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FEDERAL COMMUNICATIONS COMMISSION

47 CFR Part 0

[WT Docket No. 23-158; GN Docket No. 14-177; FCC 23-51; FR ID 157853]

Shared Use of the 42-42.5 GHz Band

AGENCY: Federal Communications Commission.

ACTION: Proposed rule; solicitation of comment.

SUMMARY: In this document, the Federal Communications Commission (Commission or FCC) seeks comment on how innovative, non-exclusive spectrum access models might be deployed in the 42 GHz band (42-42.5 GHz) to provide increased access to high-band spectrum, particularly by smaller wireless service providers, and to support efficient, intensive use of the band. The Commission also seeks comment on how potential sharing and licensing regimes might lower barriers to entry for smaller or emerging wireless service providers, encourage competition, and prevent spectrum warehousing.

DATES: Comments are due on or before **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**; reply comments are due on or before **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. Written comments on the Paperwork Reduction Act proposed information collection requirements must be submitted by the public, the Office of Management and Budget (OMB), and other interested parties on or before **[INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. Written comments on the Initial Regulatory Flexibility Analysis (IRFA) in this document must have a separate and distinct heading designating them as responses to the IRFA and must be submitted by the public on or before **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

ADDRESSES: Pursuant to §§ 1.415 and 1.419 of the Commission's rules (47 CFR 1.415,

1.419), interested parties may file comments and reply comments on or before the dates indicated 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). You may submit comments, identified by WT Docket No. 23-158; and GN Docket 14-177, by any of the following methods:

- *Electronic Filers*: Comments may be filed electronically using the internet by accessing the ECFS: *http://apps.fcc.gov/ecfs/.*
- *Paper Filers*:
    - Parties who choose to file by paper must file an original and one copy of each filing.
    - Filings can be sent by commercial overnight courier, or by first-class or overnight U.S. Postal Service mall. All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.
    - Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9050 Junction Drive, Annapolis Junction, MD 20701.
    - U.S. Postal Service first-class, Express, and Priority mail must be addressed to 45 L Street NE, Washington, D.C. 20554.
- Effective March 19, 2020, and until further notice, the Commission no longer accepts any hand or messenger delivered filings. This is a temporary measure taken to help protect the health and safety of individuals, and to mitigate the transmission of COVID-19. *See FCC Announces Closure of FCC Headquarters Open Window and Change in Hand-Delivery Policy, Public Notice, DA 20-304 (March 19, 2020).* https://www.fcc.gov/document/fcc-closes-headquarters-open-window-and-changes-hand-delivery-policy.

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computer diskettes, or audio recordings), please send an email to FCC504@fcc.gov or call the Consumer & Government Affairs Bureau at (202) 418-0530 (VOICE), (202) 418-0432 (TTY).

FOR FURTHER INFORMATION CONTACT: Catherine Schroeder of the Wireless Telecommunications Bureau, Broadband Division, at Catherine.Schroeder@fcc.gov or 202-418-1956. For additional information concerning the Paperwork Reduction Act proposed information requirements contained in this document, send an e-mail to PRA@fcc.gov or contact Kathy Williams at (202) 418-2918.

SUPPLEMENTARY INFORMATION: This is a summary of the Commission's *Notice of Proposed Rulemaking* (*NPRM)* in WT Docket No. 23-158 and GN Docket No. 14-177; FCC 23-51, adopted on June 8, 2023, and released on June 9, 2023. The full text of this document is available at https://docs.fcc.gov/public/attachments/FCC-23-51A1.pdf.

Regulatory Flexibility Act: The Regulatory Flexibility Act of 1980, as amended (RFA), requires an agency to 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." The Commission seeks comment on potential rule and policy changes contained in the *NPRM*, and accordingly, has prepared an IRFA. The IRFA for this *NPRM* in WT Docket No. 23-158 and GN Docket No. 14-177 is set forth below in this document and written public comments are requested. Comments must be filed by the deadlines for comments on the *NPRM* indicated under the **DATES** section of this document and must have a separate and distinct heading designating them as responses to the IRFA. The Commission reminds commenters to file in the appropriate dockets: WT Docket No. 23-158 and GN Docket No. 14-177.

Paperwork Reduction Act: This document may contain proposed modified information collection requirements. Therefore, the Commission seeks comment on potential new or revised information collections subject to the Paperwork Reduction Act of 1995. If the Commission adopts any new or revised information collection requirements, the Commission will publish a

notice in the *Federal Register* inviting the general public and the Office of Management and Budget to comment on the information collection requirements, as required by the Paperwork Reduction Act of 1995, Public Law 104-13. 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 comments on how it might further reduce the information collection burden for small business concerns with fewer than 25 employees.

Ex Parte Rules: This proceeding 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. In proceedings governed by rule 1.49(f) or for which the Commission has made available a method of electronic filing, written *ex parte* presentations and memoranda summarizing oral *ex parte* presentations, and all attachments thereto, must be filed through the electronic comment filing system available for that proceeding, and must be filed in their native format (e.g., .doc, .xml, .ppt, searchable .pdf). Documents shown or given to Commission staff during *ex parte* meetings are deemed to be written *ex parte* presentations and must be filed consistent with Rule 1.1206(b). Participants in this proceeding should familiarize themselves with the Commission's *ex parte* rules.

Synopsis

I. NOTICE OF PROPOSED RULEMAKING IN WT DOCKET NO. 23-158 AND GN DOCKET NO. 14-177

A. Background

1. As part of a multiyear effort to enable deployment of advanced wireless services such as 5G, the Commission has made 4.95 gigahertz of spectrum above 24 GHz available on an exclusively-licensed geographic area basis. The Commission has already established service and licensing rules for the 24 GHz, 28 GHz, Upper 37 GHz, 39 GHz, and 47 GHz bands, all of which are available on either a county or a Partial Economic Area (PEA) basis.[1] The Commission has held three auctions to award licenses in these bands, the most recent of which was completed in 2020.

2. The Commission also has made available a significant amount of high-band spectrum for unlicensed use. The rules for unlicensed device use at 57-64 GHz were expanded in 2016 to include 64-71 GHz, bringing the total amount of high-band spectrum available on an unlicensed basis to 14 gigahertz.

3. The 42 GHz band is currently allocated to non-Federal Fixed and Mobile services on a primary basis; there is no Federal allocation in the band.[2] Although the Commission sought comment previously on proposed service rules for this band among other bands above 24 GHz,

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[1] *See 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, 8154, paragraph 403 (2016); *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, et al.,* Second Report and Order, Second Further Notice of Proposed Rulemaking, Order on Reconsideration, and Memorandum Opinion and Order, 32 FCC Rcd 10988 (2017); *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); *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, et al.*, Fourth Report and Order, 33 FCC Rcd 12168 (2018). *See also* 47 CFR 30.4, 30.5. When citing to the *Report and Order* portions of the 2016 or 2018 documents, the Commission will refer to the *First R&O* or *Third R&O*, respectively. When citing to the *Memorandum Opinion and Order* portion of the 2018 document, the Commission will refer to the *MO&O*. When citing to the *Further Notice of Proposed Rulemaking* portion of the 2016 or 2018 document, the Commission will refer to the *First FNPRM* or *Third FNPRM*, respectively.

