce the compliance date for those information collections in a document published in the Federal Register after OMB approval and directs the Bureau to cause section 25.136(h) to be revised accordingly.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary

APPENDIX A**Final Rules**

For the reasons discussed in the preamble, the Federal Communications Commission amends 47 CFR parts 2, 25, and 30 as follows:

RULES AND REGULATIONS

1. The authority citation for part 2 continues to read as follows:

[INSERT CURRENT AUTHORITY CITATION]

2. In § 2.106, the Table of Frequency Allocations is amended as follows:
 - a. Revise page 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:

* * * * *

Federal Communications Commission

FCC-CIRC1904-02

<p>50.4-51.4 FIXED FIXED-SATELLITE (Earth-to-space) 5.338A MOBILE Mobile-satellite (Earth-to-space)</p>	<p>50.4-51.4 FIXED FIXED-SATELLITE (Earth-to-space) US156 MOBILE MOBILE-SATELLITE (Earth-to-space) G117</p>	<p>50.4-51.4 FIXED FIXED-SATELLITE (Earth-to-space) US156 MOBILE MOBILE-SATELLITE (Earth-to-space) NG65</p>	<p>Satellite Communications (25)</p>
<p>51.4-52.6 FIXED 5.338A MOBILE</p>	<p>51.4-52.6 FIXED US157 MOBILE</p>		
<p>5.547 5.556 52.6-54.25 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive)</p>	<p>52.6-54.25 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) US246</p>		
<p>5.340 5.556 54.25-55.78 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.556A SPACE RESEARCH (passive)</p>	<p>54.25-55.78 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.556A SPACE RESEARCH (passive)</p>		<p>Satellite Communications (25)</p>
<p>5.556B 55.78-56.9 EARTH EXPLORATION-SATELLITE (passive) FIXED 5.557A INTER-SATELLITE 5.556A MOBILE 5.558 SPACE RESEARCH (passive)</p>	<p>55.78-56.9 EARTH EXPLORATION-SATELLITE (passive) FIXED US379 INTER-SATELLITE 5.556A MOBILE 5.558 SPACE RESEARCH (passive) US353 US532</p>		
<p>5.547 5.557 56.9-57 EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.558A MOBILE 5.558 SPACE RESEARCH (passive)</p>	<p>56.9-57 EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE G128 MOBILE 5.558 SPACE RESEARCH (passive) US532</p>	<p>56.9-57 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE 5.558 SPACE RESEARCH (passive) US532</p>	
<p>5.547 5.557 57-58.2 EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.556A MOBILE 5.558 SPACE RESEARCH (passive)</p>	<p>57-58.2 EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.556A MOBILE 5.558 SPACE RESEARCH (passive) US532</p>		<p>RF Devices (15) Satellite Communications (25)</p>
<p>58.2-59 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive)</p>	<p>58.2-59 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) US353 US354</p>		<p>RF Devices (15)</p>

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 Upper Microwave Flexible Use Service 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 Upper Microwave Flexible Use Service and Fixed-Satellite Service, including aggregate interference to satellite receivers, if appropriate.

* * * * *

PART 25 – SATELLITE COMMUNICATIONS

3. The authority citation for part 25 is revised to read as follows:

[INSERT CURRENT AUTHORITY CITATION]

4. Amend § 25.130 by revising paragraph (b)(4) to read as follows:

§ 25.130 Filing requirements for transmitting earth stations.

* * * * *

(b) * * *

(4) Applicants for earth stations licensed in accordance with §25.136 must demonstrate that the transmitting earth stations will meet the relevant criteria specified in that section, including any showings required under §25.136(a)(4), (c), (d)(4), and/or (e)(4).

* * * * *

5. Amend § 25.136 by revising the section heading and paragraphs (e), (f), and (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.

* * * * *

(e) 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 of 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 (e)(1), (e)(2), (e)(3), or (e)(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 (e)(1), (e)(2), (e)(3), or (e)(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 (e)(4)(ii)

Population within the County where earth station is located	Maximum permitted aggregate population within -77.6 dBm/m ² /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.

