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I. INTRODUCTION

1. In this *Seventh Report and Order and Ninth Further Notice of Proposed Rulemaking*, we establish a comprehensive and coordinated nationwide approach to managing the 4.9 GHz (4940-4990 MHz) band while retaining its locally controlled, public safety nature. In doing so, we solidify the band’s status as public safety spectrum, while also allowing secondary, non-public safety use as agreed to by public safety licensees through a new leasing model. Critical to this vision for the 4.9 GHz band is the addition of a nationwide Band Manager, which will be selected based on its expertise and connections to the public safety community and will coordinate all operations in the band to ensure that any non-public safety use remains fully secondary to, and preemptible by, public safety operations. This nationwide framework will optimize public safety use and enable the integration of the latest commercially available technologies, such as 5G.

2. The *Seventh Report and Order* also modifies our rules to allow for the collection of granular data on public safety operations in the 4.9 GHz band. These data combined with a formal coordination structure performed by the Band Manager will improve interference mitigation efforts, bolster public safety confidence in the band, and will play a crucial role in the Band Manager’s ability to find opportunities for secondary, non-public safety access. We also make several changes to the technical rules for the band to promote more robust public safety operations. Finally, in the *Ninth Further Notice*, we seek comment on the details of implementing the new leasing model to achieve our goals of allowing robust locally controlled public safety operations while ensuring consistent, nationwide rules that promote overall spectral efficiency, foster innovation, and drive down equipment costs.

II. BACKGROUND

A. Current 4.9 GHz Band Rules

3. The current licensing and regulatory regime for the 4.9 GHz band is significantly different from other public safety bands. As an initial matter, the 4.9 GHz band has looser eligibility requirements; unlike the 700 MHz band which has statutorily defined eligibility criteria,¹ or the Public Safety pool which has Commission-defined eligibility criteria,² an entity need only provide public safety

¹ See 47 U.S.C. § 337(f)(1)(B).

² See 47 CFR § 90.20.

services to be eligible for a 4.9 GHz license.³ Licensees include state and local government entities,⁴ as well as nongovernmental organizations (NGOs) that support communications essential to services having the sole or principal purpose of protecting the safety of life, health, or property.⁵

4. The 4.9 GHz band is shared amongst eligible licensees—no licensee has a right to exclusive, or interference free, access to the band.⁶ Similarly, unlike other public safety bands that only authorize operations on specific frequencies and in clearly delineated geographic areas, 4.9 GHz band licenses authorize operation on any channel over the entire 50 megahertz of the band and are generally issued for the geographic area encompassing the legal jurisdiction of the licensee.⁷ Moreover, a 4.9 GHz licensee has blanket authority to operate base stations and mobile units (including portables and handheld units) and/or temporary (one year or less) fixed stations anywhere within its authorized area.⁸ Our rules also permit eligible entities to license fixed point-to-point (P-P) and point-to-multipoint (P-MP) operations on specific channels within their jurisdictions, although only those fixed sites that are used to deliver broadband service are accorded “primary” status under the rules.⁹

5. While licensees in this band are geographically limited to the state or local jurisdictions specified on the license,¹⁰ they are also permitted to operate base stations with mobile units and temporary fixed stations outside their authorized area with the permission of the jurisdiction in which they will operate.¹¹ This licensing scheme means that licenses often overlap with one or more geographic area licenses covering a given location and authorizing operations on the same spectrum, as well as multiple fixed-site licenses in the same area.¹² The Commission established this flexible structure based on public safety agencies’ unique history of coordination with one another in the use of shared frequencies.¹³ Our 4.9 GHz rules, however, historically have not specified a formal coordination requirement.¹⁴

³ *Id.* § 90.1203(a) (referring to 47 CFR § 90.523(b) which allows a nongovernmental organization that provides services, the sole or principal purpose of which is to protect the safety of life, health, or property, to hold a license in the band).

⁴ *Id.* § 90.523(a).

⁵ *Id.* § 90.523(b). In addition, to establish eligibility, a NGO must also secure and maintain the support for the right to operate its system from a state or local governmental entity whose mission is to oversee or provide services that have the sole or principal purpose of protecting the safety of life, health or property, and the NGO must provide a written certification of such support in any submitted application. *Id.*

⁶ *Id.* § 90.1209(a).

⁷ *Id.* § 90.1207(a). In the case of a NGO, the license is issued for the legal jurisdiction of the state or local government entity supporting the NGO. *Id.* Some licenses are issued for only part of a licensee’s jurisdiction, for example, an area defined by a point and a specified radius of operation.

⁸ *Id.* § 90.1207(b).

⁹ *Id.* § 90.1207(d).

¹⁰ *Id.* § 90.1207.

¹¹ *Id.* § 90.1207(c).

¹² For example, a common scenario might involve a statewide license held by the state police, a county-wide license held by the sheriff’s department, and fixed-site licenses operating in the same area by various public safety entities. Licensees informally cooperate with one another to ensure that their operations do not cause interference with one another, and to resolve interference if it occurs.

¹³ *The 4.9 GHz Band Transferred from Federal Government Use*, Memorandum Opinion and Order and Third Report and Order, 18 FCC Rcd 9152, 9164, para. 28 (2003) (*4.9 GHz Third Report and Order*) (“We note that many public safety agencies already have procedures or protocols in place with nearby jurisdictions to govern frequency sharing during situations requiring joint operations.” The Commission also explained that “the nature of public safety operations in general will . . . facilitate this sharing requirement.”).

¹⁴ 47 CFR §§ 90.175(j)(22), 90.1209(b).

B. Current State of the 4.9 GHz Band

6. There are 3,541 licenses currently issued in the band.¹⁵ This includes 137 statewide area licenses, 1,145 countywide area licenses, and 2,259 other licenses, either for geographic area licenses or other types (such as for a group of counties, a city, or parts of one or more cities) or for fixed sites.¹⁶ Most of the United States and U.S. territories are covered by at least one statewide license.¹⁷ In some states, multiple state entities hold statewide licenses.¹⁸ Licensees use P-P and P-MP operations, to facilitate video streaming, communications system backhaul, and data connections for advanced devices.¹⁹ Commenters have suggested that emerging and potential uses of the band may include robotics and airborne operations, as well as the Internet of Things.²⁰

C. Procedural History

7. In 2002, the Commission designated the 4.9 GHz band for public safety use.²¹ Operations in the band are limited to those in support of public safety operations²² and licenses for the band are exclusively available to public safety entities or those operating in support of public safety.²³ Since the designation of the band, the rules have evolved in response to changing conditions, including

¹⁵ *Universal Licensing System*, FCC, <https://wireless2.fcc.gov/UlsApp/UlsSearch/searchLicense.jsp> (last visited Jan. 10, 2023).

¹⁶ For example, Southwestern NH District Fire Mutual Aid holds a license, call sign WQNM520, covering three counties in New Hampshire.

¹⁷ The following states/territories are not covered by a statewide license: American Samoa, Georgia, Iowa, Kansas, the Northern Mariana Islands, and South Dakota.

¹⁸ For example, the State of Maryland holds a statewide 4.9 GHz band license (WPYX998), as do four other agencies of the Maryland state government (Maryland State Highway Administration – WQAN291; Maryland Department of Information Technology – WPYZ305; Maryland DNR – WPYT728; Maryland MIEMSS – WQAL856).

¹⁹ *Amendment of Part 90 of the Commission's Rules*, WP Docket No. 07-100, Order on Reconsideration and Eighth Further Notice of Proposed Rulemaking, 36 FCC Rcd 15032, 15036, para. 9 (2021) (*Order on Reconsideration or Eighth Further Notice*).

²⁰ Letter from Ralph A. Haller, Chairman, National Public Safety Telecommunications Council, to Marlene H. Dortch, Secretary, FCC, WP Docket No. 07-100, at 3 (filed Aug. 13, 2021) (NPSTC Aug. 13, 2021, *Ex Parte*) (“The NPSTC recommendations incorporate provisions for new public safety operations that advances in robotics, the internet of things (IoT) and unmanned aerial systems technologies are generating.”); *see also* IAFC Nov. 23, 2021, Comments at 6-7 (“The IAFC also agrees with NPSTC that 4.9 GHz spectrum can be instrumental in supporting emerging technologies beneficial to public safety, including aeronautical, both manned and unmanned (UAS), robotics and the public safety Internet of Things (PS IoT).”); EWA Nov. 29, 2021, Comments at 8-9 (“Designating specific 4.9 GHz channels for UAS, for robotics, and for IoT technologies will further promote efficient use of this spectrum.”). While Commission rule, section 90.1205(c), 47 CFR § 90.1205(c), currently prohibits aeronautical mobile operations, some operations have been authorized through rule waiver. *See, e.g.*, City of Long Beach, California, call sign WQJE424.

²¹ *See The 4.9 GHz Band Transferred from Federal Government Use*, WT Docket No. 00-32, Second Report and Order and Further Notice of Proposed Rulemaking, 17 FCC Rcd 3955 (2002) (*Second Report and Order*).

²² 47 CFR § 90.1203(b).

²³ *Id.* § 90.1203(a).

band use and technological innovation.²⁴ In these endeavors, the Commission has sought to increase the use of the band with the goal of maximizing the spectrum's potential.²⁵

8. *Sixth Further Notice.* On March 23, 2018, the Commission adopted the *Sixth Further Notice*. The *Notice*, drawing on comments in the record as well as a plan submitted by NPSTC in 2013 and a report provided by APCO in 2015,²⁶ sought comment on several alternatives to stimulate investment in, as well as expand use of, the 4.9 GHz band.

9. *Freeze Public Notice.* In an effort to stabilize the band while the Commission considers changes to its rules as part of this proceeding,²⁷ on September 8, 2020, the Public Safety and Homeland Security Bureau (PSHSB) and the Wireless Telecommunications Bureau (WTB) (collectively the Bureaus) announced a freeze on applications in the 4.9 GHz band.²⁸ Pursuant to the *Freeze Public Notice*, the Bureaus stopped accepting applications for new or modified licenses, including both geographic area licenses and individual fixed-site licenses.²⁹

10. *Sixth Report and Order and Seventh Further Notice.* On September 30, 2020, the Commission adopted the *Sixth Report and Order and Seventh Further Notice* in this proceeding.³⁰ The new leasing framework adopted in the *Sixth Report and Order* granted states the option to lease spectrum access through a single statewide entity designated as the State Lessor to state and local entities—whether public safety or non-public safety—as well as to commercial and other private entities in their

²⁴ See, e.g., *Order on Reconsideration and Eighth Further Notice*, 36 FCC Rcd 15032; *Amendment of Part 90 of the Commission's Rules*, WP Docket No. 07-100, *Sixth Report and Order and Seventh Further Notice of Proposed Rulemaking*, 36 FCC Rcd 1958 (2020) (*Sixth Report and Order* or *Seventh Further Notice*); *Amendment of Part 90 of the Commission's Rules*, WP Docket No. 07-100, *Sixth Further Notice of Proposed Rulemaking*, 33 FCC Rcd 3261 (2018) (*Sixth Further Notice*).

²⁵ The Commission has also received extensive input from public safety organizations such as the Association of Public-Safety Communications Officials-International, Inc. (APCO) and the National Public Safety Telecommunications Council (NPSTC). See, e.g., APCO International, 4.9 GHz Task Force Report (2015), <https://ecfsapi.fcc.gov/file/60001325364.pdf>, (APCO Sept. 28, 2015 Report); NPSTC, 4.9 GHz National Plan Recommendations Final Report (2013), https://npstc.org/download.jsp?tableId=37&column=217&id=3222&file=4_9_GHz_National_Plan_Report_131024.pdf, (NPSTC Oct. 24, 2013 Plan).

²⁶ *Sixth Further Notice*, 33 FCC Rcd at 3262, para. 3; NPSTC Oct. 24, 2013 Plan; APCO Sept. 28, 2015 Report.

²⁷ This proceeding began in 2007, and has been the subject of ongoing efforts from the Commission and the public safety community to make the most of this valuable spectrum. *Amendment of Part 90 of the Commission's Rules*, WP Docket No. 07-100, Notice of Proposed Rulemaking, 22 FCC Rcd 9595 (2007).

²⁸ *Public Safety and Homeland Security Bureau and Wireless Telecommunications Bureau Announce Temporary Filing Freeze on the Acceptance and Processing of Certain Part 90 Applications for the 4940-4990 MHz Band*, WP Docket No. 07-100, Public Notice, 35 FCC Rcd 9522 (PSHSB/WTB 2020) (*Freeze Public Notice*). The *Freeze Public Notice* also noted that any 4.9 GHz licensee could seek relief from the freeze through the Commission's waiver provisions. *Id.* at 9523.

²⁹ See *Freeze Public Notice*.

³⁰ *Sixth Report and Order*, 36 FCC Rcd at 1959. In the *Seventh Further Notice*, the Commission, among other things, proposed an expansion of the new state-based framework to include public safety operations and proposed to amend its 4.9 GHz licensing rules to limit future licensing to state entities seeking a statewide license in states without an existing statewide license for purposes of this coordination. *Seventh Further Notice*, 36 FCC Rcd at 1977-82, paras. 48-60.

jurisdictions.³¹ State Lessors were also permitted to use the band for non-public safety purposes themselves.³²

11. *Order on Reconsideration and Eighth Further Notice*. The Commission subsequently adopted the *Order on Reconsideration and Eighth Further Notice* on September 30, 2021.³³ The *Order on Reconsideration*, issued before the framework adopted in the *Sixth Report and Order* could become effective, granted three public safety organization petitions insofar as they sought reconsideration of the rules adopted in the *Sixth Report and Order*.³⁴ We agreed that, rather than allowing State Lessors to use and lease the band for non-public safety purposes, the public interest would be better served by considering other models, in particular those that advanced a single, nationwide framework for the band. As discussed below, the Commission also directed the Bureaus to lift, in part, the licensing freeze adopted in advance of the *Sixth Report and Order*, thereby allowing incumbents to modify their existing licenses or to license new permanent fixed sites. The freeze was to remain in place as to non-incumbent applicants for 4.9 GHz band licenses.

12. In the *Eighth Further Notice*, the Commission sought comment on important technical and policy questions concerning how to maximize the use of the band to support public safety, leverage technological advancements (such as 5G), foster a robust equipment market, and address non-public safety use of the band on a nationwide basis.³⁵ In contrast to the State Lessor model, which would have led to different practices for the band in different states, the Commission sought comment on a unified approach across the entire country. We thus sought input on requiring formal frequency coordination in the 4.9 GHz band to support interference protection and increase public safety confidence in using the band.³⁶ In addition, the Commission asked about the role of the Regional Planning Committees (RPCs), and whether, if we adopted frequency coordination requirements, the RPCs have the technical expertise and resources to serve as coordinators.³⁷ We also solicited feedback on several alternatives to promote innovation, stimulate investment, and facilitate robust public safety access in the 4.9 GHz band.³⁸ Further, the Commission sought comment on establishing a database that would contain consistent and reliable information about what spectrum is available and where and how it is being used.³⁹

13. Alongside these potential changes, the Commission inquired about allowing non-public safety use of the band to encourage a more robust and innovative equipment market without causing

³¹ *Sixth Report and Order*, 36 FCC Rcd at 1959, para. 2. The Commission only permitted states that are not identified in the Commission's 911 Fee Report from December 2019 as diverting 911 fees for non-911 purposes to lease spectrum rights to non-public safety or public safety entities. *Id.* at 1967-68, paras. 23-24; *see also* FCC, Eleventh Annual Report to Congress on State Collection and Distribution of 911 and Enhanced 911 Fees and Charges at 39, para. 27 (2019), <https://www.fcc.gov/files/11thannual911feereport2019pdf>.

³² *Sixth Report and Order*, 36 FCC Rcd at 1971-72, paras. 35-36.

³³ *Order on Reconsideration and Eighth Further Notice*, 36 FCC Rcd at 15032. On May 27, 2021, the Commission granted the Public Safety Spectrum Alliance's Petition for Stay of the *Sixth Report and Order*, which stayed the implementation of the new leasing framework adopted in the *Sixth Report and Order* for the 4.9 GHz band, which had not yet become effective, pending a Commission decision on the petitions for reconsideration filed in this proceeding. *Amendment of Part 90 of the Commission's Rules*, WP Docket No. 07-100, Order, 36 FCC Rcd 9761 (2021) (*Stay Order*).

³⁴ Petitions for reconsideration were filed by PSSA, APCO, and NPSTC. *Order on Reconsideration*, 36 FCC Rcd at 15038-42, paras. 16-26.

³⁵ *Eighth Further Notice*, 36 FCC Rcd at 15042-62, paras. 27-89.

³⁶ *Id.* at 15048-50, paras. 45-50.

³⁷ *Id.* at 15051-52, paras. 54-56.

³⁸ *Id.* at 15052-53, paras. 57-60.

³⁹ *Id.* at 15044-46, paras. 32-36.

harmful interference to public safety operations in the band.⁴⁰ The Commission emphasized the importance of public safety operations in this band, but sought comment on how allowing non-public safety use could not only lower equipment and deployment costs but also increase efficient use of spectrum, without undermining critical public safety operations.

14. In addition, we sought comment on implementing a nationwide spectrum management framework reflecting public safety input that “will promote more opportunistic use of the 4.9 GHz band without compromising the integrity and security of public safety operations.”⁴¹ More specifically, the Commission asked about designating a single entity to serve as a nationwide band manager or licensee for the 4.9 GHz band and what its responsibilities would be under such an approach.⁴²

15. *Freeze Modification Public Notice.* On October 21, 2021, pursuant to the *Order on Reconsideration*, the Bureaus amended the freeze to allow those with existing 4.9 GHz licenses to seek to modify those licenses, whether for permanent fixed sites or geographic areas, as permitted under the rules.⁴³

III. SEVENTH REPORT AND ORDER

A. Overview and Key Findings

16. Today we adopt rules that create a comprehensive and coordinated nationwide approach to the 4.9 GHz band, centralizing management in a single Band Manager, while retaining local control over operations conducted by individual public safety licensees. This framework will retain the band’s existing status as a locally controlled public safety band, but with more rationalized and coordinated public safety operations on a nationwide level. Each licensee will retain the authority to decide for itself how best to use the band, given its unique circumstances and needs, but within the context of a predictable and consistent spectral framework nationwide. This will enable greater public safety use, including for 5G, and allow the Band Manager to work with public safety licensees to rationalize their use and consolidate their operations, potentially freeing up new opportunities for expanded use. These expanded operations will encompass both primary public safety use and, subject to coordination by the Band Manager, secondary non-public safety use, the latter of which will be subject to preemption by public safety operations. This balanced approach will spur innovation and drive down costs, enabling more efficient use of this important mid-band spectrum.

17. Implementing a centralized coordination strategy will provide better information and certainty about existing users and public safety deployments, which in turn will help leverage new technologies, lower equipment costs, attract new users, facilitate effective frequency coordination and interference protection, and promote interoperability. We believe this structure will foster greater development and deployment of 4.9 GHz band equipment and systems, increasing spectral efficiency and furthering the public interest, while retaining the operational flexibility and local control that have been

⁴⁰ *Id.* at 15054-60, paras. 61-86.