[2] 47 CFR 2.106.

none are currently in place, and the band has no incumbent licensees.[3] The lower adjacent 40-42 GHz band has been designated for satellite use. The upper adjacent 42.5-43.5 GHz band is allocated to radio astronomy services (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.[4]

4. The Commission previously sought comment on a proposal to authorize flexible fixed and mobile operations in the 42 GHz 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. Specifically, the Commission sought comment and detailed information 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 to create a guard band below 42.5 GHz. 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. The Commission proposed licensing the band geographically using PEAs.

5. Pursuant to the directives in the MOBILE NOW Act,[5] the Commission later included in the *Third FNPRM*, 83 FR 34520 (July 20, 2018), requests for further comment on a regulatory framework to enable licensed and/or unlicensed uses of the 42 GHz band. The Commission received 17 comments and six reply comments to the *Third FNPRM* relating to the

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[3] Nine experimental licenses are authorized for testing using this frequency range. Pursuant to the Commission's rules, operation of an experimental radio station is permitted only on the condition that harmful interference is not caused to licensees. If harmful interference to an established radio service occurs, upon becoming aware of such harmful interference the Experimental Radio Service licensee must immediately cease transmissions. *See* 47 CFR 5.84.

[4] 47 CFR 2.106. Footnote US211 urges applicants for airborne or space stations assignments in the 40.5-42.5 GHz band to take all practicable steps to protect radio astronomy observations in the 42.5-43.5 GHz band from harmful interference. 47 CFR 2.106 n.US211.

[5] MOBILE NOW Act, Pub. L. 115-141, Div. P, tit. VI, 132 Stat. 1097 (2018), § 604(a), (b)(1), (b)(2) (codified at 47 U.S.C. 1503) (requiring the Commission to publish a Notice of Proposed Rulemaking to consider service rules to authorize mobile or fixed terrestrial wireless operations, including for advanced mobile service operations, in the 42 GHz band).

42 GHz band.

B. Shared Use of the 42-42.5 GHz Band

1. Potential Benefits of Shared Licensing

6. Millimeter wave (mmW)[6] transmissions have a shorter propagation range than lower-frequency spectrum and are blocked by walls and other obstacles, making it easier to reuse the same band or channel within a smaller geographic area. Technological advances such as MIMO (multiple-input multiple-output) and beamforming antennas offer additional possibilities for reuse between multiple operators. Given that the Commission already has offered both traditionally-licensed spectrum (on a geographic basis) and made spectrum available on a flexible basis for unlicensed devices in the mmW bands, and that the characteristics of mmW spectrum lend themselves to sharing and reuse, the Commission seeks to explore how novel approaches to shared licensing may support increased efficiency and intensity of use among a wider range of users within this mmW spectrum.

7. Unlike many other mmW bands, the 42 GHz band has no existing operations, either federal or non-federal.[7] This "greenfield" spectrum gives the Commission greater flexibility in designing a shared licensing scheme that may be optimized for future use and can take advantage of new developments in technology more easily than a band with existing deployments. The Commission therefore believes that consideration of alternatives to exclusive geographic area licensing in the 42 GHz band is appropriate.

8. Although the Commission has previously sought comment on licensing the 42 GHz band on the same geographic area basis as the UMFUS bands such as the 37/39 GHz bands,[8] those two ranges are separated by the 40-42 GHz satellite-only band. This separation means that there appear to be fewer potential synergies to using the same licensing approach in

[6] Generally, spectrum between 30 GHz and 300 GHz.

[7] As of March 31, 2023, nine experimental licenses are authorized for testing using this frequency range; however, as noted above, these licenses are issued on a noninterference basis. *See* 47 CFR 5.84.

[8] Some commenters supported this approach.

both bands than if the two could be combined into a single continuous band.

9. The benefits of potential unlicensed use of the 42 GHz band also appear to be limited. No commenter previously supported making this band available on an unlicensed basis, and de Vries suggested that unlicensed use of the band would not provide adequate protection against harmful interference. This latter point is significant given the importance of protecting RAS operations in the adjacent 42.5-43.5 GHz band. Harmful interference from unlicensed devices would likely be more difficult to resolve, given the additional difficulty relative to licensed operations of identifying the specific interferer.

10. In light of these considerations, the Commission seeks comment on applying a shared approach to the 42 GHz band. The Commission asks commenters to enumerate the benefits or drawbacks of this approach, as compared with either an exclusive-use licensed[9] or unlicensed approach.

2. Shared Licensing Approaches

11. In this section, the Commission discusses a variety of potential approaches to licensing the 42 GHz band on a shared basis. These approaches may have different costs and benefits in different situations, and some may facilitate certain uses better than others. The Commission seeks comment on these approaches and on any alternatives that might better promote its goals of more efficient spectrum use and lower barriers to spectrum access compared with traditional exclusive-use licensing in this band.

12. *Nationwide non-exclusive licensing.* Under this approach, currently in use in the 70/80/90 GHz bands, operators would first obtain a nationwide non-exclusive license from the Commission, and then coordinate specific deployment sites with a third-party database. This approach would likely require advance work in identifying and setting up a database administrator but could facilitate quick and efficient site registration once established. OTI,

[9] The Commission notes that it has already established a record on an exclusive-use licensed approach for the 42 GHz band. *See Third FNPRM*, 33 FCC Rcd at 5599, paragraph 54.

focusing on point-to-multipoint service, supports this licensing regime for the 42 GHz band (as well as for the Lower 37 GHz band), and it argues that such a system would reduce costs and facilitate entry and coexistence between licensees. Charter also supports this approach for the Lower 37 GHz band, in order to promote greater efficiency.

13. The Commission seeks comment on the potential use of this nationwide non-exclusive licensing approach for the 42 GHz band. Would this model best facilitate efficient use of this spectrum? Would it lower barriers to entry as compared with either traditional exclusive-use licensing, or the other shared licensing approaches discussed in this *NPRM*? Commenters advocating such an approach should also provide information regarding any limitations that should be placed on users. For example, should all licensees operating in a common area have access to the full 500 megahertz or only a portion to preserve the ability of other licensees to operate in that same area? Should there be limitations on the size of a service area that could be registered with a database to promote coexistence and enable access by other licensees? Should the Commission simply make the band available and require licensees to cooperate in the selection and use of frequencies in the band? What are the costs and benefits of taking this approach? The Commission notes that OTI's proposal focuses on fixed point-to-multipoint service. Would it be possible to use this approach to license mobile service as well? What would be the costs or obstacles associated with identifying and establishing a database administrator? The Commission seeks comment on these issues and any other considerations involved with a nationwide non-exclusive model for this band.

14. *Site-based licensing.* Alternatively, the Commission could license the 42 GHz band on a site-by-site basis directly, without the use of a nationwide non-exclusive license regime or a third-party database. This approach might provide greater transparency than the use of third-party databases, because information for each licensed site—including, for example, construction notifications demonstrating whether buildout requirements have been met—would be publicly available in the Commission's Universal Licensing System (ULS). This would also

allow the Commission to be more responsive to potential disputes, and facilitate easier administration and enforcement of buildout requirements, without needing to communicate with the third-party database manager as part of this process.