(iii) The area in which the earth station generates a PFD, at 10 meters above ground level, of greater than or equal to -77.6 dBm/m²/MHz does not contain any major event venue, urban mass transit route, passenger railroad, or cruise ship port. In addition, the area mentioned in paragraph (e)(4)(ii) of this section shall not cross any of the following types of roads, as defined in functional classification guidelines issued by the Federal Highway Administration pursuant to 23 CFR 470.105(b): Interstate, Other Freeways and Expressways, or Other Principal Arterial. The Federal Highway Administration Office of Planning, Environment, and Realty Executive Geographic Information System (HEPGIS) map contains information on the classification of roads. For purposes of this rule, an urban area shall be an Adjusted Urban Area as defined in section 101(a)(37) of Title 21 of the United States Code.

(iv) The applicant has successfully completed frequency coordination with the UMFUS licensees within the area in which the earth station generates a PFD, at 10 meters above ground level, of greater than or equal to -77.6 dBm/m²/MHz with respect to existing facilities constructed and in operation by the UMFUS licensee. In coordinating with UMFUS licensees, the applicant shall use the applicable processes contained in §101.103(d) of this chapter.

(f) 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.

(g) Any earth station authorizations issued pursuant to paragraph (a)(4), (c), (d)(4), or (e)(4) of this section shall be conditioned upon operation being in compliance with the criteria contained in the applicable paragraph.

(h) Compliance date. Paragraphs (e), (f), and (g) of this section contain new or modified information-collection and recordkeeping requirements adopted in FCC 19-XX. Compliance with these information-collection and recordkeeping requirements will not be required until after approval by the Office of Management and Budget. The Commission will publish a document in the Federal Register announcing that compliance date and revising this paragraph accordingly.

* * * * *

PART 30 – UPPER MICROWAVE FLEXIBLE USE SERVICE

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

[INSERT CURRENT AUTHORITY CITATION]

6. Amend § 30.205 by revising paragraph (a) Tables 2 and 3 to read as follows:

§ 30.205 Federal coordination requirements.

(a) ***

Table 2: Socorro, New Mexico Coordination Zone

60 dBm/100 MHz EIRP		75 dBm/100 MHz EIRP
Latitude/Longitude (decimal degrees)	Latitude/Longitude (decimal degrees)	Latitude/Longitude (decimal degrees)
34.83816/-107.66828	33.44401/-108.67876	33.10651/-108.19320
34.80070/-107.68759	33.57963/-107.79895	33.11780/-107.99980
34.56506/-107.70233	33.84552/-107.60207	33.13558/-107.85611
34.40826/-107.71489	33.85964/-107.51915	33.80383/-107.16520
34.31013/-107.88349	33.86479/-107.17223	33.94554/-107.15516
34.24067/-107.96059	33.94779/-107.15038	33.95665/-107.15480
34.10278/-108.23166	34.11122/-107.18132	34.08156/-107.18137
34.07442/-108.30646	34.15203/-107.39035	34.10646/-107.18938
34.01447/-108.31694	34.29643/-107.51071	35.24269/-107.67969
33.86740/-108.48706	34.83816/-107.66828	34.06647/-108.70438
33.81660/-108.51052		33.35946/-108.68902

33.67909/-108.58750		33.29430/-108.65004
33.50223/-108.65470		33.10651/-108.19320