⁴¹ *Id.* at 15042-62, paras. 27-89; *see also Sixth Further Notice*, 33 FCC Rcd at 3262, para. 3.

⁴² *Eighth Further Notice*, 36 FCC Rcd at 15050-51, paras. 51-53.

⁴³ *Public Safety and Homeland Security Bureau and Wireless Telecommunications Bureau Modify Temporary Filing Freeze on the Acceptance and Processing of Certain Part 90 Applications for the 4940-4990 MHz Band*, WP Docket No. 07-100, Public Notice, 36 FCC Rcd 15185 (PSHSB/WTB 2021) (*Freeze Modification Public Notice*); *Order on Reconsideration*, 36 FCC Rcd at 15041-42, para. 25. In the *Order on Reconsideration* we gave the example that an incumbent licensee is permitted to add base stations within its jurisdiction. 47 CFR § 90.1207(c). Also, an incumbent licensee may continue to seek an individual station license if required pursuant to Commission rule section 90.1207(b)(1). *Id.* § 90.1207(b)(1). In addition to new deployments within its jurisdiction pursuant to an existing geographic area license, a public safety entity may expand operations through leasing from a State Lessor. *Order on Reconsideration*, 36 FCC Rcd at 15041-42, para. 25.

the hallmarks of the band's structure. This will move the band away from being underutilized and towards being a workhorse not only for public safety operations, but also for non-public safety uses.

B. Band Manager

18. In the *Eighth Further Notice*, the Commission sought comment on revisions to the 4.9 GHz service rules to expand access to the band, spur innovation, improve coordination, and drive down costs for operators and end users through a new, nationwide framework for the band.⁴⁴ We noted the critical importance of incumbent public safety operations and the need to preserve local control over the band, both to accommodate the localized nature of public safety operations and to continue to allow the wide range of public safety uses that the band hosts.⁴⁵ At the same time, we emphasized that it was crucial that there be a single set of rules governing the band nationwide.⁴⁶ We pointed out that centralizing management of the band would help ensure that public safety operators have consistent rules and a harmonized equipment marketplace, and that any non-public safety use would be standardized and predictable.⁴⁷

19. The Commission also solicited comment on different ways to balance these goals, including via designation of a nationwide Band Manager.⁴⁸ We pointed to our experience with band managers in the 700 MHz Guard Bands and the 220 MHz band as precedents for using such an entity to establish a nationwide framework here.⁴⁹ Commenters expressed significant support for a nationwide band manager stating that doing so “further ensure[s] public safety interoperability”⁵⁰ and that it is “the most effective way to maximize the utilization of the 4.9 GHz band.”⁵¹

20. In this *Seventh Report and Order*, we adopt a single, nationwide framework for the 4.9 GHz band, that is centered around a new Band Manager, which will be equipped with additional information about the current public safety use of the band and empowered to work with public safety licensees to ensure efficient use of this spectrum and enable new, non-commercial operations on a secondary, preemptible basis. We believe that a nationwide Band Manager will be able to effectively protect the interests of incumbent public safety users by establishing consistent, nationwide rules governing use of the band and providing new opportunities for non-public safety access to the band.⁵²

⁴⁴ *Eighth Further Notice*, 36 FCC Rcd at 15042-43, para. 27.

⁴⁵ *Id.* at 15048, para. 44.

⁴⁶ *Id.* at 15050, para. 51.

⁴⁷ *Id.*

⁴⁸ *Id.* at 15050-51, paras. 51-53.

⁴⁹ *Id.* at 15050, para. 52.

⁵⁰ SBC Jan. 10, 2022, Reply at 4-6.

⁵¹ PSSA Nov. 29, 2021, Comments at 5-6, 9, 11 (stating “. . . the most-effective way to maximize the utilization of the 4.9 GHz band is to create a nationwide license and authorize a nationwide band manager to implement and enforce priority and preemption rights for public safety, and to permit use of the band for 5G public safety services, while also allowing secondary use of the spectrum on a noninterfering and pre-emptible basis”); *see also* IAFC Dec. 20, 2021, Reply at 4 (agreeing “with the PSSA that a nationwide band manager would be the most efficient way to ensure consistency throughout the country”, adding that “a nationwide band manager would implement and enforce priority and preemption rights for public safety and allow secondary use of the spectrum on a noninterfering and preemptive basis.”); Neil Horden Jan. 18, 2022, *Ex Parte* at 2 (“Only the establishment of a national strategy and national coordination, licensing, and leasing can maximize the use and utility of the spectrum.”); Letter from American Petroleum Institute, et al, to Marlene H. Dortch, WP Docket No. 07-100, at 2 (filed Aug. 25, 2022) (API et al. Aug. 25, 2022, *Ex Parte*) (supporting the implementation of a band manager-like entity that would be responsible for the “development of a 4.9 GHz spectrum band utilization strategy and policies”).

⁵² *See* IACP Nov. 29, 2021, Comments at 3; IAFC Nov. 23, 2021, Comments at 5-6 (“The band manager must also be empowered to clear 4.9 GHz spectrum of secondary users when public safety users need the band for local,

(continued....)

We also believe this approach will spur innovation and drive down costs while ensuring full protection for authorized public safety operations.⁵³ Crucially, the Band Manager will ensure that local governments can continue to use the band to suit their unique spectrum needs, while promoting the most efficient use of spectrum and creating a consistent and clear band framework nationwide. We therefore find that designating a nationwide Band Manager to coordinate public safety access and facilitate the introduction of non-public safety services to the band will best serve the public interest.

1. Selecting the Band Manager

21. In the *Eighth Further Notice*, we sought comment on the process for accepting applications and selecting the entity that will manage leasing to non-public safety entities.⁵⁴ We also sought comment on the criteria to be used to certify coordinators of public safety operations in the band.⁵⁵ Based on past Commission experience, we find that it is in the public interest for the Band Manager—who will fill both roles—to be chosen by a selection committee that represents and ensures the involvement of the relevant stakeholders, in particular the public safety community. The Commission has successfully used similar selection committees in other proceedings, such as the 700 MHz and 800 MHz proceedings,⁵⁶ and most recently in the 3.7 GHz⁵⁷ and 3.45 GHz⁵⁸ clearinghouse selections, to enable interested parties to choose who can most effectively manage complex coordination efforts. In the 3.7 GHz proceeding, for example, the Commission used a selection committee to evaluate and choose the 3.7 GHz relocation clearinghouse, the entity responsible for the multi-billion dollar relocation reimbursement process, which is an essential component of transitioning that critical mid-band spectrum to enable new wireless operations.⁵⁹ A similar process is underway in the 3.45 GHz band.⁶⁰ These selection committees have successfully incorporated feedback from relevant stakeholders to facilitate the choice of well-qualified clearinghouse candidates in the aforementioned bands. We believe using a selection committee in the 4.9 GHz band will similarly enable the efficient use of mid-band spectrum here, while ensuring that the Band Manager is representative of and fully supported by the public safety community.

22. A stakeholder-led process will be particularly useful for the selection of the Band Manager in the instant case, because the Band Manager's connections with the public safety community will form the backbone of its work. The trust and understanding of the public safety community, as well as its voluntary cooperation with and buy-in to the Band Manager's mission, will be essential to achieving

regional, or even nationwide incidents.”); PSSA Jan. 11, 2022, Reply at 2 (“As the PSSA previously stated, a nationwide license is the most effective way to maximize the utilization of the 4.9 GHz Band, and the most efficient way to ensure that public safety users enjoy priority and preemption.”); Seybold Dec. 22, 2021, Reply at 2; SBC Jan. 10, 2022, Reply at 4-6; AT&T Jan. 11, 2022, Reply at 3 (“Although utilized intensively by public safety entities in some state and local jurisdictions under the current regulatory framework, the 4.9 GHz band can and should be more efficiently managed through a nationwide, public safety-led approach.”); ETSB Jan. 21, 2022, *Ex Parte* at 8 (“The ETSB supports the use of a single entity to serve as a nationwide band manager[.]”).

⁵³ *Eighth Further Notice*, 36 FCC Rcd at 15048, para. 45.

⁵⁴ *Id.* at 15050-51, paras. 52-53.

⁵⁵ *Id.* at 15049, para. 50.

⁵⁶ See 47 CFR § 90.676; see also *id.* § 27.1413(a).

⁵⁷ *Id.* § 27.1414(a).

⁵⁸ *Facilitating Shared Use in the 3100-3550 MHz Band*, WT Docket No. 19-348, Second Report and Order, Order on Reconsideration, and Order of Proposed Modification, 36 FCC Rcd 5987, 6045, para. 163 (2021) (*3.45 GHz Second Report and Order*); see also *Wireless Telecommunications Bureau Seeks Comment on the Selection Process for and Operation of the Reimbursement Clearinghouse for the 3.45 GHz Band*, WT Docket No. 19-348, Public Notice, 36 FCC Rcd 12698 (2021) (*3.45 GHz Search Committee PN*).

⁵⁹ 47 CFR § 27.1414(a).

⁶⁰ *3.45 GHz Band Second Report and Order*, 36 FCC Rcd at 6045, para. 163; *3.45 GHz Search Committee PN*, 36 FCC Rcd 12698.

both band rationalization and use maximization of spectrum rights. The selection committee, which will be named by the Commission, will choose from a pool of qualified applicants, and as in prior cases, the final selection will be subject to a finding by the Commission that the selection satisfies the criteria established by the selection committee. While we seek comment on the rights and responsibilities of the Band Manager—which will form the basis for the committee’s selection criteria—the composition of the selection committee, and other process details in the *Ninth Further Notice*, we find that utilizing a selection committee will ensure that the Band Manager, once chosen, will adequately represent the public safety community and foster a cooperative environment that promotes the efficient management and use of this band. We delegate to the Bureaus the authority to manage the process of determining the selection committee’s responsibilities, including by issuing public notices as necessary to obtain additional comment to address questions regarding the selection committee.

2. Band Manager Responsibilities

23. Once selected, the Band Manager will have three primary responsibilities: (1) frequency coordination; (2) incentivizing the use of the latest commercially available technologies, including 5G; and (3) facilitating secondary non-public safety use. We describe each responsibility below, and seek comment in the *Ninth Further Notice* on questions related to the implementation of these provisions, as well as the Commission’s role in ensuring the Band Manager can achieve these goals.

24. *Frequency Coordination.* In the *Eighth Further Notice*, we sought comment on whether frequency coordination should be incorporated into management of the band to support efficient and interference-free access for public safety operations.⁶¹ Based on record support, we assign to the Band Manager responsibility for performing the frequency coordination function for public safety applicants seeking to license new or modify existing facilities in the band, thus ensuring the efficient assignment and use of spectrum by public safety licensees.⁶² As discussed below,⁶³ the Band Manager will perform its frequency coordination duties consistent with the Commission’s rules, once adopted,⁶⁴ and with input from public safety licensees and applicants to ensure that they are able to access sufficient spectrum for their operations. In doing so, the Band Manager will advise and help public safety licensees and applicants to design their deployments in order to promote efficient and robust use of the band and prevent harmful interference to other licensees. The Band Manager will not, however, have the authority to disallow proposed public safety operations or otherwise limit public safety operations once a public safety entity is licensed to operate in the band. Instead, the Band Manager will provide public safety licensees and applicants with recommendations for the technical characteristics of a proposed system, subject to Commission review in the case of any objections to such recommendations. While the Band

⁶¹ *Eighth Further Notice*, 36 FCC Rcd at 15043, 15048-50, paras. 30, 45-50.

⁶² See PSSA Nov. 29, 2021, Comments at 9-10 (stating that a “band manager should develop a spectrum plan for the use of 5G across the contiguous 50 MHz of spectrum” and “be responsible for developing a sustainable business model for usage of the band that would optimize such use”); IAFC Nov. 23, 2021, Comments at 5 (stating that the Commission should “designate a single nationwide band manager that would be responsible for developing a nationwide framework for the 4.9 GHz band”); Caltrans Nov. 23, 2021, Comments at 5 (“Caltrans proposes that primary tasks for a nationwide band manager include . . . Spectrum Protection [to] ensure that protection from harmful interference is strictly observed. Spectrum Band management [to] ensure that equitable spectrum allocation between public safety and non-public safety use is maintained.”); PSSA Jan. 11, 2022, Reply at 2 (stating that a band manager should be appointed to “coordinate usage of the band, ensure interoperability, and protect public safety operations from interference.”); Seybold Dec. 22, 2021, Reply at 2 (offering support for a “nationwide band manager who will issue the order to provide both the public-safety community and secondary users with the type of network management required by public safety”); Joint Filers Reply at 1-2 (“The Joint Filers believe that the majority of those submitting comments are in general agreement that . . . [t]he rules applicable to the use of the 4.9 GHz should be harmonized with those applicable to other frequency bands supporting public safety communications, including the use of Commission certified frequency coordinators in the licensing process[.]”).

⁶³ See *infra* paras. 36-43.

⁶⁴ See *infra* paras. 36-43, 73-86.

Manager will ensure that consistent criteria are used to evaluate the potential for harmful interference, and that all 4.9 GHz operations are designed with the same best practices for efficient spectrum use, it will not impose any limits on public safety use of the band. We recognize that the success of this framework will depend in part on public safety licensees' cooperation and responsible use of spectrum, and given the history of collaboration within this community we anticipate few, if any, issues.

25. *Technological Incentivization.* The *Eighth Further Notice* also sought comment on commercial 5G offerings available to public safety, and on any public safety use cases supported by 5G and other advanced technologies.⁶⁵ The Commission further raised the potential for the 4.9 GHz band to support applications enabled by 5G technology, but it expressed a strong preference to adhere to a technology-neutral policy for the band and strive for operational flexibility.⁶⁶

26. In response, several commenters supported the deployment and integration of commercially available technologies such as 5G in the 4.9 GHz band,⁶⁷ with some commenters stating that frequency coordination and facilitation by a Band Manager may be necessary if advanced technologies are introduced into the band.⁶⁸ For instance, NPSTC asserted that advanced technologies, such as 5G, must be deployed in such a way that supports continued public safety operations.⁶⁹

27. Based on the comments before us, we conclude that the Band Manager should use its background and expertise to determine and recommend, as part of a spectrum plan for the band and for the benefit of any interested licensees and lessees, how best to incorporate the latest commercially available technologies, including 5G, into the 4.9 GHz band in a manner that supports and protects public safety operations. We decline to mandate the use of such technologies in the band, as we agree that this more restrictive approach could limit the use of certain equipment by incumbent licensees.⁷⁰ In keeping

⁶⁵ *Eighth Further Notice*, 36 FCC Rcd at 15052, para. 57.

⁶⁶ *Id.* at 15052-53, paras. 58-59.

⁶⁷ NPSTC Nov. 29, 2021, Comments at 16-17; IACP Nov. 29, 2021, Comments at 4 (“the full 50 MHz of 4.9 GHz is best suited for 5G deployment and, if so, aligns with the ability to pass public presented 5G data to first responders in the field”); PSSA Nov. 29, 2021, Comments at 5; PSSA Jan. 11, 2022, Reply at 3; IAFC Nov. 23, 2021, Comments at 6; IAFC Dec. 20, 2021, Reply at 4-5 (stating that “IAFC agrees with NPSTC that it is enthusiastic about the potential use of 5G technology to serve public safety needs and agrees with PSSA that 4.9 GHz band is well-suited for emerging technologies, including 5G”).

⁶⁸ See STARNet Nov. 24, 2021, Comments at 3; Joint Filers Nov. 29, 2021, Comments at 4; PSSA Jan. 11, 2022, Reply at 3 (stating “[t]he most effective way to accelerate the deployment of 5G technologies in the 4.9 GHz Band is through a nationwide licensee (and the appointment of a band manager by such licensee) to develop a spectrum plan for the use of 5G across the band, which would facilitate widespread deployment and interoperability, and lower equipment costs”); PSSA Nov. 29, 2021, Comments at 9; IAFC Dec. 20, 2021, Reply at 5 (concurring with PSSA).

⁶⁹ NPSTC Comments at 16 (“5G technology must be deployed in a way needed to serve the public safety community with the requisite capacity, reliability, real coverage, backup power provisions, operational features, rugged devices and specialized applications required. However, to date, NPSTC has seen no evidence that deploying 5G would eliminate the need for the current communications uses at 4.9 GHz, i.e., uses that will continue to be required by the public safety community”); see also Joint Filers Reply at 4 (“The concept of public safety 5G as advocated by the PSSA, IACP, and IAFC fails to address that there are thousands of 4.9 GHz fixed microwave paths in use today that must be protected.”).

⁷⁰ API and ENTELEC Nov. 29, 2021, Comments at 6; WISPA Jan. 11, 2022, Reply at 14-15 (stating “[n]o commenter recommended that the Commission should mandate the use of 5G technology in the 4.9 GHz band”); BART Nov. 29, 2021, Comments at 8-9 (stating it “applauds the Commission’s strong preference ‘to adhere to a technology-neutral policy’ and ‘strive for operational flexibility’” but “[a]ny new technology standards should not require new investment or updates by incumbent licensees”); WISPA Nov. 29, 2021, Comments at 23-25 (opposing mandating 5G, or any other technology or standard, because it would undermine the intended objectives of this proceeding by limiting the use of proprietary equipment that is ready-made for the 4.9 GHz band); Maryland et al. Jan. 11, 2022, Reply at 4 (“[t]he concept of public safety 5G as advocated by the PSSA, IACP, and IAFC fails to address that there are thousands of 4.9 GHz fixed microwave paths in use today that must be protected”).

with our goal of protecting public safety operations, we will require the Band Manager to seek input from licensees and work to facilitate the deployment of advanced wireless technologies in a manner that supports and protects public safety users. We also seek comment in the *Ninth Further Notice* below on ways to further encourage the deployment of the latest commercially available technologies below in the *Ninth Further Notice*.⁷¹

28. *Facilitating Non-Public Safety Access.* While the Commission emphasized the importance of public safety operations in the 4.9 GHz band in the *Eighth Further Notice*, we also recognized that introducing non-public safety operations in the band may help foster innovation and drive down equipment costs, thereby making more intensive public safety use of the spectrum a possibility.⁷² To that end, we sought comment on expanding use of the band to non-public safety entities, subject to appropriate safeguards to protect public safety operations.⁷³ In response, various commenters supported introducing non-public safety users into the band, asserting that this could foster a “‘virtuous cycle’ of reduced costs,”⁷⁴ “create opportunities for incumbents and new entrants alike”, and “encourage equipment manufacturers to innovate and develop an expanded device ecosystem.”⁷⁵ Commenters cautioned, however, that public safety operations must be protected from harmful interference if the band is opened to non-public safety use.⁷⁶

29. Today, we adopt new rules to allow limited non-public safety access to the 4.9 GHz band, on a secondary basis to, and subject to preemption by, public safety licensees, which will remain the primary users of the band. This expanded access for non-public safety entities will rely on a Band Manager-facilitated spectrum leasing framework premised on the Band Manager’s analysis of where, when, and at what frequencies non-public safety operations can take place without impacting public safety operations. The Band Manager will identify, based on consultation with relevant public safety licensees and its own expertise, situations where there are unused spectrum access opportunities. This cooperative process will enable the Band Manager to take advantage of both its expertise on 4.9 GHz band public safety operations and its extensive links with the public safety community to identify spectrum access opportunities potentially available to non-public safety entities with flexibility to permit regional variation and maximize spectrum use, but also enough consistency to ensure full protection for current and future public safety operations. We believe this approach strikes the proper balance between allowing localized control of public safety operations and reducing interference, while also ensuring that consistent, nationwide rules will promote overall spectral efficiency, foster innovation, and drive down equipment costs.⁷⁷ We elaborate further on this approach below in this *Seventh Report and Order*, and seek comment in the *Ninth Further Notice* on the details of implementing the Band Manager facilitated

⁷¹ NPSTC Nov. 29, 2021, Comments at 14; TDD Nov. 29, 2021, Comments at 3; FPL Nov. 29, 2021, Comments at 2-5; IAFC Nov. 23, 2021, Comments at 6-7 (concurring with NPSTC); PSSA Jan. 11, 2022, Reply at 3, 6; *see also* 3GPP, <https://3gpp.org> (last visited Jan. 10, 2023).