15. The Commission seeks comment on a potential site-based licensing approach in this context. Would licensing each individual site directly be overly burdensome on licensees? Would adopting a site-based licensing approach facilitate the easier enforcement of buildout requirements as compared to using a third party database registrar, and therefore contribute to greater efficiency and less warehousing of this spectrum? To what extent would the lack of a third-party database administrator result in logistical hurdles that might increase costs or decrease efficiency of licensees' operations, or would it be a benefit to have license issues addressed directly with the Commission? Would prospective licensees be able to access this spectrum more quickly and easily under a third-party database approach, versus licensing each site with the Commission? Would there be additional or different technical or operational rules needed under either approach, for example specific rules for resolving coexistence issues under site-based licensing versus relying on the database for this purpose in a third-party registration approach? The Commission seeks comment on these and any other considerations relating to this licensing model.

16. *Technology-based sensing.* In the context of the Lower 37 GHz band, Qualcomm proposes that the Commission adopt a technology-based long-term sensing mechanism for mmW spectrum. Qualcomm suggests that this approach would allow "multiple licensees each using any air interface, to share on a licensed basis the entire…band in the same location, on the same frequencies, and at the same time, by taking advantage of the highly directional nature of mmW communications."[10] This proposal, which describes technology-based sensing using a

[10] Letter from John W. Kuzin, Vice President, Qualcomm, to Marlene H. Dortch, Secretary, FCC, GN Docket 14-177 et al., at 1 (filed Mar. 18, 2022) (emphasis removed). *See also* Letter from John W. Kuzin, Vice President, Qualcomm, to Marlene H. Dortch, Secretary, FCC, GN Docket 14-177 et al., at 2 (filed Oct. 2, 2021).

geographic area licensing regime, would require that licensees coordinate among themselves a measurement window during which all licensees (except for a priority user in each channel) cease transmissions for a given time period in order to use long-term sensing to detect any active receivers, and then transmit afterwards only in directions where no such receivers are detected. Qualcomm suggests that, if properly implemented, this system would provide priority licensees with more reliable protection than other sensing-based systems such as Listen Before Talk, and would also allow indoor operation across the entire band without disrupting priority or outdoor operations, and without requiring a database.

17. The Commission seeks comment on applying this potential approach to the 42 GHz band, and the attendant costs and benefits of adopting a technology-based sensing framework. Because Qualcomm designed this proposal for the Lower 37 GHz band, are there changes that would need to be made to make it suitable for the 42 GHz band? For example, would this proposal be viable without a priority user in a given channel? Similarly, given that Qualcomm's proposal demonstrates how technology-based sensing operates using geographic license areas, would adjustments need to be made to the proposal for a different type of licensing regime? Further, would the measurement and sensing requirements mean that users of the 42 GHz band could not take advantage of the equipment ecosystems of existing millimeter-wave bands? If so, would it increase equipment costs or increase barriers to entry for smaller or emerging operators? Are there other long-term sensing systems that should be considered? The Commission seeks comment on what steps the Commission or industry should take to ensure that, if adopted, any technology-based sensing protocols are non-proprietary/open-source or widely available to maximize use and drive innovation. The Commission seeks comment on these and any other considerations for this approach.

18. *Coordination mechanism.* The Commission assumes that any shared licensing regime will require a coordination mechanism to protect all licensees from harmful interference. Examples of potential coordination mechanisms include the third-party database queries used in

70/80/90 GHz, the Spectrum Access Systems (SAS) used in the Citizens Broadband Radio Service to manage access to spectrum by different classes of licensed users in the 3550-3700 MHz band, the Automated Frequency Coordination (AFC) system recently established in 6 GHz to facilitate coexistence of unlicensed devices with incumbent operations and radio astronomy observatories, and equipment-based long-term sensing like the approach proposed by Qualcomm for the Lower 37 GHz band. The Commission seeks comment on these and other potential coordination mechanisms. What are the costs and benefits of each model? Which model would work best for each potential licensing regime? Are there concerns specific to the 42 GHz band that might recommend one coordination mechanism over another?

19. *Other Considerations.* The Commission seeks general comment on the sharing and licensing mechanisms described above, as applied to the 42 GHz band. Which model would be most conducive to the intensive and efficient use of this spectrum? Which model would yield the greatest benefits, at the least cost? What are the potential barriers to deployment, operation, or equipment availability under each model? The Commission also seeks comment on which types of services might be accommodated by these shared licensing regimes. OTI suggests the Commission also allow for point-to-multipoint service in this context. Would it be possible to accommodate both point-to-point and point-to-multipoint services in the 42 GHz band? Would it also be possible to accommodate mobile service? Are there specific licensing or sharing mechanisms that would better facilitate multiple services in the band? Are there specific technical or licensing requirements or coordination mechanisms that would better facilitate the inclusion of mobile service?

20. The Commission seeks comment on whether first-in-time protections[11] are necessary or appropriate for each of the shared licensing regimes discussed above, and if so,

[11] The Commission could, for example adopt a first-come-first-served licensing or registration scheme in which the first actual users that are licensed/registered have a right to interference protection (provided they deploy their systems within the requisite time period), but they have no right to exclude other users.

what form they should take. Charter argues that the use of time division duplex (TDD) synchronization would enable multiple operators to coexist in exactly the same area. Would requiring TDD synchronization be sufficient to enable such reuse? If so, would such a system render first-in-time protections moot? To what extent would the certainty provided by a first-in-time guarantee be necessary to encourage deployment in this band? Would the lack of such a guarantee deter investment by potential licensees? Do the answers to these questions depend on which shared licensing regime the Commission adopts? Are there licensing mechanisms (such as technology-based sensing) for which a first-in-time guarantee would be unnecessary, or more burdensome than beneficial? If the Commission does not adopt first-in-time protections, what other mechanisms might resolve situations of congestion or harmful interference in a particular area? The Commission seeks general comment on this issue, including on any other potential costs or benefits not mentioned here.

21. The Commission also seeks comment on the appropriate coordination requirements for site-based licensing or site-based registration (in conjunction with a nationwide license), should the Commission adopt it. OTI suggests that site-based licensing (or registration) should require coordination not only on a site-by-site basis, but on a sector-by-sector basis, to increase spectrum reuse, avoid warehousing, and encourage competition. Would this level of specificity be feasible from a deployment perspective? Would it be unduly burdensome on licensees who might wish to license or register multiple sectors at the same site? How prevalent are deployment scenarios in which operators use only a subset of sectors? Would access to one sector (or some subset of a full arc) at a particular site provide smaller or later-deploying operators with a greater opportunity to deploy alongside other licensees? If the Commission does incorporate sector-level licensing or registration, what would the appropriate sector size be? Is it 30-degree sectors, as OTI suggests? Should the Commission allow licensees or registrants to specify a sector size when applying or registering? If sector-based licensing is not appropriate in the 42 GHz band, is there some other way of licensing or registering sites that might facilitate

greater spectrum reuse while still providing licensees with adequate spectrum access?