Table 3: White Sands, New Mexico Coordination Zone

60 dBm/100 MHz EIRP		75 dBm/100 MHz EIRP	
Latitude/Longitude (decimal degrees)	Latitude/Longitude (decimal degrees)	Latitude/Longitude (decimal degrees)	Latitude/Longitude (decimal degrees)
33.98689/-107.15967	31.78455/-106.54058	31.7494/-106.49132	32.88382/-108.16588
33.91573/-107.46301	32.24710/-106.56114	32.24524/-106.56507	32.76255/-108.05679
33.73122/-107.73585	32.67731/-106.53681	32.67731/-106.53681	32.56863/-108.43999
33.37098/-107.84333	32.89856/-106.56882	32.89856/-106.56882	32.48991/-108.50032
33.25424/-107.86409	33.24323/-106.70094	33.04880/-106.62309	32.39142/-108.48959
33.19808/-107.89673	33.98689/-107.15967	33.21824/-106.68992	31.63664/-108.40480
33.02128/-107.87226		33.24347/-106.70165	31.63466/-108.20921
32.47747/-107.77963		34.00708/-107.08652	31.78374/-108.20798
32.31543/-108.16101		34.04967/-107.17524	31.78322/-106.52825
31.79429/-107.88616		33.83491/-107.85971	31.7494/-106.49132

* * * * *

APPENDIX B

Final Regulatory Flexibility Analysis

1. As required by the Regulatory Flexibility Act of 1980, as amended (RFA),¹ an Initial Regulatory Flexibility Analysis (IRFA) was incorporated in the *Third Further Notice of Proposed Rulemaking (Third FNPRM)* released in June 2018 in this proceeding.² The Commission sought written public comment on the proposals in the *3rd FNPRM*, including comments on the IRFA. No comments were filed addressing the IRFA. This present Final Regulatory Flexibility Analysis (FRFA) conforms to the RFA.³

A. Need for, and Objectives of, the Fifth Report and Order

2. In the attached *Fifth Report and Order*, the Commission authorizes Fixed-Satellite Service (FSS) use of the 50.4-51.4 GHz band for individually licensed earth stations, which will allow FSS operators to provide additional capacity that can be used to provide faster and more advanced services to their customers. In authorizing FSS use of the 50.4-51.4 GHz band for individually licensed earth stations, we will apply the licensing criteria we adopted for the 24.75-25.25 GHz band. Accordingly, in the *Fifth Report and Order* we modify Section 25.136 of our rules to include the 50.4-51.4 GHz band and make a minor conforming modification to Section 25.130(b)(4) to include this newly modified rule section in the list of rules sections that FSS transmitting earth station applicants must comply with when seeking authorization in bands shared with UMFUS. Additionally, we amend footnote NG65 to the U.S. Table of Allocations as proposed to include the 50.4-51.4 GHz band, making clear the relative interference protection obligations between the co-primary services.

3. With regard to Federal use in the 37 GHz band, the Commission establishes a process that accommodates the military's needs, while protecting the interests of non-Federal licensees in the Upper 37 GHz spectrum band. The Department of Defense may submit requests for access to the Upper 37 GHz band for specific additional military sites, such as military bases and ranges. Such requests would be made only when the proposed operations could not be accommodated in the Lower 37 GHz band. Commission staff would review the request to assess any potential impact on non-Federal licensees, contacting the potentially affected licensees and facilitating direct coordination with the Department. This action will accommodate military needs while providing certainty to potential applicants as we begin the auction process for the Upper 37 GHz band, the 39 GHz band (38.6-40 GHz band), and the 47 GHz band (47.2-48.2 GHz) later this year.⁴

B. Summary of Significant Issues raised by Public Comments in Response to the IRFA

4. There were no comments filed that specifically addressed the proposed rules and policies presented in the IRFA.

C. Response to Comments by the Chief Counsel for Advocacy of the Small Business

¹ See 5 U.S.C. § 603. The RFA, 5 U.S.C. §§ 601-612, has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996, (SBREFA) Pub. L. No. 104-121, Title II, 110 Stat. 857 (1996).

² See *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, et al.*, Third Report and Order, Memorandum Opinion and Order, and Third Further Notice of Proposed Rulemaking, FCC 18-73 (rel. June 8, 2018).

³ See 5 U.S.C. § 604.

⁴ *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, et al.*, Fourth Report and Order, FCC 18-180 (rel. Dec. 12, 2018) (*Spectrum Frontiers Fourth R&O*).