⁷² *Eighth Further Notice*, 36 FCC Rcd at 15054-55, paras. 61-65.

⁷³ *Id.*

⁷⁴ T-Mobile Jan. 11, 2022, Reply at 3-4.

⁷⁵ APCO Nov. 29, 2021, Comments at 7.

⁷⁶ WISPA Nov. 29, 2021, Comments at 17-19; APCO Comments at 7; STARNet Nov. 24, 2021, Comments at 9-10; Seybold Dec. 22, 2021, Reply at 2.

⁷⁷ *See* PSSA Nov. 29, 2021, Comments at 8 (stating that a nationwide licensee would “facilitate nationwide network deployment, thereby accelerating the availability of the 4.9 GHz Band for 5G services and reducing equipment costs” and agreeing with the Commission that a nationwide approach to the band will “promote a robust equipment market, drive down prices and costs, spur innovation, and increase the likelihood of interoperable communications and consistent interference protection”); PSSA Jan. 11, 2022, Reply at 2 (stating a nationwide licensee “is also the most effective way to facilitate the Commission’s other goals regarding the 4.9 GHz Band, including nationwide network deployment, interoperability, and reduced equipment costs”).

non-public safety leasing model to achieve these goals.

C. Licensing Database

30. The Commission sought comment in the *Eighth Further Notice* on collecting more granular data on 4.9 GHz operations in a licensing database and combining that data with a formal coordination structure to improve interference mitigation efforts and bolster public safety confidence in the band.⁷⁸ We also sought comment on whether to continue using the Universal Licensing System (ULS) or transition to a third-party licensing database to accommodate additional information.⁷⁹

31. Commenting parties overwhelmingly supported the collection of more granular data on public safety operations.⁸⁰ In particular, filers supported the collection of complete microwave path data for fixed links and site-by-site data on base stations (currently licensed under the geographic licensing scheme) as proposed in the *Eighth Further Notice*.⁸¹ Commenters also universally supported keeping ULS over transitioning to a third-party database.⁸² For example, EWA stated that “there is no need to look beyond the FCC’s own” ULS and argued there is no “rationale to support the introduction of a third-party managed database that would replicate capabilities already available in ULS.”⁸³ Commenting parties also explained that transitioning to a third-party database would result in added delays and additional costs for licensees.⁸⁴

⁷⁸ *Eighth Further Notice*, 36 FCC Rcd at 15044, para. 32.

⁷⁹ *Id.*

⁸⁰ NPSTC Nov. 29, 2021, Comments at 6-7; APCO Nov. 29, 2021, Comments at 4; AASHTO Nov. 29, 2021, Comments at 3; Caltrans Nov. 23, 2021, Comments at 4; IACP Nov. 29, 2021, Comments at 2; IAFC Nov. 23, 2021, Comments at 3-4; Region 20 Nov. 29, 2021, Comments at 3; Maryland et al. Nov. 29, 2021, Comments at 4; BART Nov. 29, 2021, Comments at 3-4; STARNet Nov. 23, 2021, Comments at 2; CalOES Nov. 29, 2021, Comments at 3; RapidSOS Jan. 11, 2022, Reply at 2; Region 20 Jan. 11, 2022, Reply at 1; BART Dec. 28, 2021, Reply at 5; IAFC Dec. 20, 2021, Reply at 2; *see also* API et al. Aug. 25, 2022, *Ex Parte* at 2.

⁸¹ NPSTC Nov. 29, 2021, Comments at 7 (supporting “requiring incumbents and future applicants to supply complete microwave path data for fixed links and to license base stations...on a site-by-site basis.”); APCO Nov. 29, 2021, Comments at 4 (supporting “adding the 4.9 GHz band to the ULS microwave schedule” and “uncoupling base and mobile stations from geographic licenses”); STARNet Nov. 23, 2021, Comments at 4 (stating that “path points should be specifically defined as opposed to the current practice of merely identifying station locations, and specific numbers relative to base stations and mobile devices should be provided by licensees”); Region 20 Nov. 29, 2021, Comments at 3 (mirroring STARNet Nov. 23, 2021, Comments); Maryland et al. Jan. 11, 2022, Reply at 1 (noting that “the majority of commenters are in general agreement that ULS should be enhanced to provide more data, e.g., specific path connection points, frequencies used, etc., which will facilitate spectrum coordination and interference reduction”); *see also Eighth Further Notice*, 36 FCC Rcd at 15044-45, para. 33.

⁸² NPSTC Nov. 29, 2021, Comments at 7; APCO Nov. 29, 2021, Comments at 4; AASHTO Nov. 29, 2021, Comments at 3; Caltrans Nov. 23, 2021, Comments at 4 (mirroring AASHTO Nov. 29, 2021, Comments); IACP Nov. 29, 2021, Comments at 2; IAFC Nov. 23, 2021, Comments at 3; STARNet Nov. 23, 2021, Comments at 2; CalOES Nov. 29, 2021, Comments at 3; Maryland et al. Nov. 29, 2021, Comments at 2; Region 20 Jan. 11, 2022, Reply at 1; BART Nov. 29, 2021, Comments at 4; EWA Nov. 29, 2021, Comments at 7-8; BART Dec. 28, 2021, Reply at 5; IAFC Dec. 20, 2021, Reply at 2. *But see* API et al. Aug. 25, 2022, *Ex Parte* at 2 (proposing that FCC-certified Frequency Advisory Committees assist the Commission with the “development of a 4.9 GHz database by securing information about current 4.9 GHz utilization and, thereafter, through the registration/licensing process”).

⁸³ EWA Nov. 29, 2021, Comments at 7-8.

⁸⁴ AASHTO Nov. 29, 2021, Comments at 3 (stating the use of a third-party database “may require a learning process and have significant additional costs to the 4.9 GHz spectrum users with large jurisdictions”); Caltrans Nov. 23, 2021, Comments at 4 (mirroring AASHTO Nov. 29, 2021, Comments); EWA Nov. 29, 2021, Comments at 8 (indicating that a third-party database alternative “would increase costs and complexity without providing any apparent benefit”).

32. Finally, commenters overwhelmingly supported at least a one-year period for incumbent licensees to submit the necessary technical details into ULS.⁸⁵ For instance, NPSTC said it would prefer a shorter deadline but believes many licensees with extensive deployments in the band “may not already have full geographic or technical information at its fingertips and may need to determine that information for numerous facilities.”⁸⁶ BART estimated it will need at least eight hours per site to collect the necessary information from the hundreds of fixed sites in its 131.4 mile network.⁸⁷ Therefore, BART indicated it will need one year to eighteen months to submit the necessary data into ULS.⁸⁸

33. We agree with commenting parties that collecting additional technical data on public safety operations will improve interference protection and give public safety licensees more confidence in the band without adding a significant burden on licensees or applicants.⁸⁹ We further believe that having more granular technical data will help the Band Manager perform its duties and enable non-public safety use of excess capacity in the band without causing interference. As such, we adopt our proposal to collect more granular data on public safety deployments and will provide incumbent licensees a one-year period to submit the necessary technical detail. We also agree with commenting parties that ULS can be modified to collect the more granular data described above and that transitioning to a third-party database would introduce added delays and complexity.⁹⁰ Therefore, we will continue using ULS as the licensing database for public safety operations in the 4.9 GHz band.

34. Consequently, we direct the Bureaus to make any necessary enhancements to ULS, to obtain any necessary review under the Paperwork Reduction Act, and announce by public notice when ULS is prepared to accept the more granular data on public safety operations in the 4.9 GHz band. Consistent with record support, we will require incumbent licensees and future applicants to supply complete microwave path data for fixed links, and to obtain a license for base stations (currently authorized under the geographic license scheme) on a site-by-site basis.⁹¹ We direct the Bureaus to modify ULS so that it can collect transmission data from incumbent licensees and future applicants.⁹² Specifically, for licensees operating permanent fixed P-P, P-M and fixed receiver stations, the Bureaus should enhance ULS to collect transmitter and receiver antenna coordinates, frequencies, polarizations, tolerance, effective isotropic radiated power, emission designator, type of modulation, antenna model, gain, antenna center line height(s) above ground level and ground elevation above mean sea level, path

⁸⁵ NPSTC Nov. 29, 2021, Comments at 7-8; IAFC Nov. 23, 2021, Comments at 4; Maryland et al. Nov. 29, 2021, Comments at 5; BART Nov. 29, 2021, Comments at 4-5; STARNet Nov. 23, 2021, Comments at 4-5.

⁸⁶ NPSTC Nov. 29, 2021, Comments at 8.

⁸⁷ BART Nov. 29, 2021, Comments at 5.

⁸⁸ *Id.*

⁸⁹ *See, e.g.*, IAFC Nov. 23, 2021, Comments at 3-4 (stating it believes “additional data would improve the level of interference protection licensees receive” and “would create a more predictable and transparent spectrum environment for the users of the 4.9 GHz band”); AASHTO Nov. 29, 2021, Comments at 3 (stating that “[p]roviding more detailed information does not cause a significant burden on the users and more detailed information may in fact prove beneficial when, and if users experience harmful inference”); Caltrans Nov. 23, 2021, Comments at 4 (mirroring AASHTO Nov. 29, 2021, Comments); EWA Nov. 29, 2021, Comments at 8 (stating the collection of system-specific data in ULS “will promote sound spectrum management”).

⁹⁰ AASHTO Nov. 29, 2021, Comments at 3; Caltrans Nov. 23, 2021, Comments at 4; EWA Nov. 29, 2021, Comments at 7-8; APCO Nov. 18, 2022, *Ex Parte* at 1, n.4.

⁹¹ *Eighth Further Notice*, 36 FCC Rcd at 15044-45, paras. 32-33.

⁹² This new information will, by default, be publicly available in order to facilitate the operations of the new Band Manager and to allow prospective 4.9 GHz band users to determine where spectrum access is available.

azimuth and distance.⁹³ For licensees operating base/mobile, mobile-only or temporary fixed stations, the Bureaus should enhance ULS to collect coordinates (base), antenna height above average terrain (base), center frequency, emission designator, effective radiated power, number of units (mobile and temporary fixed), and area of operation (mobile and temporary fixed). Licensees which fail to comply with this new requirement on the timeline specified by the Bureaus shall be subject to penalties as a violation of our rules.

35. Finally, incumbent licensees will have at least one year from the publication of this item in the Federal Register to provide the required data in ULS.⁹⁴ Given the record before us, we believe one year is sufficient time to allow licensees to confirm the necessary information about their existing deployments, and that this requirement will not be unduly burdensome for licensees, which already operate and maintain these deployments.⁹⁵ Nonetheless, we encourage licensees to enter their data into ULS as soon as it is available once the Bureaus announce that the ULS modifications are complete and OMB has completed its review of any new collection requirements.

D. Frequency Coordination

36. The *Eighth Further Notice* also solicited comment on requiring formal frequency coordination in the 4.9 GHz band to support interference protection and increase public safety confidence in using the band.⁹⁶ In particular, we sought input on whether mandatory frequency coordination would provide certainty and incentives for public safety to increase its use of the band,⁹⁷ and if so, whether part 90 type frequency coordination, part 101 type frequency coordination, or a combination of the two would be best suited for the 4.9 GHz band.⁹⁸ As detailed below, we adopt a part 90 formal frequency coordination requirement for public safety applicants seeking to license facilities in the 4.9 GHz band and assign nationwide authority to the Band Manager to perform the coordination function.

37. Commenting parties overwhelmingly supported formal frequency coordination to bolster interference protection and increase public safety confidence in using the band.⁹⁹ For instance, APCO stated that “[f]requency coordination is the most effective way to promote public safety use of the band” while EWA noted that frequency coordination has been used for years in other frequency bands to “promote sound spectrum management.”¹⁰⁰ Based on the record before us, we adopt formal frequency

⁹³ API and ENTELEC oppose a polarization requirement since it believes any such requirement would be “limiting or impractical.” See API and ENTELEC Nov. 29, 2021, Comments at 5-6. While we specify technical parameters for P-P, P-MP, and fixed receivers, we will not require licensees to deploy a certain type of polarization.

⁹⁴ *Eighth Further Notice*, 36 FCC Rcd at 15045-46, para. 36. The Bureaus will release a public notice announcing the deadline for submitting required data in ULS only after determining and receiving Office of Management and Budget (OMB) approval of the new collection requirements.

⁹⁵ NPSTC Nov. 29, 2021, Comments at 7-8; IAFC Nov. 23, 2021, Comments at 4; Maryland et al. Nov. 29, 2021, Comments at 5; BART Nov. 29, 2021, Comments at 4-5; STARNet Nov. 23, 2021, Comments at 4-5.

⁹⁶ *Eighth Further Notice*, 36 FCC Rcd at 15048, para. 45.

⁹⁷ *Id.* at 15048-49, para. 47.

⁹⁸ *Id.* at 15049, para. 48. Part 90 frequency coordination is where an applicant must demonstrate that its application was coordinated by a Commission-certified frequency coordinator. See 47 CFR § 90.175. Part 101 frequency coordination is where an applicant must coordinate proposed facilities with existing licensees and other applicants whose facilities could be affected by the new proposal. See *id.* § 101.103(d)(1).

⁹⁹ NPSTC Nov. 29, 2021, Comments at 7; APCO Nov. 29, 2021, Comments at 3; AASHTO Nov. 29, 2021, Comments at 3; IAFC Nov. 23, 2021, Comments at 5; EWA Nov. 29, 2021, Comments at 8-9; BART Nov. 29, 2021, Comments at 7; Cal OES Nov. 29, 2021, Comments at 3; Caltrans Nov. 23, 2021, Comments at 6; BART Dec. 28, 2021, Reply at 3; RapidSOS Jan. 11, 2022, Reply at 2; EWA Jan. 11, 2022, Reply at 5; Letter from Jeffrey S. Cohen, Counsel to APCO International, to Marlene Dortch, Secretary, FCC, WP Docket No. 07-100, at 1 (Nov. 18, 2022) (APCO Nov. 18, 2022, *Ex Parte*).

¹⁰⁰ APCO Nov. 29, 2021, Comments at 3; EWA Nov. 29, 2021, Comments at 8.

coordination procedures for the 4.9 GHz band to minimize the potential for interference and increase public safety confidence in the band. In making this decision, we find persuasive arguments by commenting parties who believe the benefits of formal frequency outweigh any nominal costs.¹⁰¹

38. Although commenters were split on the type of coordination that should be applied to public safety operations in the band,¹⁰² we find that part 90 coordination with the Band Manager serving as the nationwide frequency coordinator best suits our goal of establishing a nationwide framework for coordinating access to the 4.9 GHz band. We note that part 90 coordination has for years reduced interference while promoting robust public safety operations in other frequency bands.¹⁰³ In addition, by performing the frequency coordination function, the Band Manager can ensure the efficient assignment and use of spectrum by public safety licensees. Therefore, we find the part 90 frequency coordination framework with the Band Manager serving as frequency coordinator preferable to a part 101-type coordination approach whereby applicants individually coordinate proposed facilities with existing licensees and other applicants whose facilities could be affected by the new proposal.¹⁰⁴ Furthermore, we assign the frequency coordination function solely to the Band Manager (as opposed to allowing competitive coordination) because we find that a single nationwide coordinator is preferable for 4.9 GHz since we are implementing a nationwide framework for use of the band in contrast to other part 90 bands where coordination is more local or regional.¹⁰⁵

39. Under the part 90 coordination framework we adopt today, the Band Manager will review applications from public safety entities seeking to license new or modify existing facilities in the 4.9 GHz band before they are filed with the Commission. As frequency coordinator, the Band Manager, utilizing the interference criteria on which we seek comment on below,¹⁰⁶ and the more granular data collected in

¹⁰¹ Caltrans Nov. 23, 2021, Comments at 6 (stating “[t]he nominal costs associated with frequency coordination is considerably less than the potential costs of interference mitigation, frustration, and loss of system operation as a result of interference from improperly licensed or un-coordinated systems”).

¹⁰² Some commenting parties prefer part 90 coordination, others part 101 coordination and some did not specify what type of coordination they prefer. See Caltrans Nov. 23, 2021, Comments at 6 (suggesting that “Point-to-Point applications follow the Part 101 guidelines” but noting that “coordination through the Part 90 process will also be required” since the 4.9 GHz band supports “the use of mobile units” as well); Cal OES Nov. 29, 2021, Comments at 3 (supporting “Part 90 formal coordination by a certified frequency coordinator”); APCO Nov. 29, 2021, Comments at 3 (stating that for “base station and mobile use, Part 90 contour-based coordination is appropriate” whereas for “fixed point-to-point (P-P) and point-to-multipoint (P-MP) use, a propagation modeling approach . . . would be preferable to . . . Part 101 type coordination”); Joint Filers Nov. 29, 2021, Comments at 4 (stating it looks “to our industry associations, such as APCO International, to work collegially with the broader user community to develop new coordination technologies and tools that can be used by states”); EWA Jan. 11, 2022, Reply at 6 (saying “FCC-certified frequency coordinators, including EWA and several Public Safety organizations, recommend frequencies based on the first-in-time principle” provided “all frequency coordinators and licensees adhere to the FCC criteria, the process promotes intensive use of the spectrum without compromising Public Safety operations”). *But see* WISPA Nov. 29, 2021, Comments at 22 (stating it “believes that mandatory frequency coordination governed by a SAS ‘is necessary to support interference protection and increase public safety confidence in using the band’ and will ‘provide certainty and incentives for public safety to increase its use of the band’”); API et al. Aug. 25, 2022, *Ex Parte* at 2 (recommending “a registration/application process to be used by participating FACs pursuant to the FCC’s MOU”).

¹⁰³ EWA Jan. 11, 2022, Reply at 6 (stating that part 90 frequency coordination by FCC-certified frequency coordinators “promotes intensive use of the spectrum without compromising Public Safety operations”).

¹⁰⁴ See 47 CFR § 101.103(d)(1)-(2).