22. The Commission also seeks comment on whether there would be any potential synergies in the instant context with approaches being considered for the Lower 37 GHz (37-37.6 GHz) band. In 2016, the Commission adopted rules to permit fixed and mobile terrestrial operation across the 37 GHz band (37-38.6 GHz) and made the Lower 37 GHz band available for coordinated co-primary sharing between Federal and non-Federal users, with the non-Federal users licensed by rule. The Commission indicated that both Federal and non-Federal users would access the band by registering individual sites through a coordination mechanism and sought comment on the details of that coordination mechanism and what functions it should perform. In 2018, the Commission sought comment on several specific proposals for this coordination mechanism, including first-come-first-served site-based licensing or registration in conjunction with several different types of potential licenses. In addition to OTI, Charter, and Qualcomm, whose proposals are discussed above, several commenters suggest that Commission base its rules for Lower 37 GHz on those adopted for the 70/80 GHz bands. The Commission seeks comment on whether it should adopt a shared licensing approach for the 42 GHz band that mirrors the Commission's approach to the Lower 37 GHz band. What would be the benefits or costs to doing so? Are there other ways to leverage the potential of these bands together? The Commission notes that unlike the 42 GHz band, the Lower 37 GHz band must accommodate sharing and coordination between Federal and non-Federal users.

23. Finally, the Commission also seeks comment on any other model or mechanism for non-exclusive licensing not discussed here which may be better suited for the 42 GHz band, or any other relevant considerations for these or other shared licensing regimes. Commenters suggesting alternative approaches should do so with as much specificity as possible, including discussing the potential costs and benefits of their proposed option as compared with the approaches above and either an exclusive-use licensed or unlicensed approach. The Commission also seeks comment on whether it could enable secondary operations in the 42 GHz band, while

still ensuring primary licensees protection from harmful interference.

3. Buildout Requirements

24. In traditional exclusive-use geographic area licensing regimes, the Commission typically sets buildout requirements in terms of service coverage of a given percentage of the population of the license area. For licensing regimes not tied to a particular license area, or where a license area is shared among multiple licensees, however, this metric may not be suitable or feasible. The Commission's overarching goal is to adopt a buildout metric that ensures in each circumstance that spectrum is meaningfully being put to use in practice. To this end, the Commission seeks comment on the appropriate buildout requirements for potential licensees under the various approaches described above.

25. One buildout approach could be to require licensees to begin operations within a specified time. OTI has proposed that an appropriate timeframe would be 12 months or less from site registration, after which a licensee would lose any first-in-time protections for that site. The Commission seeks comment on this proposal, including any alternative timeframes. The Commission also seeks comment on whether this approach would be better suited to certain sharing and licensing regimes, and, conversely, whether it might be unsuitable or inapplicable to certain others. Recognizing that the Commission seeks comment above on whether it should adopt first-in-time protections for this band, if the Commission ultimately do not adopt such protections as part of the shared licensing regime here, what other consequence for failing to meet a build-out deadline might be appropriate? Would any consequence for failure to build out in a timely manner be necessary in such circumstances?

26. The Commission also seeks general comment on the appropriate buildout metrics for potential technology-based sharing regimes. If the Commission ultimately adopts a sharing mechanism where the equipment itself determines access to spectrum, should it impose any buildout requirement at all, or is the inherently non-exclusive nature of such a regime sufficient to ensure efficient use and prevent spectrum warehousing? The Commission seeks comment on

these and any other considerations for buildout requirements under sharing regimes based on technology-based long-term sensing, including any potential solutions not discussed here.

27. The Commission also seeks comment on any other potential buildout requirement metrics or levels suitable for the sharing mechanisms discussed in this *NPRM*. Additionally, to the extent that commenters have suggestions for other potential sharing or licensing mechanisms, the Commission encourages them to include suggestions for corresponding buildout requirements, or other methods of ensuring efficient spectrum use and preventing spectrum warehousing.

4. License Term and Applicability of Part 30 Technical Rules

28. The Commission previously sought comment on licensing the 42 GHz band under the part 30 UMFUS licensing and technical rules. Although the Commission is not proposing to adopt an exclusive-use licensing regime, it does propose to adopt a ten-year license term for licenses in this band, similar to other part 30 services. The Commission seeks comment on this proposal, and ask whether there are additional considerations in adopting a ten-year license term under a shared licensing approach.

29. The mmW bands the Commission has previously licensed are all governed by the technical rules found in part 30.[12] This uniform treatment facilitates development of a common equipment ecosystem and easier operator deployment, and is supported generally in the underlying record in this proceeding.[13] Inclusion in this uniform technical regime might allow these benefits to also accrue to the 42 GHz band. If this band is made available under a licensing scheme significantly different from the other part 30 bands, however, it is possible that those benefits might be diminished, or costs or other inefficiencies incurred.

30. The Commission seeks comment on the applicability of the part 30 technical rules

[12] 47 CFR 30.201 through 209.

[13] No commenters oppose the inclusion of 42 GHz in these technical rules, or suggest specific variations.

to the 42 GHz band as licensed under the various potential sharing regimes outlined above. Should the Commission apply these existing technical rules for the 42 GHz band, regardless of the licensing regime it ultimately adopts? Are there changes to the technical rules might be appropriate or necessary to accommodate shared licensing? Are there different costs or benefits that may be associated with the existing part 30 technical rules in this context, which the Commission has not previously considered?

5. Band Plan

31. In the *Third FNPRM*, the Commission proposed to license the 42 GHz band as five 100 megahertz channels. Most commenters supported the Commission's proposal. They noted that a 100 megahertz channel is a building block for mmW mobile equipment, and that this channel size is consistent with 3rd Generation Partnership Project ("3GPP") standards in the mmW bands. Several commenters also asserted that 100 megahertz block sizes would facilitate the deployment of 5G services. A few commenters advocated using 200 MHz channels. For example, TIA argues that wider channels will better support 5G services.[14] In response to the *First FNPRM*, 81 FR 58269 (August 24, 2016), Qualcomm also supported a band plan with two 200 megahertz channels.

32. The Commission again proposes to license the 42 GHz band in five 100 megahertz channels and seeks comment on this proposal in the context of the new proposals under consideration here. Would the benefits previously noted by commenters supportive of 100 megahertz channels still apply under the sharing regimes discussed above? Would the increased flexibility of a non-exclusive licensing regime benefit more from 100 megahertz channels, or from another channel size? Are there particular sharing or licensing regimes that would benefit most from a different channel size?

[14] TIA addressed this issue in its comments to a separate Further Notice, 83 FR 42089 (Aug. 20, 2018). *See Use of Spectrum Bands Above 24 GHz For Mobile Radio Services*, GN Docket 14-177, *Fourth Further Notice of Proposed Rulemaking*, 33 FCC Rcd 7674 (2018) (*Fourth FNPRM*). *See* TIA *Fourth FNPRM* Comments at 5-6, Table 1, 11.

6. Protecting RAS Services at 42.5-43.5 GHz

33. As noted above, in the *First FNPRM*, the Commission proposed to authorize flexible mobile and fixed operations in the 42 GHz band, provided that RAS could be protected in the adjacent 42.5-43.5 GHz band.[15] The Commission sought comment on the forms that such protection should take, *e.g.*, whether it should establish special out-of-band emission (OOBE) limits into the 42.5-43.5 GHz band or create a guard band below 42.5 GHz. After noting the National Academy of Sciences' Committee on Radio Frequencies (CORF) and T-Mobile's agreement that RAS bands could be protected by limiting UMFUS operations near an RAS observatory, the Commission renewed its call in the *Third FNPRM* for interested parties to provide detailed technical analysis of the coexistence of RAS with terrestrial mobile operations that fully supported any proposed methodology. Specifically, the Commission asked whether its rules should be based on the International Telecommunication Union Radiocommunication Sector (ITU-R) RA.769 parameters, or alternate protection criteria, and sought comment on whether to establish coordination zones around relevant RAS facilities.