Administration

5. Pursuant to the Small Business Jobs Act of 2010, which amended the RFA, the Commission is required to respond to any comments filed by the Chief Counsel for Advocacy of the Small Business Administration (SBA), and to provide a detailed statement of any change made to the proposed rules as a result of those comments.⁵

6. The Chief Counsel did not file any comments in response to the proposed rules in this proceeding.

D. Description and Estimate of the Number of Small Entities To Which the Proposed Rules Will Apply

7. The RFA requires the Commission to describe and to estimate the number of small entities that may be affected by the rules adopted herein.⁶ The RFA generally defines the term “small entity” as having the same meaning as the terms “small business,” “small organization,” and “small governmental jurisdiction.”⁷ In addition, the term “small business” has the same meaning as the term “small business concern” under the Small Business Act.⁸ A “small business concern” is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the SBA.⁹

8. *Small Businesses, Small Organizations, Small Governmental Jurisdictions.* Our actions, over time, may affect small entities that are not easily categorized at present. We therefore describe here, at the outset, three broad groups of small entities that could be directly affected herein.¹⁰ 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.¹¹ These types of small businesses represent 99.9% of all businesses in the United States which translates to 28.8 million businesses.¹²

9. Next, the type of small entity described as a “small organization” is generally “any not-for-profit enterprise which is independently owned and operated and is not dominant in its field.”¹³ 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).¹⁴

⁵ 5 U.S.C. § 604(a)(3).

⁶ *Id.*

⁷ 5 U.S.C. § 601(6).

⁸ 5 U.S.C. § 601(3) (incorporating by reference the definition of “small-business concern” in the Small Business Act, 15 U.S.C. § 632). Pursuant to 5 U.S.C. § 601(3), the statutory definition of a small business applies “unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register.”

⁹ 15 U.S.C. § 632.

¹⁰ *See* 5 U.S.C. § 601(3)-(6).

¹¹ *See* SBA, Office of Advocacy, “Frequently Asked Questions, Question 1 – What is a small business?” https://www.sba.gov/sites/default/files/advocacy/SB-FAQ-2016_WEB.pdf (June 2016)

¹² *See* SBA, Office of Advocacy, “Frequently Asked Questions, Question 2- How many small businesses are there in the U.S.?” https://www.sba.gov/sites/default/files/advocacy/SB-FAQ-2016_WEB.pdf (June 2016).

¹³ 5 U.S.C. § 601(4).

¹⁴ Data from the Urban Institute, National Center for Charitable Statistics (NCCS) reporting on nonprofit organizations registered with the IRS was used to estimate the number of small organizations. Reports generated using the NCCS online database indicated that as of August 2016 there were 356,494 registered nonprofits with total

(continued...)

10. 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.”¹⁵ U.S. Census Bureau data from the 2012 Census of Governments¹⁶ indicate that there were 90,056 local governmental jurisdictions consisting of general purpose governments and special purpose governments in the United States.¹⁷ Of this number there were 37, 132 General purpose governments (county¹⁸, municipal and town or township¹⁹) with populations of less than 50,000 and 12,184 Special purpose governments (independent school districts²⁰ and special districts²¹) 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 50,000.²² Based on this data we estimate that at least 49,316 local government

revenues of less than \$100,000. Of this number, 326,897 entities filed tax returns with 65,113 registered nonprofits reporting total revenues of \$50,000 or less on the IRS Form 990-N for Small Exempt Organizations and 261,784 nonprofits reporting total revenues of \$100,000 or less on some other version of the IRS Form 990 within 24 months of the August 2016 data release date. See <http://nccs.urban.org/sites/all/nccs-archive/html//tablewiz/tw.php> where the report showing this data can be generated by selecting the following data fields: Report: “The Number and Finances of All Registered 501(c) Nonprofits”; Show: “Registered Nonprofits”; By: “Total Revenue Level (years 1995, Aug to 2016, Aug)”; and For: “2016, Aug” then selecting “Show Results”.