¹⁰⁵ EWA Jun. 21, 2022, *Ex Parte* at 1 (proposing that APCO serve as the “nationwide frequency coordinator/band manager with responsibility for developing a 4.9 GHz regulatory framework and overseeing an orderly process for licensing with input and support from the other FCC-certified Public Safety Frequency Advisory Committees”).

¹⁰⁶ See *infra* paras. 75-86.

ULS,¹⁰⁷ will perform an analysis to determine if the proposed operation would cause interference to incumbent licensees or previously filed applicants. The Band Manager may, if it so chooses, allow third parties to perform the interference analysis on its behalf. The Band Manager, however, will have sole responsibility as frequency coordinator, subject to Commission review, for informing applicants if their proposed facilities would cause interference to either an incumbent licensee or an existing applicant under the criteria we eventually adopt for the band. The Band Manager will be permitted to charge reasonable rates for its coordination services, the way other frequency coordinators do today, and we seek comment in the *Ninth Further Notice* below on any requirements we should put in place as to those fees.¹⁰⁸

40. Given the Band Manager is tasked with assisting public safety applicants with designing their deployments to promote efficient use of the band while preventing harmful interference to other licensees, as described above, we assign it authority to recommend to public safety applicants during the frequency coordination process the most appropriate channel(s), bandwidth, operating power, area of operation (if mobile or temporary fixed operation is requested), or any other technical criteria which promotes robust use of the band while minimizing interference to incumbent licensees.¹⁰⁹ Per our part 90 rules, applicants may request that the Commission overturn a frequency coordination recommendation from the Band Manager; however, any such applicant bears the burden of proof for demonstrating why the Commission should do so.¹¹⁰

41. As is typical under part 90 frequency coordination, we afford the Band Manager here flexibility to approve applications which cause or receive more interference than provided for by the criteria we eventually adopt for the band, if the application includes a concurrence letter from each incumbent (or existing applicant) that would receive higher levels of interference or a statement from the applicant accepting higher levels of interference.¹¹¹ We believe providing the Band Manager flexibility to approve such applications will promote more robust use of this band, for example by allowing licensees to elect to operate in closer proximity to each other than permitted by our rules, if they believe that their systems are more resistant to interference than our interference protection criteria assume.

42. Once the Band Manager is chosen and interference protection criteria are adopted, all applications filed with the Commission via ULS which seek to license new facilities or modify existing facilities in the 4.9 GHz band must include a showing of frequency coordination by the Band Manager. Below in the *Ninth Further Notice*, we seek comment on interference criteria to ensure public safety licensees have efficient and interference-free access to the band. We also seek comment in the *Ninth Further Notice* on whether the Band Manager, as part of its frequency coordinator duties, should mediate disputes if parties disagree about existing or proposed operations.

¹⁰⁷ See *supra* paras. 30-35.

¹⁰⁸ See *infra* paras. 124-129.

¹⁰⁹ FCC-certified frequency coordinators for the 1427-1432 MHz band have similar authority to recommend “the most appropriate frequency, operating power and area of operation.” See 47 CFR § 90.175(g).

¹¹⁰ *Id.* § 90.175(a).

¹¹¹ See *id.* § 90.187(d) (permitting an applicant seeking to license a trunked system on frequency bands between 150 and 512 MHz to operate without monitoring its proposed frequencies provided the applicant include written consent from all affected licensees); *id.* § 90.621(b)(5) (permitting an applicant seeking to license facilities in the 800 MHz band to operate at less than the minimum required co-channel distance if the applicant includes with its application a letter of concurrence from each short-spaced incumbent); *id.* § 90.621(d)(4) (permitting an applicant seeking to license facilities in the 800 MHz band to cause contour overlap to or receive contour overlap from an incumbent operating on an adjacent channel provided it includes with its application a letter of concurrence from each incumbent that receives contour overlap or a letter of concurrence from each incumbent that causes contour overlap to the applicant).

43. Finally, we decline to adopt a more active form of frequency coordination for public safety operations in the 4.9 GHz band, such as the automated frequency coordination in the 6 GHz band¹¹² or the spectrum access system that facilitates dynamic spectrum sharing in the Citizens Broadband Radio Service (CBRS).¹¹³ Given our adoption of a new Band Manager to coordinate access to the band, we find that the public interest is best served by adopting the part 90 frequency coordination framework, described above, which requires no modification of or replacement to equipment currently in use in the band and which grants to the Band Manager flexibility in working with licensees and lessees to maximize the efficient use of this spectrum.

E. Permitting Non-Public Safety Use of the Band

44. Alongside our decision today to adopt a nationwide Band Manager framework for the 4.9 GHz band, we amend our rules to allow non-public safety use of the band as authorized by the Band Manager. Specifically, we remove the restriction that 4.9 GHz band operations be in support of public safety, provided that any non-public safety operations must: (1) be authorized by the Band Manager; and (2) fully protect¹¹⁴ and, where necessary, be subject to preemption by, public safety operations in the band. We believe that this will enable the Band Manager to determine where, when, and at what frequencies non-public safety operators can use the 4.9 GHz band without limiting access to the band for public safety purposes.¹¹⁵ We emphasize that we will not license non-public safety operators, and licensed operations will remain exclusively in support of public safety. Non-public safety operations will be required to fully protect and, when necessary, abide by preemption rules regarding the public safety operations which will retain the primary use of the band.

45. In the *Eighth Further Notice*, the Commission sought comment on a range of potential approaches to expand use of the 4.9 GHz band. In particular, the Commission asked whether it is in the public interest to open the band to non-public safety uses and, if so, under what terms.¹¹⁶ Many commenters who supported sharing the spectrum argued that introducing new users into the band will allow for reduced costs and “encourage equipment manufacturers to innovate and develop an expanded device ecosystem.”¹¹⁷ The *Eighth Further Notice* solicited input on leasing regimes that could be used to provide shared non-public safety access to the band while protecting critical public safety operations.¹¹⁸ Commenters representing a range of interests supported a framework that allowed for the licensing of

¹¹² See *Unlicensed Use of the 6 GHz Band; Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz*, ET Docket No. 18-295 and GN Docket No. 17-183, Report and Order and Further Notice of Proposed Rulemaking, 35 FCC Rcd 3852, 3862-77, paras. 23-67 (2020).

¹¹³ See 47 CFR part 96.

¹¹⁴ We seek comment in the *Ninth Further Notice* on the standard by which the Band Manager will ensure full protection of public safety operations under a new “harmful interference” standard which we will define in our rules. See *infra* paras. 75-83.

¹¹⁵ SBC Jan. 10, 2022, Reply at 5-6 (stating “any secondary use must be compatible with public safety’s operations in the band, and must be subject to rules that prohibit such secondary use from causing interference to public safety”).

¹¹⁶ *Eighth Further Notice*, 36 FCC Rcd at 15054, para. 62.

¹¹⁷ APCO Nov. 29, 2021, Comments at 7; see also T-Mobile Jan. 11, 2022, Reply at 3-4; WISPA Nov. 29, 2021, Comments at 5-9, 17-19; FPL Nov. 29, 2021, Comments at 5-7 (noting that “by allowing CII entities to obtain licenses for or lease spectrum in the 4.9 GHz band, the Commission will expand the band’s user base and, by extension, increase demand for equipment that can operate in the band”); Federated Wireless Nov. 29, 2021, Comments at 8-9; WISPA Jan. 11, 2022, Reply at 2-6, 15-16 (stating that “positions advanced by WISPA, DSA, Federated Wireless and New America’s OTI suggests that if the equipment market will expand with CII, it most certainly will expand”).

¹¹⁸ *Eighth Further Notice*, 36 FCC Rcd at 15055-56, paras. 66-68.

secondary rights in the band to non-public safety entities,¹¹⁹ and filers representing public safety agencies also generally supported these goals.¹²⁰ APCO, for example, noted that sharing the band with non-public safety operations could create “opportunities for incumbents and new entrants alike” and “encourage equipment manufacturers to innovate and develop an expanded device ecosystem.”¹²¹ Similarly, non-public safety operators expressed interest in the band and noted that allowing them access will benefit not only the public interest, but also public safety users through reduced equipment costs.¹²² We believe this band has promise for a variety of innovative use cases, ranging from commercial wireless operations, including 5G, to fixed wireless broadband services, to private network operations, including those of critical infrastructure (CII) entities. Commenters supported the secondary nature of such operations, and asserted their ability to protect public safety from interference.¹²³

46. We believe the approach we adopt today will allow local public safety entities to maintain control over their operations in the band while ensuring that non-public safety users are subject to consistent nationwide rules that minimize the risk of interference, promote robust use, and ensure priority and preemption for public safety operations.¹²⁴ We note that some public safety commenters expressed concerns about sharing with non-public safety users. These commenters focused in particular on interference concerns,¹²⁵ urging the Commission to make any non-public safety operations secondary if they are permitted. We recognize the importance of protecting public safety operations from interference

¹¹⁹ OTI Nov. 29, 2021, Comments at 6-14 (arguing that “[e]nacting a tiered sharing framework in the 4.9 GHz band would both protect the interests of incumbents in the band and promote broader use of the band to further public interest goals, such as improved connectivity and economic activity”); FPL Nov. 29, 2021, Comments at 5-7; Federated Wireless Nov. 29, 2021, Comments at 8-9; Cal OES Nov. 29, 2021, Comments at 2; Maryland et al. Nov. 29, 2021, Comments at 9-10; STARNet Nov. 24, 2021, Comments at 8-9; T-Mobile Jan. 11, 2022, Reply at 3-5 (stating that “public safety entities, at their option, [should be able] to lease the spectrum to commercial providers or otherwise partner with third parties, such as critical infrastructure industry (“CII”) entities, to use the spectrum”); Federated Wireless Jan. 11, 2022, Reply at 4-6; OTI and PK Jan. 11, 2022, Reply at 4-6.

¹²⁰ AASHTO Nov. 29, 2021, Comments at 3; NPSTC Nov. 29, 2021, Comments at 10; IAFC Nov. 23, 2021, Comments at 3; IACP Nov. 29, 2021, Comments at 2; Region 20 Nov. 29, 2021, Comments at 2; PSSA Nov. 29, 2021, Comments at 6; BART Nov. 29, 2021, Comments at 2; Cal OES Nov. 29, 2021, Comments at 3; Federated Wireless Nov. 29, 2021, Comments at 8-9; Maryland et al. Nov. 29, 2021, Comments at 9-10; STARNet Nov. 24, 2021, Comments at 8-9.

¹²¹ APCO Nov. 29, 2021, Comments at 2-3, 7.

¹²² See, e.g., Federated Wireless Nov. 29, 2021, Comments at 8-9; T-Mobile Jan. 11, 2022, Reply at 3-4 (describing a “virtuous cycle” of reduced equipment costs and greater availability); WISPA Nov. 29, 2021, Comments at 5-8; WISPA Jan. 11, 2022, Reply at 2-7.

¹²³ WISPA Nov. 29, 2021, Comments at 5-8; WISPA Jan. 11, 2022, Reply at 2-7; Letter from Ari Q Fitzgerald, Counsel to Florida Power & Light Company to Marlene Dortch, Secretary, FCC, WP Docket No. 07-100, at 1 (Nov. 9, 2022) (FPL Nov. 9, 2022, *Ex Parte*).

¹²⁴ Some commenters expressed that state management is the best approach; however, we believe the Commission sufficiently addressed this alternative in the *Order on Reconsideration*, which determined that a “state-by-state framework would have resulted in a patchwork of different rules, processes, and terms governing the use of the spectrum” where “decisions driving technical operations would be balkanized across the different states and territories.” *Order on Reconsideration*, 36 FCC Rcd at 15039-40, paras. 20, 22; see also STARNet Nov. 24 2021, Comments at 3, 9 (explaining that “[b]and management or coordination in all other bands has been successful when states have been delegated management responsibilities, and there is no reason that cannot hold true for 4.9 GHz.”); Maryland et al. Nov. 29, 2021, Comments at 1, 3.

¹²⁵ See, e.g., AASHTO Nov. 29, 2021, Comments at 3 (opposing allowing non-public eligible users but urging such operations be secondary if permitted); BART Nov. 29, 2021, Comments at 9; BART Jan. 11, 2022, Reply at 4-5; CALTRANS Nov. 29, 2021, Comments at 5 (opposing allowing non-public eligible users but urging such operations be secondary if permitted).

and agree that non-public safety operations should be secondary to public safety uses, in addition to being coordinated by the Band Manager.

47. We find that we can meet our goal of promoting increased access to the 4.9 GHz band generally, in addition to promoting and protecting public safety use, by allowing non-public safety entities to lease unused spectrum from the public safety licensees through the Band Manager. This model will ensure that leased operations will be on a non-interference basis, thereby, fully protecting public safety operations and providing a mechanism to enable preemption by public safety licensees. While our action today opens the band for leased access by non-public safety operators, we seek comment in the *Ninth Further Notice* on how that access will be implemented and which non-public safety entities should be eligible to operate in the band.¹²⁶

48. Based on our review of existing operations, there is potential for widespread use of the 4.9 GHz band by non-public safety operators without impinging on public safety access. For example, there is no statewide licensee for three states and two U.S. territories, meaning wide swaths of those areas likely host little to no 4.9 GHz band activity.¹²⁷ Moreover, even where there is a statewide public safety licensee, it likely is not using the spectrum throughout the state, particularly given the band's limited propagation characteristics. We believe the Band Manager will be well-equipped to find these opportunities, based both on its expertise and experience with the band and on the new, more granular deployment data we will begin collecting in ULS, and be able to match them with the entities capable of making the best use of the band. The Band Manager will evaluate all potential non-public safety operations based on consistent technical parameters and use restrictions deemed necessary to ensure full protection of public safety operations. Allowing the Band Manager to centrally coordinate non-public safety access will promote a standardized set of rules and contractual provisions for such access, which ensure that public safety retains priority and preemption rights.¹²⁸

49. Under our current rules, 4.9 GHz licensees are permitted to enter into spectrum sharing arrangements with entities that do not meet the eligibility requirements for a license, so long as those entities use the spectrum in support of public safety.¹²⁹ Here, we clarify that leases to non-public safety entities will only be permitted if they are coordinated and approved by the Band Manager, subject to any requirements we adopt pursuant to the *Ninth Further Notice*. Public safety licensees will also continue to be able to enter directly into 4.9 GHz band sharing arrangements for public safety operations.

F. Priority and Preemption for Public Safety

50. In the *Eighth Further Notice*, the Commission additionally sought comment on affording public safety licensees priority access to the 4.9 GHz band, including the ability to preempt any non-public safety operations that may be authorized in the future.¹³⁰ In particular, we asked whether “public safety priority and preemption should be elements of any sharing model we ultimately adopt” if the Commission opens the 4.9 GHz band to non-public safety users.¹³¹ We also requested input on “the types of mission-critical public safety operations that should have priority over other public safety as well as

¹²⁶ See *infra* paras. 94-123.

¹²⁷ The following states/territories are not covered by a statewide license: American Samoa, Georgia, Iowa, Kansas, the Northern Mariana Islands, and South Dakota.

¹²⁸ See STARNet Nov. 24, 2021, Comments at 8-9; FPL Nov. 29, 2021, Comments at 1; FPL Jan. 11, 2022, Reply at 5-6; EWA Jan. 11, 2022, Reply at 4; T-Mobile Jan. 11, 2022, Reply at 1.

¹²⁹ 47 CFR § 90.1203(b); see also *id.* §§ 1.9020, 1.9030, and 1.9035 (describing obligations for and eligibility of lessees under spectrum manager, long-term *de facto* transfer, and short-term *de facto* transfer spectrum leasing arrangements).

¹³⁰ *Eighth Further Notice*, 36 FCC Rcd at 15047, para. 39.

¹³¹ *Id.* at 15047, para. 41.

non-public safety operations” and “the technical feasibility of building priority and preemption algorithms into 4.9 GHz networks and equipment.”¹³²

51. Parties commenting on this issue strongly supported affording public safety licensees priority access to the band over non-public safety users and the ability to preempt these operations when needed.¹³³ For example, TDD indicated that priority and preemption is “an essential element of the public safety network, especially when non-public priority users are on the band.”¹³⁴ AASHTO, Caltrans, BART, and IAFC, who opposed sharing the band with non-public safety users, supported priority and preemption under any sharing framework.¹³⁵

52. Accordingly, we will ensure public safety entities have priority access to the 4.9 GHz band through licensing on a primary basis, while non-public safety users will be permitted to operate in the band only on a secondary basis. In other words, non-public safety users, subject to coordination and facilitation by the Band Manager, will only be permitted to operate in the band in a manner which causes no interference to primary public safety licensees, and with no interference protection from public safety operations. Therefore, we conclude that by allowing non-public users to operate in the band only on a secondary basis we retain public safety’s ability to access the band on a priority basis.

53. The Commission also sought comment in the *Eighth Further Notice* on “the types of mission-critical public safety operations that should have priority over other public safety . . . operations,”¹³⁶ but no commenting party responded to this request. The Commission does not typically prioritize one public safety entity over another when it processes license applications under part 90.¹³⁷ Therefore, we conclude that a local public safety community can adjudicate its own priority levels between public safety users since individual public safety incidents may have differing communication

¹³² *Id.* at 15047-48, paras. 42-43.

¹³³ NPSTC Nov. 29, 2021, Comments at 18-19 (“NPSTC recommends that public safety remain primary in the band, as it has been since inception. However, we recognize the role CII plays during emergencies and thus would also support CII having next priority and preemption rights over any other non-public safety use that may be permitted now or in the future.”); APCO Nov. 29, 2021, Comments at 7 (stating “APCO is not opposed to a sharing approach provided that public safety is guaranteed priority and preemption over other users”); IAFC Nov. 23, 2021, Comments at 3-5 (stating it “opposes co-primary status with any other entity on the band.”); PSSA Nov. 29, 2021, Comments at 5-6 (“While the PSSA supports secondary use of the band for capacity not being utilized by public safety, first responders need to be able to preempt such secondary use at any time.”); IACP Nov. 29, 2021, Comments at 5 (stating “public safety must retain priority and ruthless preemption”); STARNet Nov. 24 2021, Comments at 5; Maryland et al. Nov. 29, 2021, Comments at 6 (stating “[p]lanning for communications use and identifying users that should be prioritized can often best be facilitated at the state level”); PSSA Jan. 11, 2022, Reply at 2 (stating “secondary access must be able to be immediately preempted by public safety users”); IAFC Dec. 20, 2021, Reply at 3-4 (stating it “opposes co-primary status with any other entity on the band” and that it “agrees with the PSSA that secondary use of the 4.9 GHz band should only be permitted if it is compatible with public safety and does not cause interference to public safety’s use of the band”); TDD Nov. 29, 2021, Comments at 4 (stating “[t]he 4.9 GHz band should also incorporate priority and preemption.”); WISPA Nov. 29, 2021, Comments at 20-21 (“SAS functions are far superior to any other shared use model in enabling near real-time priority use, providing transparency to non-public safety users and ensuring that public safety users do not interference with each other when communications are essential.”); WISPA Jan. 11, 2022, Reply at 8-9; Andrew Seybold Dec. 22, 2021, Reply at 2; SBC Jan. 10, 2022, Reply at 4; *see also* Rachel Culp et al. Nov. 29, 2021, Comments at 3-4 (“Some use for non-public safety purposes may be allowed, but if this hinders securing public safety, they must be excluded or pushed back.”).