34. CORF has 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, which facilitates the measurement of stellar temperature, density, wind velocity and other parameters. The 42 GHz band also is one of the preferred bands for measuring continuum observations. RAS observations are currently made at a limited set of observatories around the United States.[16] Additionally, according to a report by the National Academy of Sciences, Engineering, and Medicine, the Next Generation Very Large Array (ngVLA) is a top priority for U.S. astronomy in the coming decade and would include new sites

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[15] The adjacent band, 42.5-43.5 GHz, is allocated for Federal and non-Federal RAS operations and Federal fixed, earth-to-space satellite and mobile services. 47 CFR 2.106.

[16] RAS observations in this band are currently made at various U.S. observatories: Green Bank Telescope (GBT), WV; VLA Socorro, NM; Westford, MA (Haystack); Brewster, WA; Fort Davis, TX; Hancock, NH; Kitt Peak, AZ; Los Alamos, NM; Mauna Kea, HI; North Liberty, IA; Owens Valley, CA; Pie Town, NM; St. Croix, VI. CORF FNPRM Comments at 9 & n.7 (*citing* 47 CFR 2.106, n.US131).

predominantly near the current VLA, but also throughout New Mexico and adjacent states with long baseline stations in close proximity to existing VLBA stations. Because a typical radio telescope receives less than 1 percent of one-billionth of one-billionth of a watt (10^{-20} W) from a typical cosmic object, the telescope is particularly vulnerable to in-band emissions, spurious out-of-band emissions, and emissions producing harmonics, making protection important. CORF has represented that the detrimental levels for continuum and spectral line radio astronomy observations for single dishes are -227 dBW/m^2/Hz and -210 dBW/m^2/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, CORF represented that the corresponding limit is -175 dBW/m^2/Hz). T-Mobile agreed that the ITU power flux density (PFD) limits are appropriate to address potential interference to RAS.

35. Proponents of using the 42 GHz band for flexible terrestrial wireless use have generally agreed that various practical methods may be effective at protecting RAS, including use of exclusion zones, coordination zones, and aggregate emissions limits—particularly because RAS sites are remotely located. None provide detailed information or examples showing how these proposed methods would work in practice.[17] Regarding whether it is necessary or appropriate to establish a guard band below 42.5 GHz in order to protect RAS, CORF stated that a guard band of 200 MHz within the radio horizon around radio astronomy sites would meet the ITU-R RA.769 protection criteria. T-Mobile argued that a guard band is unnecessary and the ITU protection threshold can be met with minimum exclusion distances. In response to the *First FNPRM*, some commenters asserted that a guard band would narrow the usable aspects of the 42

[17] Although they provide no new studies, Nokia and others direct the Commission to T-Mobile's RAS sharing study, produced for the 32/47/50 GHz bands and assert this study is well-suited to also calculating protection zones for RAS sites operating adjacent to the 42 GHz band. CORF agrees this study could be applicable for calculating coordination distances. The Commission does not find this study sufficient to establish coordination distances because it is based on an analysis done with respect to different systems in the 32 GHz band.

GHz band.[18] TIA argued it should be possible to craft UMFUS operating rules that protect adjacent RAS services via geographic coordination or otherwise, making guard bands unnecessary, especially since they interfere with the Commission's channel block plans.

36. The Commission agrees with CORF and T-Mobile that RAS bands can probably be protected by limiting 42 GHz operations near a RAS facility to reduce the risk of terrestrial interference. Because the Commission believes that geographic separation of 42 GHz licensed operations and RAS facilities will provide sufficient protection of RAS facilities, it does not propose to impose out-of-band emissions limits on licenses in the 42 GHz band that are tighter than out-of-band-emissions limits on UMFUS licenses in other mmW bands. Furthermore, the Commission does not propose to establish coordination zones around RAS facilities because it believes that compliance with the limits it proposes in this *NPRM* will be sufficient to protect RAS observations. The record to date does not contain sufficient information to determine whether, and if so, at what distances, coordination zones would be appropriate, but the Commission invites the submission of such information from commenters.

37. The Commission proposes to require 42 GHz licensees to limit emissions into the 42.5-43.5 GHz passive band at those relatively few locations where RAS observatories make observations in this band. The Commission proposes to adopt the parameters established by ITU-R RA.769 as the interference protection criteria for RAS operations, as suggested by CORF and T-Mobile. While the Commission believes that these parameters are extremely conservative, no one has previously submitted studies suggesting alternative criteria, and the ITU's analysis indicates compliance with those criteria are likely to protect the RAS facilities from harmful interference. Given that the observatories are mostly located in remote areas and signals in this frequency range are significantly attenuated by terrain and clutter, the Commission expects that adopting these conservative criteria would have only a small impact on 42 GHz licensed

[18] FWCC urges that any guard band adopted should be limited to fixed-only operations subject to full fixed service frequency coordination to control emissions in the direction of RAS sites.

operations.

38. Therefore, for all 42 GHz licensees operating near designated RAS facilities, the Commission proposes that: (1) the spectral PFD received at the RAS sites at the Haystack Observatory (Westford, MA), the Green Bank Telescope (Green Bank, WV) and the Very Large Array (Socorro, NM) averaged over the entire 42.5-43.5 GHz frequency range must not exceed -227 dBW/m^2/Hz; (2) the spectral PFD received within any 500 kHz channel within the 42.5-43.5 GHz frequency range for the three sites noted above must not exceed -210 dBW/m^2/Hz; and, (3) the spectral PFD within the 42.5-43.5 GHz frequency range for the Very Long Baseline Array (VLBA) Stations must not exceed -175 dBW/m^2/Hz. The Commission proposes to list the relevant sites in a new footnote to the United States Table of Frequency Allocations for clarity. The Commission believes that these limits are sufficient to protect RAS operations in the adjacent band without establishing a guard band within the 42 GHz band. The Commission emphasizes that its proposal to adopt these limits is based on the specific factors present in the 42 GHz band and would not necessarily control future decisions it makes regarding other frequency bands subject to note US342. In addition to these requirements, the existing requirements for coordination in the National Radio Quiet Zone will be maintained.[19] The Commission seeks comment on this proposal.

C. Costs and Benefits and Diversity, Equity, and Inclusion

39. The Commission invites comment generally on the costs and benefits associated with the various approaches discussed in this *NPRM*. Are there any aspects of the above issues that the Commission has not considered? Are there any studies, efforts, or analyses that the Commission should consider? If so, the Commission asks that commenters identify them and explain why they should be considered.

40. *Digital Equity and Inclusion.* Finally, the Commission, as part of its continuing

[19] 47 CFR 1.924.

effort to advance digital equity for all,[20] including people of color, persons with disabilities, persons who live in rural or Tribal areas, and others who are or have been historically underserved, marginalized, or adversely affected by persistent poverty or inequality, invites comment on any equity-related considerations[21] and any potential benefits that may be associated with the various approaches and issues discussed herein. Specifically, the Commission seeks comment on how the various approaches that the Commission may consider may promote or inhibit advances in diversity, equity, inclusion, and accessibility, as well the scope of the Commission's relevant legal authority.