¹⁵ 5 U.S.C. § 601(5).

¹⁶ See 13 U.S.C. § 161. The Census of Government is conducted every five (5) years compiling data for years ending with “2” and “7”. See also Program Description Census of Government <https://factfinder.census.gov/faces/affhelp/jsf/pages/metadata.xhtml?lang=en&type=program&id=program.en.CO G#>.

¹⁷ See U.S. Census Bureau, 2012 Census of Governments, Local Governments by Type and State: 2012 - United States-States. <https://factfinder.census.gov/bkmk/table/1.0/en/COG/2012/ORG02.US01>. Local governmental jurisdictions are classified in two categories - General purpose governments (county, municipal and town or township) and Special purpose governments (special districts and independent school districts).

¹⁸ See U.S. Census Bureau, 2012 Census of Governments, County Governments by Population-Size Group and State: 2012 - United States-States. <https://factfinder.census.gov/bkmk/table/1.0/en/COG/2012/ORG06.US01>. There were 2,114 county governments with populations less than 50,000.

¹⁹ See U.S. Census Bureau, 2012 Census of Governments, Subcounty General-Purpose Governments by Population-Size Group and State: 2012 - United States – States. <https://factfinder.census.gov/bkmk/table/1.0/en/COG/2012/ORG07.US01>. There were 18,811 municipal and 16,207 town and township governments with populations less than 50,000.

²⁰ See U.S. Census Bureau, 2012 Census of Governments, Elementary and Secondary School Systems by Enrollment-Size Group and State: 2012 - United States-States. <https://factfinder.census.gov/bkmk/table/1.0/en/COG/2012/ORG11.US01>. There were 12,184 independent school districts with enrollment populations less than 50,000.

²¹ See U.S. Census Bureau, 2012 Census of Governments, Special District Governments by Function and State: 2012 - United States-States. <https://factfinder.census.gov/bkmk/table/1.0/en/COG/2012/ORG09.US01>. [The U.S. Census Bureau data did not provide a population breakout for special district governments.](#)

²² See U.S. Census Bureau, 2012 Census of Governments, County Governments by Population-Size Group and State: 2012 - United States-States - <https://factfinder.census.gov/bkmk/table/1.0/en/COG/2012/ORG06.US01>; Subcounty General-Purpose Governments by Population-Size Group and State: 2012 - United States–States - <https://factfinder.census.gov/bkmk/table/1.0/en/COG/2012/ORG07.US01>; and Elementary and Secondary School Systems by Enrollment-Size Group and State: 2012 - United States-States. <https://factfinder.census.gov/bkmk/table/1.0/en/COG/2012/ORG11.US01>. [While U.S. Census Bureau data did not provide a population breakout for special district governments, if the population of less than 50,000 for this category of local government is consistent with the other types of local governments the majority of the 38, 266 special district governments have populations of less than 50,000.](#)

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jurisdictions fall in the category of “small governmental jurisdictions.”²³

11. *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.²⁴ The appropriate size standard under SBA rules is that such a business is small if it has 1,500 or fewer employees.²⁵ For this industry, U.S. Census Bureau data for 2012 show that there were 967 firms that operated for the entire year.²⁶ Of this total, 955 firms had employment of 999 or fewer employees and 12 had employment of 1,000 employees or more.²⁷ Thus under this category and the associated size standard, the Commission estimates that the majority of wireless telecommunications carriers (except satellite) are small entities.

12. *Fixed Microwave Services*. Microwave services include common carrier,²⁸ private-operational fixed,²⁹ and broadcast auxiliary radio services.³⁰ They also include the Upper Microwave Flexible Use Service,³¹ the Millimeter Wave Service,³² Local Multipoint Distribution Service (LMDS),³³ the Digital Electronic Message Service (DEMS),³⁴ and the 24 GHz Service,³⁵ where licensees can choose between common carrier and non-common carrier status.³⁶ 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.³⁷ The

²³ *Id.*

²⁴ NAICS Code 517210. See <https://factfinder.census.gov/faces/affhelp/jsf/pages/metadata.xhtml?lang=en&type=ib&id=ib.en/ECN.NAICS2012.517210>.