¹³⁴ TDD Nov. 29, 2021, Comments at 4.

¹³⁵ AASHTO Nov. 29, 2021, Comments at 4; Caltrans Nov. 23, 2021, Comments at 4 (mirroring AASHTO Nov. 29, 2021, Comments); BART Nov. 29, 2021, Comments at 6; IAFC Dec. 20, 2021, Reply at 3-4.

¹³⁶ *Eighth Further Notice*, 36 FCC Rcd at 15047, para. 42.

¹³⁷ *See, e.g.*, 47 CFR § 90.173 (regarding policies for assignment of frequencies under part 90).

priority. However, the establishment of local priority levels does not preclude a licensee from exercising any rights or seeking any remedy available to it under our rules.

54. Finally, although there was broad support for public safety licensees to have the ability to preempt non-public safety users, there was little detail in the record about how this would work in practice.¹³⁸ Therefore, we seek comment below in the *Ninth Further Notice* on questions related to the Band Manager’s implementation of an appropriate pre-emption mechanism, including “shut down” procedures and possible limitations on preemption requests.

G. Annual Reports

55. The *Eighth Further Notice* also sought comment on whether to impose reporting requirements on any Band Manager designated to manage the 4.9 GHz band¹³⁹ and, if so, what those reports should address and how often they should be filed with the Commission.¹⁴⁰ We note that band managers in other frequency bands are required to submit annual reports.¹⁴¹ Consequently, we adopt an annual reporting requirement that will allow the Commission to oversee the Band Manager, ensure its activities advance the Commission’s stated goals for this band, and provide greater transparency, certainty, and predictability in the 4.9 GHz band.

56. The current record does not reflect input on the type of information that should be included in such reports. Therefore, below in the *Ninth Further Notice*, we seek comment on the type of information the Band Manager should include in its annual report to facilitate oversight and ensure transparency, certainty, and predictability in the 4.9 GHz band.

H. Regional Planning Committees

57. Section 90.1211(a) of the current rules provides that each RPC may voluntarily submit a plan with guidelines to be used for sharing 4.9 GHz spectrum within the RPC region. The *Eighth Further Notice* inquired whether RPCs should play a continued or expanded role in the spectrum management framework for the 4.9 GHz band.¹⁴² In particular, we asked whether regional planning is consistent with the Commission’s goal of establishing a national framework for management of the band and, if so, what resources RPCs would need to ensure that plans were filed for all regions given that only 10 of 55 RPCs voluntarily filed plans to date.¹⁴³

¹³⁸ APCO Nov. 29, 2021, Comments at 7 (stating “APCO is not opposed to a sharing approach provided that public safety is guaranteed priority and preemption over other users”); PSSA Nov. 29, 2021, Comments at 5-6 (stating “[w]hile the PSSA supports secondary use of the band for capacity not being utilized by public safety, first responders need to be able to preempt such secondary use at any time.”); IACP Nov. 29, 2021, Comments at 5 (stating “public safety must retain priority and ruthless preemption”); TDD Nov. 29, 2021, Comments at 4 (stating “[t]he 4.9 GHz band should also incorporate priority and preemption.”); PSSA Jan. 11, 2022, Reply at 2 (stating “secondary access must be able to be immediately preempted by public safety users . . .”).

¹³⁹ *Eighth Further Notice*, 36 FCC Rcd at 15050, para. 52.

¹⁴⁰ *Id.*

¹⁴¹ The 700 MHz Guard Band licensee and 220 MHz band manager must file annual reports with the Commission. See 47 CFR § 27.607; see also *Annual Guard Band Reports*, FCC (Aug. 2, 2022), <https://www.fcc.gov/wireless/bureau-divisions/mobility-division/700-mhz-guard-bands/annual-guard-band-reports>.

¹⁴² *Eighth Further Notice*, 36 FCC Rcd at 15051, para. 56.

¹⁴³ *Id.*

58. Commenting parties generally showed little enthusiasm for continuing or expanding the RPC's current role.¹⁴⁴ Although some commenters supported a continued role for the RPCs,¹⁴⁵ many believed a lack of funding and resources for RPC's, which are voluntary organizations, would hinder their ability to perform frequency coordination or spectrum management functions.¹⁴⁶ For instance, NPSPTC stated that "given the current economic conditions, the necessary resources required for robust regional planning of the 4.9 GHz band throughout the country simply do not exist at this time."¹⁴⁷ Moreover, Region 20 noted the challenge RPCs would face if required to manage newer technologies such as LTE and 5G.¹⁴⁸ We agree and decline to adopt a spectrum management role for RPCs in this band given the lack of necessary funding and resources for RPCs nationwide, lack of expertise in much of the new technology likely to be deployed in the band, and lack of consensus in the record that regional planning is consistent with our goal of establishing a nationwide framework for the band.

I. Interoperability Standards

59. The Commission also sought comment in the *Eighth Further Notice* on whether to adopt any technical standards that would promote interoperability in the 4.9 GHz band.¹⁴⁹ Commenting parties were split on this question. A few commenters believed the Commission should formulate and adopt technical standards to promote interoperability in the band.¹⁵⁰ For instance, while not expressly advocating for the Commission to promulgate interoperability standards, IACP saw a need for systems operating in the 4.9 GHz band to "interoperate securely and reliably with existing land mobile radio legacy networks whenever possible and practical."¹⁵¹ On the other hand, some commenting parties such as APCO, NPSTC, and IAFC recommended against the Commission developing interoperability standards for the band.¹⁵² NPSTC stated that "the diversity of uses in the 4.9 GHz band . . . makes

¹⁴⁴ APCO Nov. 29, 2021, Comments at 7 (stating that "any continued or expanded role [for RPC's] should take into account the funding and authority limitations creating challenges today"); NPSTC Nov. 29, 2021, Comments at 9 (noting that although "voluntary involvement of strong and knowledgeable regional planning committees has been helpful" in larger metropolitan areas the "current economic conditions . . . do not exist at this time" for robust regional planning throughout the country at 4.9 GHz); WISPA Nov. 29, 2021, Comments at 22 (stating "[t]here is no need to designate . . . regional planning committees to coordinate frequencies"); IAFC Dec. 20, 2021, Reply at 3 (citing NPSTC Comments). *But see* Region 20 Nov. 29, 2021, Comments at 4 (stating that "RPCs can play an advisory role in the identification and assignment of available spectrum as we do today with 700 and 800 MHz NPSPEC frequencies"); BART Nov. 29, 2021, Comments at 8 (stating it "strongly supports a continued role for the regional committees").

¹⁴⁵ BART Nov. 29, 2021, Comments at 8 (stating it "strongly supports a continued role for the regional committees"); Maryland et al. Nov. 29, 2021, Comments at 10 (stating "[b]and management or coordination in all other bands has been successful when Regional Planning Committees or states have been delegated management responsibilities and there is no reason that cannot hold true for 4.9 GHz").

¹⁴⁶ APCO Nov. 29, 2021, Comments at 7; NPSTC Nov. 29, 2021, Comments at 9; IAFC Dec. 20, 2021, Reply at 3.

¹⁴⁷ NPSTC Nov. 29, 2021, Comments at 9.

¹⁴⁸ Region 20 Nov. 29, 2021, Comments at 4 (stating that its "concerns relate to newer technologies, such as 5G, which could introduce challenging issues for RPC members with which we may not be fully experienced" and noting that if a new entrant to the band "desires to add private LTE, or in particular, private LTE with multiple eNodeB transmitter locations, technologies with which we are unfamiliar, the challenges of frequency coordination could be more challenging").

¹⁴⁹ *Eighth Further Notice*, 36 FCC Rcd at 15046, para. 37.

¹⁵⁰ TDD Nov. 29, 2021, Comments at 3-4; IACP Nov. 29, 2021, Comments at 5; STARNet Nov. 24, 2021, Comments at 5; Maryland et al. Nov. 29, 2021, Comments at 5.

¹⁵¹ IACP Nov. 29, 2021, Comments at 5.

¹⁵² APCO Nov. 29, 2021, Comments at 6 (stating that "[t]he use cases for 4.9 GHz do not implicate the interoperability issues more commonly seen in bands used for land mobile radio networks"); NPSTC Nov. 29, 2021, (continued....)

designating an interoperability standard impractical,” and “fixed links . . . [do] not have an interface directly with public safety personnel on the street.”¹⁵³

60. We agree with the latter position. While we recognize that interoperability is an integral part of the public safety communications ecosystem, the lack of technical mandates in this band has led to the development of a variety of innovative uses, some of which have no need to work directly with one another.¹⁵⁴ Consequently, given the wide variety of uses and potential uses of the band, we believe imposing interoperability standards at this juncture could lead to fewer equipment options thereby potentially stifling innovation and contradicting our goal of reducing equipment costs.¹⁵⁵

J. Other Technical Issues

61. In the *Eighth Further Notice*, the Commission sought comment on certain technical rule proposals from the *Sixth Further Notice* to increase utilization of the 4.9 GHz band.¹⁵⁶ Below, we summarize each proposal, review the record, and set forth our decisions.

62. *Channel Aggregation*. The Commission’s rules limit aggregation of channels in the 4.9 GHz band to 20 megahertz bandwidth.¹⁵⁷ In the *Sixth Further Notice*, the Commission proposed expanding the limit to 40 megahertz because it may enable public safety access to 5G technologies.¹⁵⁸ The majority of parties commenting on this issue supported expanding the aggregation limit with some suggesting that channel aggregation up to 50 megahertz be permitted.¹⁵⁹ For instance, the IACP states that “the full 50 MHz of 4.9 GHz is best suited for 5G deployment.”¹⁶⁰ We agree with these commenters that wider bandwidths should be permitted particularly, as commenters note, because 5G technology permits operation with a channel bandwidth up to 50 MHz.¹⁶¹ Therefore, we will allow channel aggregations up to 50 megahertz to provide maximum flexibility for channel licensing. Unlike with a

Comments at 15; IAFC Nov. 23, 2021, Comments at 4 (stating “[g]enerally, technologies on the 4.9 GHz band do not normally involve user-to-user or tactical applications”); IAFC Dec. 20, 2021, Reply at 7.

¹⁵³ NPSTC Nov. 29, 2021, Comments at 15.

¹⁵⁴ E.g., fixed point-to-point systems and ad hoc mobile networks would not need to directly communicate with one another.

¹⁵⁵ NPSTC Nov. 29, 2021, Comments at 15-16 (stating that “the diversity of uses in the 4.9 GHz band . . . makes designating an interoperability standard impractical” and that although it is “enthusiastic” about the potential for 5G technology to “serve the public safety community” it sees no evidence that 5G technology will “eliminate the need for the current communications uses at 4.9 GHz, i.e., uses that will continue to be required by the public safety community”); APCO Nov. 29, 2021, Comments at 6 (stating that “[t]he use cases for 4.9 GHz do not implicate the interoperability issues more commonly seen in bands used for land mobile radio networks”); BART Nov. 29, 2021, Comments at 8-9 (stating it “applauds the Commission’s strong preference ‘to adhere to a technology-neutral policy’ and ‘strive for operational flexibility’” and that “[a]ny new technology standards should not require new investment or updates by incumbent licensees”); Rachel Culp et al. Nov. 29, 2021, Comments at 3 (arguing that non-public safety use of the band will result in “technological innovation, equipment cost reduction”); IAFC Dec. 20, 2021, Reply at 7 (stating that it supports 5G technology being used in the band “as long as it does not interfere with other public safety uses”).

¹⁵⁶ *Eighth Further Notice*, 36 FCC Red at 15053, para. 60.

¹⁵⁷ 47 CFR § 90.1213(a).

¹⁵⁸ *Sixth Further Notice*, 33 FCC Red at 3265, para. 10.

¹⁵⁹ Maryland et al. Nov. 29, 2021, Comments at 7; STARNet Nov. 23, 2021, Comments at 6 (supporting channel aggregation up to 40 MHz); APCO Nov. 29, 2021, Comments at 4; IACP Nov. 29, 2021, Comments at 4 (supporting channel aggregation up to 50 MHz). *But see* API and ENTELEC Nov. 29, 2021, Comments at 3 (suggesting a smaller aggregation limit of up to 15 megahertz).

¹⁶⁰ IACP Nov. 29, 2021, Comments at 4.

¹⁶¹ *Id.*

smaller aggregation limit, this expanded limit will provide licensees with increased bandwidth and throughput and may encourage the use of new innovative technologies in the band. Nonetheless, licensees and applicants should request no more bandwidth than necessary for a particular use. As noted above, the requested bandwidths (among other technical parameters) on all applications seeking to license new or modified facilities will be subject to frequency coordination by the Band Manager, which may recommend bandwidth limits on a case-by-case basis as necessary to protect neighboring or overlapping users and ensure efficient operation in the band. Finally, to promote economies of scale for the equipment market, the expanded limit will apply to all users; however, non-public safety users will be subject to any use restrictions, including potential bandwidth restrictions, that the Band Manager deems necessary to ensure full protection of public safety operations.

63. *Primary Status for Fixed Links.* Currently, the rules accord primary status only to P-P and P-MP fixed links that deliver broadband traffic, while links that do not meet this criterion are secondary to other operations in the 4.9 GHz band.¹⁶² The Commission proposed to accord primary status for all P-P and P-MP links on Channels 14-18 of the band plan, including fixed links that operate with narrowband traffic.¹⁶³ Maryland et al. and STARNet advocated for primary status “for the entire band, not merely channels 14-18.”¹⁶⁴ Moreover, several public safety parties also supported removing the broadband requirement,¹⁶⁵ and no filer in the latest comment window opposed extending primary status to fixed links on all channels in the band. We believe that extending primary status to P-P and P-MP fixed links that operate only on Channels 14-18 in the band, as originally proposed, may continue to limit flexibility and make the band less attractive for investment. Furthermore, we agree with those commenters that support removing the requirement that fixed links deliver broadband traffic in order to obtain primary status. Accordingly, going forward we will authorize all P-P and P-MP links throughout the band on a primary basis including those transmitting narrowband traffic. We will also permit licensees operating fixed links which are currently authorized on a secondary basis to seek to upgrade those links to primary status. Applications requesting initial authorization for primary links or upgrades from secondary status to primary status for existing links will be accepted once a Band Manager is selected and the formal frequency coordination process described above is in place.

64. *Temporary P-P Operation.* The Commission proposed to limit temporary P-P operation to thirty days maximum over a given path over a one-year period “in order to limit ‘temporary’ links to truly temporary uses.”¹⁶⁶ Maryland et al. and STARNet opposed such a limit as excessive, noting that it would potentially constrict operations during a disaster or an on-going event.¹⁶⁷ No filer in the latest comment window supported a limit on temporary P-P operations. We agree that a limit on temporary P-P operations will limit flexibility in the band. Accordingly, we decline to adopt this proposal.

65. *Antenna Gain.* The Commission proposed to require a minimum antenna gain of 26 dBi for P-P antennas to “enable users to deploy larger directional antennas, . . . and to produce narrower beam widths and more directional P-P links, which should enable co-channel users in congested areas to place links closer together and achieve greater frequency reuse.”¹⁶⁸ A majority of commenters opposed this

¹⁶² 47 CFR § 90.1207(d).

¹⁶³ *Sixth Further Notice*, 33 FCC Rcd at 3278-79, para. 48.

¹⁶⁴ Maryland et al. Nov. 29, 2021, Comments at 2; STARNet Nov. 23, 2021, Comments at 3.

¹⁶⁵ APCO Nov. 29, 2021, Comments at 5; Region 20 Nov. 29, 2021, Comments at 2 (the term broadband “is not specifically defined in the rules”); Maryland et al. Nov. 29, 2021, Comments at 1, 2, 7 (“Fixed point-to-point and point-to multi-point 4.9 GHz paths represent the main use of the band, serve an important public safety interest, and should be afforded primary status regardless of whether they are used to deliver broadband service.”); STARNet Nov. 23, 2021, Comments at 1-3, 6; Maryland et al. Jan. 11, 2022, Reply at 1-2.

¹⁶⁶ *Sixth Further Notice*, 33 FCC Rcd at 3279, para. 50 (citing NPSTC Oct. 24, 2013 Plan at 7).

¹⁶⁷ Maryland et al. Nov. 29, 2021, Comments at 7; STARNet Nov. 23, 2021, Comments at 7.

¹⁶⁸ *Sixth Further Notice*, 33 FCC Rcd at 3281, para. 56.

proposal. For example, Maryland et al. and STARNet stated that they are “uncertain why the Commission focuses on a ‘minimum’ gain for antennas” and that “[t]his seems to contradict the goals of the 8th Further Notice by immediately affecting specifications for ‘innovative technologies.’”¹⁶⁹ WISPA stated that “[a] 26 dBi parabolic antenna would be approximately 18 inches or more in diameter, and is larger than commercially available panel antennas.”¹⁷⁰ On the other hand, API and ENTELEC recommended varying minimum antenna gains and power limits depending on link distance and whether a link serves multipoint receivers because API and ENTELEC “feel that the minimum antenna gain requirements should align with the communications distance sought to maximize channel re-use.”¹⁷¹ While power limits depending on such factors may be appropriate as a method to reduce the likelihood of interference,¹⁷² we agree with the bulk of commenters that a minimum gain requirement would introduce an unnecessary restriction. The proposed restriction would mean that commercially available antennas, which WISPA reports are smaller than a parabolic antenna with 26 dB minimum gain, would be rendered non-compliant. Thus, we believe such a limit may inhibit development of a robust and affordable equipment market for the band that leverages commercially available antennas and technologies. Accordingly, we decline to adopt the minimum antenna gain proposal.

66. *Construction Deadline.* The Commission proposed to require all 4.9 GHz geographic area licensees to place at least one base or temporary fixed station in operation within 12 months of license grant and to reduce the construction period for fixed P-P stations from 18 months to 12 months.¹⁷³ The Commission also included P-MP stations in this proposed requirement.¹⁷⁴ Maryland et al., STARNet, and API and ENTELEC supported these proposals.¹⁷⁵ No filer in the latest comment window opposed this proposal. We believe that shortening the construction period to one year for all 4.9 GHz licenses will lead to more timely use of the spectrum and reduce the possibility of spectrum warehousing. Moreover, the change will harmonize the construction deadlines for the 4.9 GHz band with the deadlines of section 90.155, which is the analogous rule for the majority of part 90 radio services.¹⁷⁶ Accordingly, taking into account that base stations will be licensed on a site-by-site basis rather than on geographic licenses as discussed above and including P-MP stations, we adopt the revised construction deadlines.

67. *Robotic Use.* The Commission proposed to allow robotic use in the lowest five megahertz of the band, Channels 1-5.¹⁷⁷ TDD and API and ENTELEC supported allowing robotic

¹⁶⁹ Maryland et al. Nov. 29, 2021, Comments at 7; STARNet Nov. 23, 2021, Comments at 7.