II. INITIAL REGULATORY FLEXIBILITY ANALYSIS IN WT DOCKET NO. 23-158 AND GN DOCKET NO. 14-177

41. As required by the Regulatory Flexibility Act of 1980, as amended (RFA),[22] the Commission has prepared this Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on a substantial number of small entities by the policies and rules proposed in this *NPRM*. 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 in the *NPRM*. The Commission will send a copy of the *NPRM* including this IRFA, to the Chief Counsel for Advocacy of the Small Business Administration (SBA).[23] In addition, the *NPRM* and IRFA (or summaries thereof) will be published in the *Federal Register*.[24]

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[20] Section 1 of the Communications Act of 1934 as amended provides that the FCC "regulat[es] interstate and foreign commerce in communication by wire and radio so as to make [such service] available, so far as possible, to all the people of the United States, without discrimination on the basis of race, color, religion, national origin, or sex." 47 U.S.C. 151.

[21] The term "equity" is used here consistent with E.O. 13985 as the consistent and systematic fair, just, and impartial treatment of all individuals, including individuals who belong to underserved communities that have been denied such treatment, such as Black, Latino, and Indigenous and Native American persons, Asian Americans and Pacific Islanders and other persons of color; members of religious minorities; lesbian, gay, bisexual, transgender, and queer (LGBTQ+) persons; persons with disabilities; persons who live in rural areas; and persons otherwise adversely affected by persistent poverty or inequality. *See* E.O. No. 13985, 86 Fed. Reg. 7009, E.O. on Advancing Racial Equity and Support for Underserved Communities Through the Federal Government (Jan. 20, 2021).

[22] *See* 5 U.S.C. 603. The RFA, 5 U.S.C. 601 through 612, has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996, (SBREFA) Pub. L. 104-121, Title II, 110 Stat. 857 (1996).

[23] *See* 5 U.S.C. 603(a).

[24] *See id.*

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

42. In the *NPRM*, the Commission proposes to increase the Nation's supply of spectrum for mobile broadband by adopting rules for fixed and mobile services in the 42-42.5 GHz band. The Commission proposes to license this spectrum on a shared, non-exclusive basis. 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 seeks comment on the specific types of licenses under which it should make this spectrum available, including non-exclusive nationwide licensing, site-based licensing, and technology-based sensing. The Commission seeks comment in particular on what licensing models might best facilitate entry and participation by smaller and emerging entities as well as comments that provide options for potentially lowering barriers to entry for smaller or emerging wireless service providers, encourage competition, and avoid spectrum warehousing.

43. 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, the industry is taking another look at the mmW bands and beginning to realize that at least some of the presumed disadvantages can be turned to advantages. 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.

B. Legal Basis

44. The proposed action is authorized pursuant to sections 1, 2, 4, 301, 302, 303, 304, 307, 309, and 310 of the Communications Act of 1934, as amended, 47 U.S.C. 151, 152, 154, 301, 302a, 303, 304, 307, and 309, § 604 of the MOBILE NOW Act, 47 U.S.C. 1503, and § 1.411 of the Commission's Rules, 47 CFR 1.411.

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

45. 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.[25] The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction."[26] In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act."[27] 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.[28]

46. *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.[29] First, while there are industry specific size standards for small businesses that are used in the regulatory flexibility analysis, according to

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[25] 5 U.S.C. 603(b)(3).

[26] 5 U.S.C. 601(6).

[27] 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*."

[28] 15 U.S.C. 632.

[29] *See* 5 U.S.C. 601(3) through (6).

data from the SBA's Office of Advocacy, in general a small business is an independent business having fewer than 500 employees.[30] These types of small businesses represent 99.9% of all businesses in the United States, which translates to 32.5 million businesses.[31]

47. 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."[32] The Internal Revenue Service (IRS) uses a revenue benchmark of $50,000 or less to delineate its annual electronic filing requirements for small exempt organizations.[33] Nationwide, for tax year 2020, there were approximately 447,689 small exempt organizations in the U.S. reporting revenues of $50,000 or less according to the registration and tax data for exempt organizations available from the IRS.[34] 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."[35] U.S. Census Bureau data from the 2017 Census of Governments[36] indicate there were 90,075 local governmental jurisdictions consisting of general purpose governments and

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[30] *See* SBA, Office of Advocacy, Frequently Asked Questions, "What is a small business?," https://cdn.advocacy.sba.gov/wp-content/uploads/2021/11/03093005/Small-Business-FAQ-2021.pdf. (Nov 2021).

[31] *Id.*

[32] *See* 5 U.S.C. 601(4).

[33] The IRS benchmark is similar to the population of less than 50,000 benchmark in 5 U.S.C 601(5) that is used to define a small governmental jurisdiction. Therefore, the IRS benchmark has been used to estimate the number of small organizations in this small entity description. S*ee* Annual Electronic Filing Requirement for Small Exempt Organizations – Form 990-N (e-Postcard), "Who must file," https://www.irs.gov/charities-non-profits/annual-electronic-filing-requirement-for-small-exempt-organizations-form-990-n-e-postcard. The Commission notes that the IRS data does not provide information on whether a small exempt organization is independently owned and operated or dominant in its field.

[34] *See* Exempt Organizations Business Master File Extract (EO BMF), "CSV Files by Region," https://www.irs.gov/charities-non-profits/exempt-organizations-business-master-file-extract-eo-bmf. The IRS Exempt Organization Business Master File (EO BMF) Extract provides information on all registered tax-exempt/non-profit organizations. The data utilized for purposes of this description was extracted from the IRS EO BMF data for businesses for the tax year 2020 with revenue less than or equal to $50,000 for Region 1-Northeast Area (58,577), Region 2-Mid-Atlantic and Great Lakes Areas (175,272), and Region 3-Gulf Coast and Pacific Coast Areas (213,840) that includes the continental U.S., Alaska, and Hawaii. This data does not include information for Puerto Rico.

[35] *See* 5 U.S.C. 601(5).

[36] See 13 U.S.C. 161. The Census of Governments survey is conducted every five (5) years compiling data for years ending with "2" and "7". *See also* Census of Governments, https://www.census.gov/programs-surveys/cog/about.html.

special purpose governments in the United States.[37] Of this number, there were 36,931 general purpose governments (county,[38] municipal, and town or township[39]) with populations of less than 50,000 and 12,040 special purpose governments—independent school districts[40] with enrollment populations of less than 50,000.[41] Accordingly, based on the 2017 U.S. Census of Governments data, the Commission estimates that at least 48,971 entities fall into the category of "small governmental jurisdictions."[42]

48. *Fixed Microwave Services.* Fixed microwave services include common carrier,[43] private-operational fixed,[44] and broadcast auxiliary radio services.[45] They also include the

[37] *See* U.S. Census Bureau, 2017 Census of Governments – Organization Table 2. Local Governments by Type and State: 2017 [CG1700ORG02], https://www.census.gov/data/tables/2017/econ/gus/2017-governments.html. Local governmental jurisdictions are made up of general purpose governments (county, municipal and town or township) and special purpose governments (special districts and independent school districts). *See also* tbl.2. CG1700ORG02 Table Notes_Local Governments by Type and State_2017.

[38] *See id.* at Table 5. County Governments by Population-Size Group and State: 2017 [CG1700ORG05], https://www.census.gov/data/tables/2017/econ/gus/2017-governments.html. There were 2,105 county governments with populations less than 50,000. This category does not include subcounty (municipal and township) governments.