²⁵ 13 CFR § 121.201, NAICS code 517210.

²⁶ U.S. Census Bureau, *2012 Economic Census of the United States*, Table EC1251SSSZ5, Information: Subject Series: Estab and Firm Size: Employment Size of Firms for the U.S.: 2012 NAICS Code 517210 (rel. Jan. 8, 2016). https://factfinder.census.gov/bkmk/table/1.0/en/ECN/2012_US/51SSSZ5//naics~517210.

²⁷ *Id.* Available census data does not provide a more precise estimate of the number of firms that have employment of 1,500 or fewer employees; the largest category provided is for firms with “1000 employees or more.”

²⁸ See 47 CFR Part 10, Subpart I.

²⁹ Persons eligible under Parts 80 and 90 of the Commission’s rules can use Private-Operational Fixed Microwave services. See 47 CFR Parts 80 and 90. Stations in this service are called operational-fixed to distinguish them from common carrier and public fixed stations. Only the licensee may use the operational-fixed station, and only for communications related to the licensee’s commercial, industrial, or safety operations.

³⁰ Auxiliary Microwave Service is governed by Part 74 and Part 78 of Title 47 of the Commission’s rules. Available to licensees of broadcast stations, cable operators, and to broadcast and cable network entities. Auxiliary microwave stations are used for relaying broadcast television signals from the studio to the transmitter, or between two points such as a main studio and an auxiliary studio. The service also includes TV pickup and CARS pickup, which relay signals from a remote location back to the studio.

³¹ See 47 CFR Part 30.

³² See 47 CFR Part 101, Subpart Q.

³³ See 47 CFR Part 101, Subpart L.

³⁴ See 47 CFR Part 101, Subpart G.

³⁵ See *id.*

³⁶ See 47 CFR §§ 30.6, 101.1017.

³⁷ These statistics are based on a review of the Universal Licensing System on September 22, 2015.

(continued...)

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.³⁸ 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.³⁹ Thus under this SBA category and the associated standard, the Commission estimates that the majority of fixed microwave service licensees can be considered small.

13. 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. We note, however, that both the common carrier microwave fixed and the private operational microwave fixed licensee categories includes some large entities.

14. *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."⁴⁰ 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.⁴¹ 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.⁴² Of this total, 299 firms had annual receipts of less than \$25 million.⁴³ Consequently, we estimate that the majority of satellite telecommunications providers are small entities.

15. *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.⁴⁴ 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.⁴⁵ Establishments providing Internet services or voice over Internet protocol (VoIP) services via client-supplied telecommunications connections are also

³⁸ 13 CFR § 121.201, NAICS code 517210.

³⁹ *Id.* Available census data do not provide a more precise estimate of the number of firms that have employment of 1,500 or fewer employees; the largest category provided is for firms with "1000 employees or more."

⁴⁰ U.S. Census Bureau, 2012 NAICS Definitions, "517410 Satellite Telecommunications", <https://factfinder.census.gov/faces/affhelp/jsf/pages/metadata.xhtml?lang=en&type=ib&id=ib.en/ECN.NAICS2012.517410#>.

⁴¹ 13 CFR § 121.201, NAICS code 517410.

⁴² U.S. Census Bureau, 2012 *Economic Census of the United States*, Table EC1251SSSZ4, Information: Subject Series - Estab and Firm Size: Receipts Size of Firms for the United States: 2012, NAICS code 517410 https://factfinder.census.gov/bkmk/table/1.0/en/ECN/2012_US/51SSSZ4/naics~517410.

⁴³ *Id.*

⁴⁴ See U.S. Census Bureau, 2012 NAICS Definitions, NAICS Code "517919 All Other Telecommunications", <https://factfinder.census.gov/faces/affhelp/jsf/pages/metadata.xhtml?lang=en&type=ib&id=ib.en/ECN.NAICS2012.517919#>.