¹⁷⁰ WISPA Nov. 29, 2021, Comments at 25.

¹⁷¹ API and ENTELEC Nov. 29, 2021, Comments at 5.

¹⁷² *See supra* para. 68.

¹⁷³ *Sixth Further Notice*, 33 FCC Rcd at 3283, para. 63; *see also* 47 CFR § 90.1209(d) (imposing an 18-month construction deadline only on fixed P-P stations that are licensed on a site-by-site basis, and no construction deadline for base and temporary fixed stations).

¹⁷⁴ *Sixth Further Notice*, 33 FCC Rcd at 3301, Appx. B, proposed rule 90.1209(d) (“Fixed point-to-point and point-to-multipoint stations which are licensed on a site-by-site basis must be placed in operation within twelve (12) months of the grant date or the authorization . . .”).

¹⁷⁵ Maryland et al. Nov. 29, 2021, Comments at 1, 8 (stating “the license rules for constructing stations in 4.9 GHz should be harmonized with other bands, e.g., VHF, UHF, 700, and 800 MHz”); STARNet Nov. 23, 2021, Comments at 4, 8; API and ENTELEC Nov. 29, 2021, Comments at 6 (explaining “a buildout requirement in the Remaining Band of 12 months is sufficient to ensure that licensing is properly utilized”).

¹⁷⁶ 47 CFR § 90.155; *see also* Maryland et al. Nov. 29, 2021, Comments at 5; STARNet Nov. 23, 2021, Comments at 4 (asking “that the Commission harmonize LMR [land mobile radio] and 4.9 GHz rules whenever practical”).

¹⁷⁷ *Sixth Further Notice*, 33 FCC Rcd at 3267, para. 16.

operations on a coordinated basis,¹⁷⁸ as did several public safety parties and CORF, albeit limited to public safety uses.¹⁷⁹ NPSTC stated that “robotics should be allowed on other channels in the 4.9 GHz band as well and not be limited to channels 1-5.”¹⁸⁰ We agree with NPSTC regarding allowed channels, because NPSTC contends that robotic deployments are conducted in relatively confined areas,¹⁸¹ which reduces interference concerns. As such, there is little need to separate robotic operations spectrally from other uses of the band. Accordingly, we permit robotic use throughout the band on a frequency coordinated basis as approved by the Band Manager. At this time, we place no specific public safety eligibility limits on robotic use because we do not wish to constrain the Commission’s options to encourage robust non-public-safety use of the band. Any future non-public safety robotic use of the band, as with other operations, would be subject to the leasing framework we seek comment on below in the *Ninth Further Notice*.

68. *Power.* The Commission’s rules currently set maximum conducted output power at 33 dBm for the widest available channel bandwidth, 20 megahertz.¹⁸² The Commission tentatively concluded that maximum equivalent isotropically radiated power (EIRP) limits should be codified in the rules,¹⁸³ and proposed maximum EIRP limits of 65.15 dBm for P-P and 55.15 dBm for P-MP links.¹⁸⁴ API and ENTELEC recommended a maximum EIRP of 40 dBm for P-P links less than 8 kilometers; 60 dBm for P-P links exceeding 8 kilometers, and 27 dBm for P-MP links.¹⁸⁵ APCO supported allowing EIRP for fixed P-P and P-MP operations equivalent to part 101 levels,¹⁸⁶ which sets a maximum allowable EIRP of 55 dBW (85 dBm) for frequency bands near 4.9 GHz. WISPA suggested the Commission should “cap the conducted power . . . as is done in the U-NII-3 band.”¹⁸⁷

69. We agree with APCO that a higher EIRP limit will encourage licensees to achieve higher broadband data rates.¹⁸⁸ Consequently, we set the maximum EIRP limit to match the limit under Part 101

¹⁷⁸ FPL Nov. 29, 2021, Comments at 2-5; TDD Nov. 29, 2021, Comments at 3; API and ENTELEC Nov. 29, 2021, Comments at 3; Letter from American Petroleum Institute, et al, to Marlene H. Dortch, WP Docket No. 07-100 (filed Oct. 27, 2022) (API et al. Oct. 27, 2022, *Ex Parte*) (“promot[ing] more intensive use of this spectrum for multiple use cases such as . . . robotics”); FPL Nov. 9, 2022, *Ex Parte* at 1.

¹⁷⁹ APCO Nov. 29, 2021, Comments at 5; NPSTC Nov. 29, 2021, Comments at 10, 14 (stating “[r]obotics communications are normally conducted in a relatively confined area compared to that of many point-to-point links or airborne communications, and multiple robotic devices may be deployed simultaneously”); IACP Nov. 29, 2021, Comments at 6; IAFC Dec. 20, 2021, Reply at 5; Maryland et al. Nov. 29, 2021, Comments at 2; CORF Nov. 26, 2021, Comments at 8 (noting “any robotic use of this [should] band be limited to public safety agencies: due to the limited number of exigent circumstances in which such robots are anticipated to be used for public safety purposes . . .”).

¹⁸⁰ NPSTC Nov. 29, 2021, Comments at 14.

¹⁸¹ *Id.* (“Robotics communications are normally conducted in a relatively confined area compared to that of many point-to-point links or airborne communications, and multiple robotic devices may be deployed simultaneously.”).

¹⁸² 47 CFR § 90.1215.

¹⁸³ *Sixth Further Notice*, 33 FCC Rcd at 3276, para. 42.

¹⁸⁴ *Id.* at 3281, para. 57.

¹⁸⁵ API and ENTELEC Nov. 29, 2021, Comments at 5 (recommending minimum antenna gains for P-P links).

¹⁸⁶ APCO Nov. 29, 2021, Comments at 5 (stating “[h]igher EIRP levels encourage agencies to deploy larger antennas to achieve higher broadband data rates”); *see also* 47 CFR § 101.113.

¹⁸⁷ WISPA Nov. 29, 2021, Comments at 25-26; *see also* 47 CFR § 15.407(a)(3)(i) (setting a maximum conducted output power limit for Unlicensed National Information Infrastructure (U-NII) devices operating in the 5.725-5.850 GHz band).

¹⁸⁸ APCO Nov. 29, 2021, Comments at 5.

for nearby frequency bands at 55 dBW (85 dBm).¹⁸⁹ APCO also was “open to limiting EIRP for shorter paths similar to Part 101,”¹⁹⁰ and API and ENTELEC’s suggestion regarding different power limits at different distances is consistent with this approach. We agree that power should be limited for shorter paths to reduce the potential for interference while still permitting sufficient power for the microwave path. Accordingly, because we are adopting the part 101 fixed power limit, we adopt the part 101 “minimum” path length of 17 kilometers at which maximum EIRP is permitted, and we adopt the part 101 power reduction rule for 4.9 GHz band path lengths shorter than 17 kilometers.¹⁹¹ The existing power limit rules remain in effect for base/mobile, mobile-only, and temporary fixed operations; albeit extrapolated for aggregated bandwidths larger than 20 megahertz and up to 50 megahertz.¹⁹² As with bandwidth and other technical parameters, requested power levels on all new applications and modification applications are subject to frequency coordination by the Band Manager, which may impose limits on a case-by-case basis as necessary to protect neighboring or overlapping users. The Commission also sought comment on whether emission mask M is sufficient, or whether a tighter emission mask should be imposed for high power operations.¹⁹³ No party commented on high power emission masks, and we take no further action on the emission mask M at this time.

K. 4.9 GHz Band Freeze

70. As the Commission directed in the *Order on Reconsideration*, the Bureaus amended the freeze to allow those with existing 4.9 GHz licenses to modify those licenses as permitted under the rules.¹⁹⁴ Pending resolution of issues raised in the *Ninth Further Notice* below, we retain the freeze for all applicants who are not already 4.9 GHz licensees.¹⁹⁵ The *Ninth Further Notice* seeks comment on a wide range of questions related to the implementation of our new Band Manager model, including the best policies as to new licensing in the band. Issuing licenses to new licensees under the existing rules while these questions remain unresolved would further complicate the spectrum environment and undermine the Band Manager’s flexibility to provide for efficient use of this spectrum by public safety and non-public safety operations. New entrants facing special circumstances may seek a waiver of the freeze pursuant to section 1.925 of the Commission’s rules.¹⁹⁶

¹⁸⁹ See 47 CFR § 101.113 (allowing a maximum EIRP of 55 dBW for the 3,700-4,200 MHz and 5,925-6,425 MHz frequency bands).

¹⁹⁰ APCO Nov. 29, 2021, Comments at 5, n.16; see also 47 CFR § 101.143 (setting a minimum path length of 17 kilometers in the 1,850-7,125 MHz band (inclusive of the 4.9 GHz band); and a power reduction formula for shorter path lengths).

¹⁹¹ See 47 CFR § 101.143(b) (setting a power reduction formula of $EIRP = MAXEIRP - 40 \cdot \log(A/B)$ dBW; where: EIRP = The new maximum EIRP (equivalent isotropically radiated power) in dBW; MAXEIRP = Maximum EIRP as set forth in the Table in Section 101.113(a); A = Minimum path length from the Table above for the frequency band in kilometers; and B = The actual path length in kilometers. In the 4.9 GHz band rule change we adopt today, MAXEIRP = 55 dBW and A = 17 kilometers).

¹⁹² See *Sixth Further Notice*, 33 FCC Rcd at 3304, Appx. B, proposed rule § 90.1215(a)(1) (extrapolating low power and high power maximum conducted output power limits for bandwidths over 20 megahertz and up to 40 megahertz, which was the maximum bandwidth); see also *Sixth Further Notice*, 33 FCC Rcd at 3265, para. 10.

¹⁹³ *Sixth Further Notice*, 33 FCC Rcd at 3265, para. 10; see also 47 CFR § 90.210(m).

¹⁹⁴ *Order on Reconsideration*, 36 FCC Rcd at 15041-42, para. 25; *Freeze Modification Public Notice*, 36 FCC Rcd 15185.

¹⁹⁵ *Order on Reconsideration*, 36 FCC Rcd at 15042, para. 26; see also Caltrans Nov. 23, 2021, Comments at 4 (stating “Caltrans welcomes the Commission’s decision of lifting the freeze on licensing, allowing incumbents to modify their existing licenses or licensing new permanent 4.9 GHz fixed sites”). By stating here that we retain the freeze, we do not mean to affect the Bureaus’ discretion to modify, lift, or expand the freeze in the future as it deems necessary.

¹⁹⁶ 47 CFR § 1.925; see also *Freeze Public Notice*, 35 FCC Rcd at 9523.

IV. NINTH FURTHER NOTICE OF PROPOSED RULEMAKING

71. In this *Ninth Further Notice*, we seek comment on a range of questions related to the implementation of our new Band Manager model for the 4.9 GHz band adopted above in the *Seventh Report and Order*. This model will preserve the essentially public safety nature of the band while decreasing access costs and expanding use to a variety of primary public safety and secondary non-public safety operations.

72. First, we seek comment on the Band Manager's efforts in coordinating public safety operations, in particular mitigating harmful interference and modernizing operations. Next, we seek comment on the Band Manager's role in facilitating leasing to non-public safety users; how to enable such leasing, how to manage the revenues that arise from it, and how to ensure preemption rights for public safety operations. We also seek comment on the implementation of our committee-based selection process for the Band Manager, which mirrors the approach we have taken for selecting clearinghouses and transition coordinators in a number of other bands. Finally, we seek comment on our oversight of the Band Manager and on other issues related to the implementation of the Band Manager model.

A. Rights and Responsibilities of the Nationwide Band Manager Regarding Public Safety Operations

73. We seek comment on the rights and responsibilities of the Band Manager with regards to the coordination and management of public safety operations in the 4.9 GHz band. We believe that the Band Manager, which need not necessarily be a public safety entity itself, at a minimum, must be representative of all eligible licensees in the 4.9 GHz band to ensure that, in coordinating the band and enabling non-public safety access, the Band Manager is knowledgeable and its judgment is impartial.¹⁹⁷ This representativeness, familiarity, and impartiality will help the Band Manager work with public safety licensees and non-public safety users to maximize efficient use of the 4.9 GHz band.

74. We also believe that the Band Manager must have a complete, accurate, and current knowledge of the 4.9 GHz band environment. This would mean that the Band Manager would be able to competently perform frequency coordination, understand and ensure compliance with our interference rules, and control use of the spectrum so as to facilitate protection for public safety. In addition, the Band Manager must be familiar with all applicable Commission rules, policies, and procedures, including the *Seventh Report and Order* and any subsequent orders adopted in this proceeding. We believe this would mean that the Band Manager should also have experience with ULS so that it can fulfill its role as a frequency coordinator for both public safety and non-public safety entities.

1. Criteria for Harmful Interference at 4.9 GHz

75. In the *Eighth Further Notice*, the Commission sought comment on how to ensure public safety licensees have efficient and interference-free access to the band.¹⁹⁸ In particular, it sought comment on the feasibility of the TIA-10 standard¹⁹⁹ to guard against interference between licensees deploying fixed P-P links and P-MP hubs but also asked about an appropriate standard for licensees deploying non-fixed, geographic-area operations or ad-hoc temporary operations.²⁰⁰

¹⁹⁷ Since 1958, the Commission has expected entities that are fulfilling the frequency coordinator role to refrain from discriminating amongst users and to honor all requests for coordination. *Frequency Coordination in the Private Land Mobile Radio Services*, PR Docket No. 83-737, Report and Order, 103 FCC 2d 1093, 1101-02, para. 18 (1986).

¹⁹⁸ *Eighth Further Notice*, 36 FCC Rcd at 15043, para. 30.

¹⁹⁹ Telecommunications Industry Association, TIA Standard Interference Criteria for Microwave Systems TIA-10 (2019), <https://documents.tiaonline.org/1nq99bt/1> (TIA-10). The TIA-10 standard provides a methodology for designing and frequency coordinating fixed point-to-point microwave relay systems.

²⁰⁰ *Eighth Further Notice*, 36 FCC Rcd at 15043-44, para. 31.

76. In this *Ninth Further Notice*, we build off the record before us and seek comment on specific criteria for protecting public safety licensees operating in the band from what we term “harmful interference at 4.9 GHz.”²⁰¹ Caltrans proposed that, “[s]hould the Commission decide to allow non-public safety use,” one of the “primary tasks for a nationwide Band Manager include[] Spectrum Protection [to] ensure that protection from harmful interference is strictly observed.”²⁰² We agree, and thus, tentatively conclude that the Commission will adopt interference criteria for protecting public safety operations in the band from “harmful interference at 4.9 GHz” and that the Band Manager will be required to apply those interference criteria, once adopted, as it manages access to the band to ensure public safety licensees have efficient and interference-free operations in the band. The interference criteria, once adopted, will be used to protect public safety incumbents from “harmful interference at 4.9 GHz” by other public safety licensees as well as non-public safety users in the band. We seek comment on this tentative conclusion. Below we seek comment on how to define “harmful interference at 4.9 GHz.”

77. Commenting parties uniformly supported the goal of protecting current and future public safety licensees from interference but differ on how to define harmful interference at 4.9 GHz and which interference protection approach is most appropriate.²⁰³ For instance, NPSTC stated that the threshold degradation approach of TIA-10 “has a demonstrated track record of ensuring interference protection for point-to-point fixed links.”²⁰⁴ TIA-10 defines threshold degradation as interference which degrades a victim receiver’s 10^{-6} bit error rate (BER) threshold by more than 1 dB.²⁰⁵ NPSTC noted, however, that TIA-10 is designed to “minimize interference to fixed operations” but indicates that “[w]hatever approach is ultimately adopted should protect the range of public safety operations [including mobile operations] from interference.”²⁰⁶ APCO on the other hand preferred a propagation modeling approach it uses for coordinating TDMA systems in the VHF band for protecting fixed P-P and P-MP systems in the 4.9 GHz band from interference.²⁰⁷ APCO prefers its approach to TIA-10 because it believes it will make frequency coordination “much simpler and more efficient overall.”²⁰⁸ Furthermore, APCO said “Part 90 contour-based coordination” is appropriate for protecting base/mobile operations in the 4.9 GHz band.²⁰⁹ WISPA stated that it believes the TIA-10 standard “is overly restrictive” and preferred a contour-based overlap approach similar to one used to protect Priority Access Licenses in the CBRS band from interference.²¹⁰

78. Given the lack of consensus on a protection method, we seek further comment on how best to protect public safety licensees from harmful interference at 4.9 GHz. TIA-10, as noted above,

²⁰¹ Although the term “harmful interference” is already defined under part 90, we seek comment on a specific definition for “harmful interference” which will apply only to the 4.9 GHz band and which will be used as the baseline for interference protection to public safety operations in the band. See 47 CFR § 90.7 (defining harmful interference as “any emission, radiation, or induction which specifically degrades, obstructs, or interrupts the service provided by such stations”).

²⁰² Caltrans Nov. 23, 2021, Comments at 5.

²⁰³ APCO Nov. 29, 2021, Comments at 2-3; AASHTO Nov. 29, 2021, Comments at 3; NPSTC Nov. 29, 2021, Comments at 10; IAFC Nov. 23, 2021, Comments at 3; IACP Nov. 29, 2021, Comments at 2; Region 20 Nov. 29, 2021, Comments at 2; PSSA Nov. 29, 2021, Comments at 6; BART Nov. 29, 2021, Comments at 2; Cal OES Nov. 29, 2021, Comments at 3.

²⁰⁴ NPSTC Nov. 29, 2021, Comments at 9-10.

²⁰⁵ TIA-10 at 38.

²⁰⁶ NPSTC Nov. 29, 2021, Comments at 9-10.

²⁰⁷ APCO Nov. 29, 2021, Comment at 3.

²⁰⁸ *Id.*

²⁰⁹ *Id.*

²¹⁰ WISPA Nov. 29, 2021, Comments at 18.

defines digital threshold to interference (T/I) as the “difference between the desired signal power (expressed in dBm) when the receiver is at 10^{-6} BER threshold and the interfering power (expressed in dBm) into the victim receiver which degrades the receiver threshold by 1 dB.”²¹¹ The TIA-10 standard notes that only the strength of the interfering signal (I) into the victim receiver must be calculated if a victim receiver’s desired threshold signal power (T) is known.²¹² It also notes that there are many ways of setting up the calculation, but “the results should be identical if the same parameters are used.”²¹³

79. Therefore, we seek comment on whether the Commission should adopt interference criteria to protect public safety licensees in the 4.9 GHz band in terms of digital T/I or some other standard? Is T/I the proper metric to ensure protection of mission critical communications as NPSTC suggested?²¹⁴ If so, would 1 dB of 10^{-6} BER threshold degradation be the proper way to provide sufficient interference protection to public safety? In other words, a public safety licensee would need to tolerate interference that degrades its receiver’s 10^{-6} BER threshold level by 1 dB but would serve to ensure protection from harmful interference at 4.9 GHz. Would these criteria for interference protection strike the right balance between allowing robust use of the band while protecting critical public safety communications or would it be more conservative than is necessary, as WISPA suggested?²¹⁵ If it is too conservative, should higher levels of threshold degradation be tolerated or should a different bit error rate be used? Is establishing an approach that ensures protection from harmful interference at 4.9 GHz in terms of digital T/I valid only when considering fixed sites? If so, why not apply it when considering interference to or from mobile operations? What criteria would be appropriate for mobile operations?