[39] *See id.* at Table 6. Subcounty General-Purpose Governments by Population-Size Group and State: 2017 [CG1700ORG06], https://www.census.gov/data/tables/2017/econ/gus/2017-governments.html. There were 18,729 municipal and 16,097 town and township governments with populations less than 50,000.

[40] *See id.* at Table 10. Elementary and Secondary School Systems by Enrollment-Size Group and State: 2017 [CG1700ORG10], https://www.census.gov/data/tables/2017/econ/gus/2017-governments.html. There were 12,040 independent school districts with enrollment populations less than 50,000. *See also* Table 4. Special-Purpose Local Governments by State Census Years 1942 to 2017 [CG1700ORG04], CG1700ORG04 Table Notes_Special Purpose Local Governments by State_Census Years 1942 to 2017.

[41] While the special purpose governments category also includes local special district governments, the 2017 Census of Governments data does not provide data aggregated based on population size for the special purpose governments category. Therefore, only data from independent school districts is included in the special purpose governments category.

[42] This total is derived from the sum of the number of general purpose governments (county, municipal and town or township) with populations of less than 50,000 (36,931) and the number of special purpose governments - independent school districts with enrollment populations of less than 50,000 (12,040), from the 2017 Census of Governments - Organizations Tables 5, 6 & 10.

[43] *See* 47 CFR part 101, Subparts C and I.

[44] *See id.* Subparts C and H.

[45] Auxiliary Microwave Service is governed by part 74 of Title 47 of the Commission's Rules. *See* 47 CFR part 74. Available to licensees of broadcast stations and to broadcast and cable network entities, broadcast 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 mobile TV pickups, which relay signals from a remote location back to the studio.

UMFUS,[46] Millimeter Wave Service (70/80/90 GHz),[47] Local Multipoint Distribution Service (LMDS),[48] the Digital Electronic Message Service (DEMS),[49] 24 GHz Service,[50] Multiple Address Systems (MAS),[51] and Multichannel Video Distribution and Data Service (MVDDS),[52] where in some bands licensees can choose between common carrier and non-common carrier status.[53] Wireless Telecommunications Carriers (*except* Satellite)[54] is the closest industry with a SBA small business size standard applicable to these services. The SBA small size standard for this industry classifies a business as small if it has 1,500 or fewer employees.[55] U.S. Census Bureau data for 2017 show that there were 2,893 firms that operated in this industry for the entire year.[56] Of this number, 2,837 firms employed fewer than 250 employees.[57] Thus under the SBA size standard, the Commission estimates that a majority of fixed microwave service licensees can be considered small.

49. The Commission's small business size standards with respect to fixed microwave services involve eligibility for bidding credits and installment payments in the auction of licenses for the various frequency bands included in fixed microwave services. When bidding credits are adopted for the auction of licenses in fixed microwave services frequency bands, such credits

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[46] *See* 47 CFR part 30.

[47] *See* 47 CFR part 101, Subpart Q.

[48] *See id.* Subpart L.

[49] *See id.* Subpart G.

[50] *See id.*

[51] *See id.* Subpart O.

[52] *See id.* Subpart P.

[53] *See* 47 CFR 101.533 and 101.1017.

[54] *See* U.S. Census Bureau, *2017 NAICS Definition, "517312 Wireless Telecommunications Carriers* (*except Satellite*)," https://www.census.gov/naics/?input=517312&year=2017&details=517312.

[55] *See* 13 CFR 121.201, NAICS Code 517312 (as of 10/1/22, NAICS Code 517112).

[56] *See* U.S. Census Bureau, *2017 Economic Census of the United States*, *Employment Size of Firms for the U.S.: 2017,* Table ID: EC1700SIZEEMPFIRM, NAICS Code 517312, https://data.census.gov/cedsci/table?y=2017&n=517312&tid=ECNSIZE2017.EC1700SIZEEMPFIRM&hidePreview=false.

[57] *Id.* The available U.S. Census Bureau data does not provide a more precise estimate of the number of firms that meet the SBA size standard.

may be available to several types of small businesses based average gross revenues (small, very small and entrepreneur) pursuant to the competitive bidding rules adopted in conjunction with the requirements for the auction and/or as identified in part 101 of the Commission's rules for the specific fixed microwave services frequency bands.[58]

50. In frequency bands where licenses were subject to auction, the Commission notes that as a general matter, the number of winning bidders that qualify as small businesses at the close of an auction does not necessarily represent the number of small businesses currently in service. Further, the Commission does not generally track subsequent business size unless, in the context of assignments or transfers, unjust enrichment issues are implicated. Additionally, since the Commission does not collect data on the number of employees for licensees providing these services, at this time the Commission is not able to estimate the number of licensees with active licenses that would qualify as small under the SBA's small business size standard.

51. *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.[59] 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.[60] The SBA small business size standard for this industry classifies businesses having 1,250 employees or less as small.[61] U.S. Census Bureau data for 2017 show that there were 656 firms in this industry that operated for the entire

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[58] *See* 47 CFR 101.538(a)(1) through (3), 101.1112(b) through (d), 101.1319(a)(1) through (2), and 101.1429(a)(1) through (3).

[59] *See* U.S. Census Bureau, *2017 NAICS Definition, "334220 Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing,*" https://www.census.gov/naics/?input=334220&year=2017&details=334220.

[60] *Id.*

[61] *See* 13 CFR 121.201, NAICS Code 334220.

year.[62] Of this number, 624 firms had fewer than 250 employees.[63] Thus, under the SBA size standard, the majority of firms in this industry can be considered small.

52. *Satellite Telecommunications.* This industry comprises firms "primarily engaged in providing telecommunications services to other establishments in the telecommunications and broadcasting industries by forwarding and receiving communications signals via a system of satellites or reselling satellite telecommunications."[64] Satellite telecommunications service providers include satellite and earth station operators. The SBA small business size standard for this industry classifies a business with $38.5 million or less in annual receipts as small.[65] U.S. Census Bureau data for 2017 show that 275 firms in this industry operated for the entire year.[66] Of this number, 242 firms had revenue of less than $25 million.[67] Additionally, based on Commission data in the 2021 Universal Service Monitoring Report, as of December 31, 2020, there were 71 providers that reported they were engaged in the provision of satellite telecommunications services.[68] Of these providers, the Commission estimates that approximately

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[62] *See* U.S. Census Bureau, *2017 Economic Census of the United States*, *Employment Size of Firms for the U.S.: 2017,* Table ID: EC1700SIZEEMPFIRM, NAICS Code 334220, https://data.census.gov/cedsci/table?y=2017&n=334220&tid=ECNSIZE2017.EC1700SIZEEMPFIRM&hidePreview=false.

[63] *Id.* The available U.S. Census Bureau data does not provide a more precise estimate of the number of firms that meet the SBA size standard.

[64] *See* U.S. Census Bureau, *2017 NAICS Definition, "517410 Satellite Telecommunications,"* https://www.census.gov/naics/?input=517410&year=2017&details=517410.

[65] *See* 13 CFR 121.201, NAICS Code 517410.

[66] *See* U.S. Census Bureau, *2017 Economic Census of the United States*, *Selected Sectors: Sales, Value of Shipments, or Revenue Size of Firms for the U.S.: 2017,* Table ID: EC1700SIZEREVFIRM, NAICS Code 517410, https://data.census.gov/cedsci/table?y=2017&n=517410&tid=ECNSIZE2017.EC1700SIZEREVFIRM&hidePreview=false.