⁴⁵ *Id.*

included in this industry.”⁴⁶ 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.⁴⁷ 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.⁴⁸ 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, 999,999.⁴⁹ Thus, the Commission estimates that a majority of “All Other Telecommunications” firms potentially affected by our actions can be considered small.

16. *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.⁵⁰ 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.”⁵¹ The SBA has established a size standard for this industry of 1,250 employees or less.⁵² U.S. Census Bureau data for 2012 shows that 841 establishments operated in this industry in that year.⁵³ 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.⁵⁴ Based on this data, we conclude that a majority of manufacturers in this industry is small.

E. Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements

17. We expect the rules adopted in the *Fifth Report and Order* will impose new or additional reporting or recordkeeping and/or other compliance obligations on small entities as well as other applicants and licensees. FSS earth station applicants and licensees in the 50.4-51.4 GHz band will be subject to the reporting, recordkeeping, and compliance requirements applicable in the 24.75-25.25 GHz band.⁵⁵ When they submit applications for authority to operate earth stations in the 50.4-51.4 GHz band,

⁴⁶ *Id.*

⁴⁷ 13 CFR 121.201; NAICS Code 517919.

⁴⁸ U.S. Census Bureau, *2012 Economic Census of the United States*, Table EC1251SSSZ4, Information: Subject Series - Estab and Firm Size: Receipts Size of Firms for the United States: 2012, NAICS code 517919, https://factfinder.census.gov/bkmk/table/1.0/en/ECN/2012_US/51SSSZ4//naics~517919.

⁴⁹ *Id.*

⁵⁰ The NAICS Code for this service is 334220. 13 C.F.R 121.201. *See also* U.S. Census Bureau, 2012 NAICS Definitions, “334220 Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing” <https://factfinder.census.gov/faces/affhelp/jsf/pages/metadata.xhtml?lang=en&type=ib&id=ib.en./ECN.NAICS2012.334220#>.

⁵¹ *See* U.S. Census Bureau, 2012 NAICS Definitions, NAICS Code 334220, available at <https://factfinder.census.gov/faces/affhelp/jsf/pages/metadata.xhtml?lang=en&type=ib&id=ib.en./ECN.NAICS2012.334220#>.

⁵² 13 CFR § 121.201, NAICS Code 334220.

⁵³ U.S. Census Bureau, *2012 Economic Census of the United States*, Table EC1231SG2, Manufacturing: Summary Series: General Summary: Industry Statistics for Subsectors and Industries by Employment Size: 2012 NAICS Code 334220, https://factfinder.census.gov/bkmk/table/1.0/en/ECN/2012_US/31SG2//naics~334220.

⁵⁴ *Id.*

⁵⁵ Applicants for earth stations in the 50.4-51.4 GHz band must demonstrate that they comply with limits on the number of earth stations in a given county and Partial Economic Area. In addition, there are limits on the aggregate area in which the earth station, together with the similar area of any other earth station operating in the 50.4-51.4 GHz band in the same county, generate a power flux density (PFD), at 10 meters above ground level, of greater than

(continued...)

they will be required to demonstrate that the proposed earth stations comply with technical criteria designed to ensure that the earth stations would not unduly limit possible future terrestrial service. These demands are necessary to ensure that the proposed operations will comply with the technical rules, and not unduly preclude possible future terrestrial operation in the band and will require small businesses as well as other entities that intend to offer such satellite telecommunications services to use professional, accounting, engineering or survey services in order to meet these requirements. To attain consistency with the existing application of our rules, the reporting, recordkeeping, and other compliance requirements resulting from our actions in the *Fifth Report and Order* will apply to all entities in the same manner.