80. We also seek comment on the propagation modeling approach proposed by APCO.²¹⁶ When performing part 90 frequency coordination involving a TDMA system operating or proposing to operate in the VHF band, APCO and other public safety frequency coordinators comprising the Public Safety Communications Council (PSCC) use the Longley-Rice propagation methodology to calculate the strength of an unwanted signal at the receive antenna of a system being evaluated.²¹⁷ The PSCC considers an interfering signal at the receive antenna of less than 9 dBu as passing coordination, an interfering signal greater than 29 dBu as failing coordination, and any value in between as needing further evaluation.²¹⁸ Could a similar methodology be used to determine harmful interference at 4.9 GHz and, if so, how would harmful interference at 4.9 GHz be defined? Would harmful interference at 4.9 GHz be defined in terms of the strength of an unwanted signal in dBu or dBm at the receive antenna of a station under consideration? If so, what unwanted signal level would be considered to cause harmful interference at 4.9 GHz? Would this methodology allow for robust use of the band while protecting critical public safety communications? Are there other propagation models besides Longley-Rice which could be used to perform interference calculations for the 4.9 GHz band? If so, what are they and how would these alternate models improve the process? Is the propagation method used by the PSCC only valid when considering the interference potential between fixed sites? If so, why can it not be applied when considering interference to or from mobile operations and what methodology might be more appropriate

²¹¹ TIA-10 at 38.

²¹² *Id.*

²¹³ *Id.*

²¹⁴ NPSTC Nov. 29, 2021, Comments at 9 (noting that “[p]ublic safety fixed links carry mission critical information and need to be protected from interference”).

²¹⁵ WISPA Nov. 29, 2021, Comments at 18.

²¹⁶ APCO Nov. 29, 2021, Comments at 3.

²¹⁷ See Letter from Farokh Latif, Chairman, Public Safety Communications Council, to Michael Wilhelm, Deputy Chief, Policy and Licensing Division, Public Safety and Homeland Security Bureau (Jan. 22, 2013) (PSCC Jan. 22, 2013 Letter). The PSCC frequency coordinators perform Longley-Rice study at 50%, 50%, 50% (time, location and probability) when calculating the signal level from a proposed system. *Id.* at 1.

²¹⁸ PSCC Jan. 22, 2013 Letter at 1-2.

for mobile operations? Commenting parties who support this propagation modeling approach should explain why it would make the frequency coordination process simpler and more efficient, as APCO claims, compared to the digital T/I methodology described above.²¹⁹

81. We also seek comment on contour overlap analysis as the basis for determining harmful interference at 4.9 GHz. As noted above, APCO supported contour overlap analysis for frequency coordination if base/mobile operations are involved but offers no proposal for what contours should be used for determining interference protection.²²⁰ WISPA, on the other hand, suggested the -96 dBm contour of a public safety licensee should be protected against aggregate interference exceeding -80 dBm.²²¹ Would these contour levels be appropriate for establishing interference protection in the 4.9 GHz band under a contour overlap approach? What method should be used to calculate the contours under this approach? Would using contours simplify the process for determining interference compared to the methods discussed above? Is contour overlap analysis valid only for base/mobile operations or can it also be used for interference analysis of fixed sites? Is contour analysis also a valid method for determining interference when mobile-only or temporary fixed operations are concerned? Further, as discussed previously, would interference protection based on contour overlap allow for robust use of the band while protecting critical public safety communications?

82. We seek comment on whether there are alternative methods not discussed above for establishing interference protection for public safety licensees operating in the 4.9 GHz band. Further, should there be different definitions for harmful interference at 4.9 GHz based upon whether a system deploys fixed or mobile operations? If so, how would interference analysis work when considering systems deploying different operations (for example, an incumbent deploying fixed facilities and an applicant seeking to license mobile operations)? Would a better approach be to have one definition for harmful interference at 4.9 GHz for all deployments in the band but allow the Band Manager maximum flexibility to perform the interference analysis in any manner it sees fit provided the Band Manager uses good engineering principles (with, as noted in the *Seventh Report and Order*, the possibility of challenging this determination to the Commission)? In any case, we request that commenting parties provide us with specific proposals for protecting public safety licensees from interference and to explain the costs and benefits of those proposals.

83. Finally, we seek comment on whether the nationwide Band Manager should be responsible for establishing interference criteria for public safety operations in the band. Is this an appropriate delegation of our authority to the Band Manager? If so, what should the Commission's role be resolving a dispute regarding whether the interference criteria established by the Band Manager are appropriate or whether a particular operation exceeds the interference criteria? We seek comment on this approach.

2. Mediation

84. In the *Seventh Report and Order*, we adopt a part 90 formal frequency coordination requirement for public safety applicants seeking to license facilities in the 4.9 GHz band and assign nationwide authority to the Band Manager to perform the coordination function. We now seek comment on what role the Band Manager should play, as part of its frequency coordination duties, in mediating or deciding disputes if parties disagree about existing or proposed operations.

85. For instance, if the Band Manager does play a role in mediating disputes between an applicant and an incumbent licensee, we seek comment on whether we should assign authority to the Band Manager to resolve disputes when mediation is not successful, or simply instruct it to refer matters to the Commission. If the former, should the parties involved in any dispute be able to appeal the Band

²¹⁹ APCO Nov. 29, 2021, Comments at 3.

²²⁰ *Id.*

²²¹ WISPA Nov. 29, 2021, Comments at 18.

Manager's decision to the Commission? If the latter, should the Band Manager provide a recommended resolution when referring any unresolved dispute to the Commission? In this regard, we seek input on what process would work best if the Band Manager needs to mediate disputes between parties over technical issues such as the potential for one user to cause interference to another user. Has frequency coordination worked in other bands without the need for any formal requirement of mediation?

86. Should the Band Manager also have a role in mediating disputes outside its frequency coordination duties? For instance, should the Band Manager mediate disputes as part of its role, as discussed below, in facilitating the leasing of unused spectrum rights to non-public safety entities? If so, would the mediation procedures described above work if the Band Manager needed to mediate disputes between parties over determining the availability of excess capacity for leasing from public safety to non-public safety users? Are there any other scenarios where the Band Manager might need to mediate disputes between parties, such as over the determination of which links are afforded primary status under our rules?

3. Evaluating Potential Integration with Broadband Networks Used by Public Safety

87. PSSA suggested that the nationwide Band Manager should evaluate "potential integration" of the 4.9 GHz band "with the Nationwide Public Safety Broadband Network."²²² Indeed, ten years ago, the Commission sought comment on how the 4.9 GHz band could complement the 700 MHz public safety broadband network.²²³ Since that time, a number of commercial networks have integrated public safety operations into their broadband networks.²²⁴ Thus, we believe the time is ripe to consider this issue anew, but with a broader approach. As it identifies unused spectrum in the band, we tentatively conclude that the Band Manager should explore opportunities to lease spectrum, through the leasing models described below, to operators of broadband networks used by public safety in other frequency bands. We seek comment on our tentative conclusion.

88. We seek further comment on whether the Band Manager should be able to engage with any broadband network providers (public safety and/or commercial) to pursue opportunities for integrating operations in the 4.9 GHz band with broadband networks used by public safety in other spectrum bands through the leasing models described below. Would the introduction of 5G technology into the 4.9 GHz band provide an opportunity for integration with public safety broadband networks in other bands? Are there other technologies that could be deployed in the 4.9 GHz band that also offer an opportunity for integration with public safety broadband networks? What benefits would flow from integrating operations in the 4.9 GHz band with public safety broadband networks? Is there existing statutory authority that would permit the integration of the 4.9 GHz band into public safety broadband networks? If not, would integrating operations in the 4.9 GHz band with broadband networks require legislative or statutory action? Finally, what requirements would ensure that the Band Manager has the appropriate incentives to pursue opportunities to integrate with public safety networks, including broadband networks, in other bands?

²²² PSSA Nov. 29, 2021, Comments at 9.

²²³ *Amendment of Part 90 of the Commission's Rules; Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band; Service Rules for the 698-746, 747-762 and 777-792 MHz Bands*, WP Docket No. 07-100, PS Docket No. 06-229, WT Docket No. 06-150, Fourth Report and Order and Fifth Further Notice of Proposed Rulemaking, 27 FCC Rcd 6577, 6594-95, para. 47 (2012).

²²⁴ See, e.g., *Verizon Unveils Public Safety Private Core*, Verizon (March 27, 2018), <https://www.verizon.com/about/news/verizon-unveils-public-safety-private-core>; *We've Made a 10-Year, up to \$7.7 Billion Commitment to First Responder Agencies*, T-Mobile, <https://www.t-mobile.com/business/government/public-safety> (last visited Jan. 10, 2023).

4. Technological Incentivization

89. In the *Seventh Report and Order*, we conclude that the nationwide Band Manager should, as part of a spectrum plan for the band and for the benefit of any interested licensees and lessees, determine how best to incorporate the latest commercially available technologies, including 5G, into the 4.9 GHz band. Should we require that the Band Manager file its spectrum plan for review by the Commission? In addition, should we require that the Band Manager complete the spectrum plan within a certain timeframe, such as within four to six months after the Band Manager is selected?

90. We also seek comment on how to encourage the widespread deployment of such technologies in a way that would promote interoperability while also lowering equipment costs. Should the Band Manager designate one or more preferred standards as part of this process, such as the 3GPP 5G standard, as long as the standards are not mandated and do not restrict the uses of other technologies and protocols, consistent with our preference to adhere to a technology-neutral policy?²²⁵ We seek comment on this approach.

5. Contents of Annual Reports

91. The *Seventh Report and Order*, adopts an annual reporting requirement that will allow the Commission to more effectively oversee the Band Manager, to ensure its activities advance the Commission's stated goals for this band, and to provide greater transparency, certainty, and predictability to the 4.9 GHz band. We now seek comment on what information should be included in those annual reports.

92. We tentatively conclude that the annual reports should include detailed descriptions of the Band Manager's efforts to: (1) develop a nationwide framework that maximizes use of the band; (2) leverage technological advancements, including 5G; (3) foster a robust equipment market and lower equipment costs; and (4) address non-public safety use of the band to foster innovation and investment. We seek comment on our tentative conclusion. For instance, are these the proper topics for the Band Manager to address when reporting on the status of the band to the Commission? Is there any other information that should be included in these reports by the Band Manager?

B. Rights and Responsibilities of a Nationwide Band Manager Regarding Non-Public Safety Operations

93. In the *Seventh Report and Order* above, we adopt rules that will permit the Band Manager to facilitate and coordinate spectrum leasing to non-public safety entities on a secondary basis. While public safety licensees will remain the primary users of the band, we find that our Band Manager coordinated leasing framework, which enables secondary access by non-public safety users subject to oversight and approval by the Band Manager, is the most efficient way to promote increased use of the 4.9 GHz band. Below, we seek comment on options for implementing this nationwide leasing program.

1. Leasing to Non-Public Safety Entities

94. The Band Manager will be responsible for coordinating public safety and non-public safety access to the band, ensuring that non-public safety use does not interfere with public safety operations, and for adopting procedures to ensure that non-public safety operations can be pre-empted by authorized public safety users as needed. We seek input on two possible means of enabling Band Manager-coordinated non-public safety leasing, as well as general considerations for creating an effective leased access model for the band, in particular, the need to ensure non-discriminatory treatment of potential lessees. Under either model, we want to ensure that all potentially affected licensees, as

²²⁵ See, e.g., PSSA Jan. 11, 2022, Reply at 3 (stating “[t]he most effective way to accelerate the deployment of 5G technologies in the 4.9 GHz Band is through a nationwide licensee (and the appointment of a band manager by such licensee) to develop a spectrum plan for the use of 5G across the band, which would facilitate widespread deployment and interoperability, and lower equipment costs”); PSSA Nov. 29, 2021, Comments at 9; IAFC Dec. 20, 2021, Reply at 5 (concurring with PSSA).

discussed below,²²⁶ are given the opportunity to consent to the leasing arrangements and we seek comment on this below. We also seek comment generally on the distribution of leasing revenues, and methods for ensuring that public safety users retain priority and preemption rights within the band.

95. *Model 1: Band Manager as Lessee/Sublessor.* Under Model 1, the Band Manager would lease spectrum access rights directly from public safety licensees and would, in turn, be permitted to sublease those rights to non-public safety entities. The Band Manager would be the only entity eligible to lease from public safety licensees and the only entity eligible to sublease (or lease) 4.9 GHz band spectrum rights to non-public safety entities; the Band Manager would play the role of mandatory intermediary between public safety licensees and any non-public safety 4.9 GHz band user. The Band Manager would be responsible for seeking to obtain leases for access to spectrum rights from all public safety licensees in a given area, as discussed below, meaning the Band Manager would effectively pool all applicable non-exclusive spectrum access rights together to form, if successful, an exclusive spectrum access right (which may be limited in time, frequency, or geographic area) which it would then be permitted to lease to non-public safety entities. The Band Manager would be responsible for ensuring that any non-public safety operations fully comply with our rules on protection of, and preemption for, public safety operations, including by approving the specifics of lessee deployments to ensure no harmful interference is created. The Band Manager's experience with the band—and its relationship with public safety licensees—would be critical factors underlying its ability under this framework to maximize opportunities for spectrum access while avoiding negative impacts on public safety licensees.

96. We seek comment on this model, and any issues related to its implementation. In particular, we seek comment on any requirements we should place on the negotiation of leases between the Band Manager and public safety licensees. Should the Band Manager and public safety licensees have full freedom in negotiating the terms of these leasing arrangements, or should we specify certain terms which must be included, such as with preemption rights? For example, should we require—or prohibit—terms which give a public safety licensee veto rights over the eventual lease entered into by the Band Manager and a non-public safety entity?²²⁷

97. *Model 2: Band Manager as Lease Approver.* Under Model 2, public safety licensees would be permitted to lease directly to non-public safety entities so long as those leases are coordinated through and approved by the Band Manager. All potentially affected public safety licensees that would have been required to lease their spectrum to the Band Manager under Model 1 would, under Model 2, be required to be parties to the lease to the non-public safety entity.²²⁸

98. The Band Manager would, in this instance, be responsible for reviewing and consenting to lease agreements and coordinating operations, including by approving the specifics of lessee deployments to ensure no harmful interference is created, but would not be a party to the lease. The Band Manager's mandatory role would be limited to supervising and managing the leasing process, ensuring all required consents had been obtained and that the lease terms and proposed operations fully comply with our rules as to protection for, and preemption by, public safety operations. While public safety licensees would be free to engage the Band Manager as their agent in negotiating the lease, it need not be involved in lease negotiations.

99. We seek comment on this model, and on the nature and requirements of the Band Manager's consent to a lease proposed by a public safety licensee or group of such licensees. Should the Band Manager's consent here be limited to ensuring compliance with our rules, or should the Band

²²⁶ See *infra* para. 108.

²²⁷ Potential examples include: the licensee does not approve of the specific sublessee selected by the Band Manager; it objects to one or more terms of the lease; or it has concerns about the proposed non-public safety operations.

²²⁸ Under Model 1, public safety agencies would only be a party to the lease to the Band Manager, not the sub-lease to non-public safety users.

Manager have the right to refuse its consent for other reasons? For example, if the Band Manager determines a lease would comply with all our rules, but believes an alternative non-public safety licensee is preferable because it has more experience with the band and its requirements, should the Band Manager be permitted to refuse its consent to the lease? If the Band Manager has the right to decline to consent to a lease, should the parties be able to appeal to the Commission? At a minimum, we propose that the Band Manager would not have the right to disapprove lease agreements for discriminatory reasons, and we seek comment on any appropriate reasons for which the Band Manager could refuse its consent. Once the Band Manager consents to the leasing agreement, what other responsibilities should the Band Manager have to ensure that the parties comply with the lease agreement and the Commission's rules? Is the fact that it will not be a party to the lease agreement a concern with regards to enforcement?

100. *Implementation of the Models.* We believe both models would move the 4.9 GHz band forward and dramatically improve the utilization of this important mid-band spectrum. In both cases, public safety licensees remain the primary users of the band and retain full control over it, with non-public safety operations limited to areas where all relevant public safety licensees voluntarily consent. Both models provide a path towards enabling meaningful non-public safety access to the band, which we believe will drive down costs for all users and help facilitate more efficient use of this public resource.

101. There are, however, potential advantages and disadvantages to each model and we seek comment on them. Our goal is to create a consistent, nationwide framework for the 4.9 GHz band that fosters efficient use of this important mid-band spectrum, but retains public safety priority and local control. To what extent do either of these models further these goals? For example, does Model 1's centralization of leasing with the Band Manager, which emphasizes nationwide consistency, potentially reduce local control by limiting a licensee's right to be a party to leases with non-public safety entities? In contrast, will Model 2 lead to too much regional variation in leasing terms? Are there ways to modify each model to more effectively achieve our goals?

102. Similarly, is one model more or less accommodating of particular types of agreements? For example, shared system agreements, where a public safety entity and a non-public safety entity jointly build and operate a system), may be more feasible under Model 2, which allows the two entities to directly enter into an agreement, subject to the Band Manager's consent. Are there ways we can better enable these kinds of agreements under Model 1? Are there advantages to encouraging a shared system approach?

103. While we have structured each model as a stand-alone proposal, we also seek comment on the possibility of implementing them simultaneously. Can the two models operate together, where some leases involve the Band Manager as a party but others only require its approval? What would be the result if some public safety licensees wish to lease to the Band Manager, but others wish to lease directly to a non-public safety entity? Does allowing both types of agreements present different the incentives for the Band Manager depending on whether or not it is a party to a lease? What other alternative models for leasing should we consider and why?

104. We propose that all lease arrangements with public safety and non-public safety entities in the 4.9 GHz band would be generally required to comply with our secondary markets rules,²²⁹ but seek comment on whether any specific rules should not apply to these leases. We also note that the secondary markets rules provide for a variety of leasing vehicles, each with their own regulatory requirements regarding the nature of the licensee's role in the lessee's operations.²³⁰ Should we limit the types of leasing arrangements that 4.9 GHz band leases may use? For example, should we limit leasing to only spectrum manager leasing arrangements,²³¹ as opposed to permitting *de facto* transfer leases?²³²

²²⁹ See 47 CFR part 1, subpart X.

²³⁰ See *id.*

²³¹ See 47 CFR § 1.9020.

²³² See *id.* §§ 1.9030, 1.9035.

Alternatively, should we create a new leasing model specific to this band, given the unique nature of the relationships involved in this framework? We seek comment on these questions with regards to all types of 4.9 GHz band leases under both Model 1 and Model 2.