[67] *Id.* The available U.S. Census Bureau data does not provide a more precise estimate of the number of firms that meet the SBA size standard. The Commission also notes that according to the U.S. Census Bureau glossary, the terms receipts and revenues are used interchangeably, *see* https://www.census.gov/glossary/#term_ReceiptsRevenueServices.

[68] Federal-State Joint Board on Universal Service, Universal Service Monitoring Report at 26, Table 1.12 (2021), https://docs.fcc.gov/public/attachments/DOC-379181A1.pdf.

48 providers have 1,500 or fewer employees.[69] Consequently, using the SBA's small business size standard, a little more than half of these providers can be considered small entities.

53. *Wireless Telecommunications Carriers (except Satellite)*. This industry comprises establishments engaged in operating and maintaining switching and transmission facilities to provide communications via the airwaves.[70] 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.[71] The SBA size standard for this industry classifies a business as small if it has 1,500 or fewer employees.[72] U.S. Census Bureau data for 2017 show that there were 2,893 firms in this industry that operated for the entire year.[73] Of that number, 2,837 firms employed fewer than 250 employees.[74] Additionally, based on Commission data in the 2021 Universal Service Monitoring Report, as of December 31, 2020, there were 797 providers that reported they were engaged in the provision of wireless services.[75] Of these providers, the Commission estimates that 715 providers have 1,500 or fewer employees.[76] Consequently, using the SBA's small business size standard, most of these providers can be considered small entities.

54. *All Other Telecommunications.* This industry is comprised of establishments primarily engaged in providing specialized telecommunications services, such as satellite

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[69] *Id.*

[70] *See* U.S. Census Bureau, *2017 NAICS Definition, "517312 Wireless Telecommunications Carriers (except Satellite),"* https://www.census.gov/naics/?input=517312&year=2017&details=517312.

[71] *Id.*

[72] *See* 13 CFR 121.201, NAICS Code 517312 (as of 10/1/22, NAICS Code 517112).

[73] *See* U.S. Census Bureau, *2017 Economic Census of the United States*, *Employment Size of Firms for the U.S.: 2017,* Table ID: EC1700SIZEEMPFIRM, NAICS Code 517312, https://data.census.gov/cedsci/table?y=2017&n=517312&tid=ECNSIZE2017.EC1700SIZEEMPFIRM&hidePreview=false.

[74] *Id.* The available U.S. Census Bureau data does not provide a more precise estimate of the number of firms that meet the SBA size standard.

[75] Federal-State Joint Board on Universal Service, Universal Service Monitoring Report at 26, Table 1.12 (2021), https://docs.fcc.gov/public/attachments/DOC-379181A1.pdf.

[76] *Id.*

tracking, communications telemetry, and radar station operation.[77] 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.[78] Providers of Internet services (e.g. dial-up ISPs) or Voice over Internet Protocol (VoIP) services, via client-supplied telecommunications connections are also included in this industry.[79] The SBA small business size standard for this industry classifies firms with annual receipts of $35 million or less as small.[80] U.S. Census Bureau data for 2017 show that there were 1,079 firms in this industry that operated for the entire year.[81] Of those firms, 1,039 had revenue of less than $25 million.[82] Based on this data, the Commission estimates that the majority of "All Other Telecommunications" firms can be considered small.

D. Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements for Small Entities

55. The Commission expects the proposed rules in the *NPRM* will impose new or additional reporting or recordkeeping and/or other compliance obligations on small entities as well as other licensees and applicants. At this time however, the Commission is not in a position to determine whether, if adopted, its proposals and the matters upon which it seeks comment will require small entities to hire professionals to comply and cannot quantify the cost of compliance

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[77] *See* U.S. Census Bureau, *2017 NAICS Definition*, "*517919 All Other Telecommunications,*" https://www.census.gov/naics/?input=517919&year=2017&details=517919.

[78] *Id.*

[79] *Id.*

[80] *See* 13 CFR 121.201, NAICS Code 517919 (as of 10/1/22, NAICS Code 517810).

[81] *See* U.S. Census Bureau, *2017 Economic Census of the United States*, *Selected Sectors: Sales, Value of Shipments, or Revenue Size of Firms for the U.S.: 2017,* Table ID: EC1700SIZEREVFIRM, NAICS Code 517919, https://data.census.gov/cedsci/table?y=2017&n=517919&tid=ECNSIZE2017.EC1700SIZEREVFIRM&hidePreview=false.

[82] *Id.* The available U.S. Census Bureau data does not provide a more precise estimate of the number of firms that meet the SBA size standard. The Commission also notes that according to the U.S. Census Bureau glossary, the terms receipts and revenues are used interchangeably, *see* https://www.census.gov/glossary/#term_ReceiptsRevenueServices.

with the potential rule changes discussed herein.

56. Depending on the licensing model the Commission ultimately adopts for the 42 GHz band, applicants for licenses may be required to coordinate their proposed operations with other licensees and applicants. Under the relevant licensing models, such coordination would be necessary to ensure that neighboring operations will not interfere with each other. The Commission seeks comment on the cost to small entities for this potential coordination with operations.

57. Small entities and other applicants in the 42 GHz band may be required to meet buildout requirements. Depending on the type of buildout requirement the Commission ultimately adopts, licensees may 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 or registered site area. Any performance or buildout requirements the Commission adopts will be structured to ensure that spectrum is being put into use and to encourage rapid deployment of next generation wireless services, including 5G, which would benefit small entities and the industry as a whole. The Commission seeks comment as to the potential equipment, operational and implementation costs to small entities working towards complying with these buildout requirements.

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

58. The RFA requires an agency to describe any significant, specifically small business, alternatives that it has considered in reaching its proposed approach, which may include the following four alternatives (among others): "(1) the establishment of differing compliance or reporting requirements 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."[83]

59. The Commission believes the potential licensing models on which it seeks comment would facilitate access to spectrum by small businesses and a wide variety of other entities. However, to assist in the Commission's evaluation of the economic impact on small entities as a result of actions that have been proposed in the *NPRM*, and to better explore options and alternatives, the Commission has sought comment from the parties. Of particular interest are those comments providing insight as to whether any of the costs associated with any potential performance or buildout requirements 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 *NPRM*.

F. Federal Rules that May Duplicate, Overlap, or Conflict with the Proposed Rules

60. None.

III. ORDERING CLAUSES

61. Accordingly, IT IS ORDERED, pursuant to sections 1, 2, 4, 301, 302, 303, 304, 307, 309, and 310 of the Communications Act of 1934, 47 U.S.C. 151, 152, 154, 301, 302a, 303, 304, 307, and 309, § 604 of the MOBILE NOW Act, 47 U.S.C. 1503, and § 1.411 of the Commission's Rules, 47 CFR 1.411, that this *Notice of Proposed Rulemaking* IS HEREBY ADOPTED.

62. IT IS FURTHER ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, SHALL SEND a copy of this *Notice of Proposed Rulemaking*, including the Initial Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration.

FEDERAL COMMUNICATIONS COMMISSION.

Marlene Dortch,

[83] 5 U.S.C. 603(a)(1) through (4).

Secretary,

Office of the Secretary.

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