F. Steps Taken to Minimize the Significant Economic Impact on Small Entities, and Significant Alternatives Considered

18. The RFA requires an agency to describe any significant, specifically small business, alternatives that it has considered in reaching its 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 or reporting requirements under the rule for 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 small entities.⁵⁶

19. Rather than creating a new framework for the licensing of FSS earth stations in the 50.4-51.4 GHz band, the Commission chose to apply the identical licensing criteria applicable to the 24.75-25.25 GHz band and adopt existing rule sections that FSS transmitting earth station applicants must comply with when seeking authorization in bands shared with UMFUS. These steps will minimize the significant economic impact on small entities by not increasing the cost of compliance with an entirely new set of rules and regulations. Moreover, to the extent an entity is already licensed and operating the 24.75-25.25 GHz band, they may have the processes and procedures and infrastructure in place to facilitate compliance with our rules, and therefore may only incur minimal incremental costs to comply with the rules adopted for the 50.4-51.4 GHz band.

20. With respect to military access to the Upper 37 GHz band, the process established by the Commission protects bidders from harmful interference while enabling the Department of Defense to carry out operations in the Upper 37 GHz band for specific additional military sites on a limited basis. Commission staff will work with affected licensees to would review the request to assess any potential impact on non-Federal licensees and facilitate direct coordination with the Department. Commission staff would review a Department request to assess any potential impact on non-Federal licensees, contacting the potentially affected licensees and facilitating direct coordination with the Department.

Report to Congress

21. The Commission will send a copy of the *Fifth Report and Order*, including this FRFA, in a report to Congress pursuant to the Congressional Review Act.⁵⁷ In addition, the Commission will send a copy of the *Fifth Report and Order*, including this FRFA, to the Chief Counsel for Advocacy of the SBA. A copy of the *Fifth Report and Order*, and FRFA (or summaries thereof) will also be published in the Federal Register.⁵⁸

or equal to -77.6 dBm/m²/MHz. Furthermore, the area in which the earth station generates a PFD, at 10 meters above ground level, of greater than or equal to -77.6 dBm/m²/MHz may not contain any major event venue, urban mass transit route, passenger railroad, or cruise ship port. In addition, that area shall not cross any of the following types of roads, as defined in functional classification guidelines issued by the Federal Highway Administration: Interstate, Other Freeways and Expressways, or Other Principal Arterial.

⁵⁶ 5 U.S.C. § 603(c)(1)-(4).

⁵⁷ See 5 U.S.C. § 801(a)(1)(A).

⁵⁸ See 5 U.S.C. § 604(b).

APPENDIX C

List of Commenters to *Third FNPRM***Comments**

5G Americas
AT&T Services Inc. (AT&T)
The Boeing Company (Boeing)
Competitive Carriers Association (CCA)
The National Academy of Sciences, through its Committee on Radio Frequencies (CORF)
CTIA
Dynamic Spectrum Alliance (DSA)
EchoStar Satellite Operating Corporation and Hughes Network Systems, LLC (EchoStar)
Elefante Group, Inc. (Elefante)
Ericsson
Federated Wireless, Inc. (Federated Wireless)
Intel Corporation and Cisco Systems, Inc. (Intel/Cisco)
Open Technology Institute at New America (New America)
Nokia
Petri Mähönen, Ljiljana Simić and Pierre de Vries (de Vries)
Qualcomm Incorporated (Qualcomm)
Samsung Electronics America (Samsung)
SES Americom, Inc. and its affiliate O3b Limited (SES)
Space Exploration Technologies Corp. (SpaceX)
Starry, Inc. (Starry)
Telecommunications Industry Association (TIA)
T-Mobile USA, Inc. (T-Mobile)
United States Cellular Corporation (U.S. Cellular)
Viasat, Inc. (Viasat)
Wireless Internet Service Providers Association (WISPA)

Reply Comments

AT&T
Boeing
CTIA
DSA
EchoStar
Elefante
Enterprise Wireless Association (EWA)
Federated Wireless
Intel/Cisco
SES
SpaceX
Starry
Telesat Canada (Telesat)
TIA
T-Mobile
U.S. Cellular
Viasat

Ex Parte Comments Relating to Issues Resolved in *Fifth Report and Order*