105. *Required Consents.* Regardless of the type of leasing structure we ultimately adopt, we propose that all potentially affected public safety licensees would be required to consent to non-public safety use. This will provide confidence to public safety licensees in the ongoing primacy of their operations specifically, but also of public safety operations generally. It will ensure that all non-public safety operations occur with the full consent of the relevant public safety licensees, making the decision to allow non-public safety operations fully voluntary. Under Model 1, this consent would take the form of a lease from the public safety licensee to the Band Manager, and under Model 2, it would instead involve being a signatory to the lease of the non-public safety entity.

106. We seek comment on this proposal, and on any alternatives to such a consent requirement. Specifically, are there hold-out concerns that would undermine the utility of leasing to rationalize and increase the efficiency of use in the band? Are there other ways of ensuring the primacy and protection of public safety use that could reduce these concerns? We seek comment on whether we should have exceptions to this general consent requirement such as after a period of non-responsiveness or if the licensee has conditioned its consent in a manner which does not conform with our rules. Similarly, should we have an exception to the general consent requirement if, as discussed below, we require certain licensees whose license area does not overlap with the lease area to consent and they do not consent but the lessee and Band Manager demonstrate full protection for their operations?

107. We also note that, in many cases, public safety licensees are subject to overlapping jurisdiction with one another, as in the case of a state public safety agency that overlaps with city and county level agencies within the state. Should the Commission take a position regarding whether each licensee makes its own, independent, decision as to a given lease? For example, states might mandate that local and county agencies consent to any lease that a state agency has consented to; should we prohibit these kinds of requirements in order to preserve local control of the band in a given jurisdiction? Commenters proposing such requirements should address our authority to impose such a restriction, whether through our preemption authority or otherwise.

108. We seek comment on how the Band Manager will determine which public safety licensees are “potentially affected” and therefore must consent—or be a party—to a given lease. To what extent can the Band Manager use ULS to determine the relevant public safety licensees? Alternatively, or in conjunction with, should the Band Manager rely solely on a licensee’s jurisdictional boundaries in determining the set of potentially affected public safety licensees? Under what circumstances should licensees whose license area does not overlap with the lease area be required to consent? In other words, if a lease area overlaps with the license areas of Licensees A and B, but merely abuts that of Licensee C, we propose that Licensees A and B must consent to the lease, but must Licensee C? How should we define consent rights for licensees of fixed systems, as opposed to geographic area, licenses? Must the Band Manager also obtain consent from a licensee who operates on defined channels but which will not be impacted by the proposed lease?

109. Public safety licensees may wish to modify their systems in ways that conflict with a lease agreement to which they have previously agreed. Should public safety licensees be permitted to withdraw consent while a lease is in effect for this reason? While lease and consent agreements might directly cover this question, we seek comment on whether we should address this issue in our rules. We also seek comment on whether our rules should address the ability of public safety licensees to withdraw consent to a lease, such as where they wish to lease to another non-public safety entity or to deploy a mixed-use system which conflicts with leased access.

110. We also seek comment on how to handle consents in situations where a public safety licensee, which did not previously have to consent to a lease, modifies its system in a way that alters whether its consent is required. For example, Licensees A, B, and C are the only licensees who must consent as of the date of a lease with Company Z, and all consent. During the lease, Licensee D applies

to modify its license in such a way that it now would be a required consenting party to the lease. Should the Band Manager condition its approval of Licensee D's modification on its consent to the lease with Company Z? Or can Licensee D decline such consent? In that case, what is the impact on Company Z's lease? We seek comment below on the related questions involving new licensees in an area with existing leases.²³³

111. *Non-Discriminatory Leasing.* We seek comment on what rules we should adopt to ensure the Band Manager administers leasing in a non-discriminatory manner, and to protect against potential conflicts of interest.²³⁴ Should these rules vary depending on what the Band Manager's role in leasing might be?

112. For purposes of Model 1, we seek comment on whether the Band Manager should be permitted to use the spectrum rights it leases from public safety licensees itself rather than subleasing it. Similarly, should it be permitted to lease to affiliated entities and, if so, should we have any specific obligations in such circumstances? For example, could such agreements be subject to certain conditions, such as a maximum term length or being limited to situations where no non-affiliated entity will agree to comparable terms?

113. For purposes of Model 2, we seek comment on potential limitations on the Band Manager's authority to refuse consent to a given lease. Should the Band Manager's authority to do so be limited to cases of non-compliance with our rules? Or can the Band Manager decline consent in favor of an alternate lessee, subject to certain conditions?

114. In the *Seventh Further Notice*, we sought comment on whether we should limit the types of non-public safety entities that should be eligible for leased access—for example, only CII entities.²³⁵ Because the non-public safety access we are enabling today will be overseen by the Band Manager—an entity vetted and supported by public safety licensees—we do not believe restrictions on the type of non-public safety entities eligible for leasing are necessary. We therefore tentatively conclude we will not adopt rules in this regard, but seek comment on whether the Band Manager should have the flexibility to engage specific non-public safety users and, if so, how that potentially aligns with our rules on non-discriminatory access.

115. Finally, we seek comment on the Commission's role in enforcing these non-discrimination rules. Should we require the Band Manager to actively report to the Commission certain information about leasing, and its relationship to the parties? Or should we rely on the relevant parties to engage the Commission where concerns arise? Should there be a formal right to appeal Band Manager decisions to the Commission? We further seek comment on whether the Commission should oversee the

²³³ See *infra* para. 149.

²³⁴ See API et al. Aug. 25, 2022, *Ex Parte* at 2 (noting the importance of “[p]romoting access to the 4.9 GHz band for all eligible parties, to be defined by the FCC on a . . . non-discriminatory basis.”).

²³⁵ *Eighth Further Notice*, 36 FCC Rcd at 15055, para. 64. Commenters were split on this question, with some supporting such a limitation as a way of ensuring that the needs of public safety operators are respected. See, e.g., TDD Nov. 29, 2021, Comments at 2-3 (stating the Commission should “incorporate parts of NPSTC’s Aug. 13, 2021 *ex parte* recommendations, such as opening the band to CII for “internal operations of the nation’s utilities, petrochemical facilities, and transportation networks that increasingly are subject to cyber-attacks”); FPL Nov. 29, 2021, Comments at 5-7 (supporting “a sharing regime that permits non-public safety CII users to access the 4.9 GHz band and agrees with the Commission that such use should not come at the expense of public safety user”). However, other commenters noted that such restrictions would limit the pool of available non-public safety operators, limiting the utility of opening the band. See, e.g., WISPA Jan. 22, 2022, Reply at 2-6 (stating “positions advanced by WISPA, DSA, Federated Wireless and New America’s OTI suggests that if the equipment market will expand with CII, it most certainly will expand even more if eligibility includes those potential users NPSTC and API/ENTELEC seek to exclude from the band”); FPL Nov. 9, 2022, *Ex Parte* at 1.

fees charged by Band Managers and, if so, to what the nature of that oversight should be.²³⁶ For example, fees charged by spectrum access system administrators in the Citizens Broadband Radio Service must be “reasonable;”²³⁷ should we impose a similar requirement on the Band Manager?

116. *Commission Oversight.* Commission oversight of the Band Manager and any leasing regime must ensure that it complies with all statutory requirements. Under either leasing model, we propose that the Commission’s oversight will be based on our secondary market rules. What, if any, changes to our rules may be needed to implement this oversight model? More specifically, should the Commission review or approve each leasing arrangement? Alternatively, if the Band Manager coordinates leases, should the Commission forebear from requiring submission of leasing notifications in ULS? What, if any, changes to our rules would be required to implement this oversight model?

117. *Geographic-Area License.* Today, most incumbent public safety licensees hold a geographic-area license which generally covers the geographic area encompassing the legal jurisdiction of the licensee.²³⁸ Under the new licensing rules we adopt today in the *Seventh Report and Order*, public safety licensees may be issued site-based licenses for all operations which currently are authorized under their geographic area licenses.²³⁹ Under the newly adopted frequency coordination requirements for the band, all licensees, even those that retain a geographic area license, will be required to coordinate future deployments with the Band Manager.²⁴⁰

118. We seek comment on the advantages and disadvantages of allowing all incumbent licensees to retain their geographic-area licenses after they have been issued site-based licenses. Would allowing some or all licensees to retain their geographic licenses aid in the facilitation of leasing excess capacity spectrum to non-public safety users? Are there reasons to only allow certain licensees to retain their geographic-area licenses for purposes of leasing excess capacity spectrum, and if so, how should those licensees be selected? Should we require all other licensees in the band to surrender their geographic-area licenses once the licensees enter their site-based data into ULS? How would site-based-only licensees and commercial operators coordinate in areas near their operations and within their jurisdictions (and thus their former geographic licensed area), but not overlapping with their site-based operations?

119. *Other Leasing Issues.* We seek comment on any other issues related to the implementation of this new leasing regime. What, if any, changes to our rules or to incumbent licenses would be required? Will existing 4.9 GHz licenses need to be modified? What guidelines should we implement to ensure that the Band Manager’s work in enabling leases and reviewing leasing applications is a fair and informed process? Should the Band Manager develop a process to provide non-public safety entities an opportunity to track the progress of their requests?

120. We also seek comment on the extent to which the Band Manager and other parties involved in leased access (public safety licensees and non-public safety operators) may, by agreement, streamline the process by which the Band Manager oversees non-public safety operations. For example, could the parties agree that the lessee may deploy without site-by-site approvals in a given area under certain circumstances?

²³⁶ *Frequency Coordination in the Private Land Mobile Radio Services*, PR Docket No. 83-737, Notice of Inquiry, FCC 83-329, 35151, para. 9 (1983).

²³⁷ See 47 CFR § 96.65.

²³⁸ *Id.* § 90.1207.

²³⁹ See *supra* Section III.C.

²⁴⁰ See *supra* Section III.D.

121. We seek comment on how to enable leased access in areas where there is no public safety licensee.²⁴¹ In these areas, should we grant the Band Manager the right to lease spectrum in those areas on its own authority? Would such authority require issuance of a license by the Commission? Or should the availability of leasing depend on a public safety entity getting a license in that geographic area?

122. In addition, notwithstanding our decision in the Order to not require interoperability between public safety users in the band, we seek comment on whether the Commission should require interoperability for non-public safety users in the band. We believe that such an approach could have multiple benefits, such as promoting more efficient use of spectrum as well as helping foster a more robust and innovative equipment market. We seek comment on those views and encourage commenters to describe any other effects such a requirement would have on consumers or stakeholders, including public safety. Are there any technical or operational challenges to adopting such a requirement? Are there any alternative approaches that the Commission should consider in lieu of mandating interoperability for non-public safety users?

123. Finally, we seek comment on whether we should distinguish between governmental agencies and nongovernmental entities which hold licenses under our rules.²⁴² We propose that the operations of non-governmental licensees must be fully protected by secondary non-public safety operations in the band, but seek comment on whether our rules on consent to leases, preemption, and compensation should take into account the difference in status of these entities. Are there different incentives for nongovernmental licensees which justify different treatment under our leasing rules? Should we instead grant authority to consent to leases to the governmental entity which supported the licensee's application?

2. Distribution of Leasing Revenues and Other Payments to Licensees

124. *Funding the Band Manager.* We propose that the Band Manager be funded, at least partially, by leasing revenues, which will enable the Band Manager to be fully independent and equipped to engage in the kind of complex spectrum analysis needed to enable this leasing model. This will ensure that those benefiting from the non-public safety access—non-public safety users and their customers—are the ones supporting the access system. We also believe this provides an incentive for the Band Manager to find available spectrum access opportunities wherever it can, subject to the consent of all relevant public safety licensees.

125. We seek comment on this proposal. Will the leasing revenues be sufficient to provide the Band Manager with both sufficient funds to cover its costs and a reasonable rate of return on its investment? We also seek comment on whether this model will provide sufficient start-up funding for the Band Manager, since extensive work will be required prior to any leases going into effect. Should we provide for advanced funding for the Band Manager, and if so, how? Conversely, should we place a cap on the amount of return the Band Manager can make from leases? If so, what should that cap be, and what should be done with revenues above and beyond that amount?

126. Under Model 1 above, the Band Manager's role in leasing provides for a direct means by which it can fund itself using leasing revenues. On the other hand, under Model 2, because licensees make agreements directly with non-public safety lessees, there is no such direct funding source for the Band Manager. We seek comment on whether the Band Manager being funded by leasing revenues is feasible if we permit Model 2 lease arrangements. Should we require that a minimum percentage of lease revenues be allocated to the Band Manager or allow negotiations by the parties to determine the Band Manager's compensation, since the Band Manager will still be required to approve all leases? If we allow

²⁴¹ The following states/territories are not covered by a statewide license: American Samoa, Georgia, Iowa, Kansas, the Northern Mariana Islands, and South Dakota.

²⁴² See 47 CFR § 90.523.

negotiations to cover the Band Manager's funding, should the Band Manager be able to withhold its consent to a lease where the parties are not providing it with sufficient funding?

127. In the *Seventh Report and Order*, we determined that the Band Manager will be permitted to charge reasonable rates for its coordination services, the way other frequency coordinators do today. We seek comment on implementing this decision, specifically on any requirements we should put in place as to those fees, noting that the Band Manager, unlike most frequency coordinators, will have exclusive control over coordination services in this band. Should we limit fees charged by the Band Manager to public safety licensees and applicants? Are there other funding sources for the Band Manager that our rules should contemplate?

128. *Compensation to Licensees.* We also seek comment on how our rules should treat compensation to licensees, either directly from non-public safety operators or from the Band Manager. While sharing of lease revenues in Model 1, and direct payments of lease revenues in Model 2, will likely form the majority of payments to licensees, they are not the only form of compensation public safety licensees may expect. Such compensation may include, but is not limited to: incentive payments to modify spectrum use by the licensee; payments for consent to a lease; and in-kind provision of services by a non-public safety entity, such as sharing access to a constructed network. Such compensation can incentivize public safety licensees to rationalize their operations to increase spectrum availability and to distribute the benefits of allowing non-public safety access to the band.

129. That said, we emphasize that the primary purpose of this band is to host public safety communications. We seek comment on how to ensure that lease revenue generation for public safety agencies continues to serve the public interest and our policy goals. We tentatively conclude that any public safety licensee which wholly ceases their licensed public safety operations in the band would no longer be eligible for a license and, therefore, any lease-related compensation. We seek comment on that conclusion, and on any other provisions we should consider that serve the same ends. Should we alternatively require some minimum level of continued public safety operations in order to permit leasing?

3. Preemption

130. In the *Seventh Report and Order*, we ensure that public safety entities will maintain primary access to the 4.9 GHz band by virtue of being the only entities licensed to operate within it, while non-public safety users will operate in the band on a secondary basis. We now seek comment on how to ensure preemption rights for public safety licensees over non-public safety users in emergency circumstances.

131. As an initial matter, we tentatively conclude that the Band Manager will be responsible for ensuring non-public safety licensees promptly comply with any preemption request, and that cooperation with preemption requests must be a material clause included in any lease agreement with non-public safety users regardless of the leasing model eventually adopted. We seek comment on this tentative conclusion, and on the role of the Band Manager in enabling preemption and ensuring preemption requests are honored. Should licensees have the ability to work directly with non-public safety users, such as when operating a shared system which has been designed to automatically shut down non-public safety operations in a preemptable situation, or should we mandate that all preemption requests flow through the Band Manager in order to ensure full compliance with our rules?

132. Further, we seek comment on what type of "shut down" mechanism would best enable public safety licensees to trigger preemption of a non-public safety user. Should the Band Manager be tasked with establishing a portal through which public safety entities could provide notice of preemption requests? If so, how long should the Band Manager have to initiate operational changes to impacted non-public safety users once the Band Manager receives a preemption request? What specific types of information should the Band Manager be authorized to collect from public safety entities in connection with preemption requests? Would such requests require the submission of any proprietary information or personally identifiable information, other than contact information (e.g., name, address, phone number,

and email address) for a point of contact at the public safety entity? Are there any privacy concerns with allowing the Band Manager to collect and maintain such information? We note that in the Citizens Broadband Radio Service, a Spectrum Access System (SAS) has 300 seconds to confirm suspension of operation of Citizen Broadband radio devices or relocate those devices to unoccupied frequencies once the SAS is informed that the signal of a federal system has been detected in the area.²⁴³ If the Band Manager has dynamic control over a given non-public safety operation in the band, would a similar timeframe be appropriate for a preemption request in the 4.9 GHz band? What would be an appropriate timeframe if the Band Manager does not have dynamic control over non-public safety users? Should there be some other means besides a notification portal for a public safety licensee to initiate a request to preempt non-public safety operations in a particular area? If so, how would preemption work in that case?

133. Are there non-public safety operations in the 4.9 GHz band that need not be subject to preemption requests? For example, would P-P links need to be included in any preemption request involving mobile operations? Similarly, should a preemption request apply to the entire band, or should the requestor identify specific band segments that need clearing? Further, should preemption requests be limited in terms of geography (such as a distance radius around a licensee) and duration? If so, what distance and time duration limits would be appropriate to ensure mission critical public safety licensees have access to the band during an emergency without unduly disrupting non-public safety operation in the band? Should there also be criteria regarding what type of event justifies a preemption request? If so, should the Band Manager have discretion to decide if a particular event justifies preemption of non-public safety operations in the vicinity of that event? Should preemption requests for emergency events of a mobile or nonfixed nature, such as a vehicle pursuit, be subject to geographic and duration limits and, if so, what should those limits be?

134. Finally, we seek comment on whether only certain mission-critical public safety licensees should have the authority to request preemption of non-public safety operations. If so, who should decide which public safety agencies have preemption authority? Should the Band Manager be tasked with working with each state to determine which public safety licensees have the authority to initiate a preemption request? Alternatively, if every public safety licensee in the band has preemption authority, could that lead to excessive preemption requests making the 4.9 GHz band effectively unusable to non-public safety users? In other words, we seek comment on how to balance the need for public safety preemption versus the need to make the band attractive to non-public safety users, which we believe will be to the ultimate benefit of all users of the band.

C. Selection of the Band Manager

135. In the *Seventh Report and Order*, we establish a nationwide Band Manager and conclude that it will be chosen from a pool of qualified applicants by a selection committee.²⁴⁴ Here, we seek comment on the nature of the committee and its processes, and on issues related to the creation of the committee and the Commission's role in ensuring its ultimate selection satisfies not only its criteria but also our rules. We believe the Commission has a responsibility to ensure the selection committee process is competitively neutral, and we seek comment on ways to accomplish this.

136. *Selection Committee Composition.* We tentatively conclude that the selection committee should include representatives from the public safety community. Should the Commission direct specific organizations to designate a representative to serve on the selection committee, like it did in the 800 MHz re-banding proceeding?²⁴⁵ In addition to public safety representatives, should committee members be

²⁴³ See 47 CFR § 96.15(a)(4); see also PSSA Jan. 11, 2022, Reply at 5 (noting that “the lifecycle of a life-threatening emergency, such as an active shooter incident, can be shorter than a 5-minute period”).

²⁴⁴ See *supra* paras. 18-43.

²⁴⁵ *Improving Public Safety Communications in the 800 MHz Band*, WT Docket 02-55, Report and Order, 19 FCC Rcd 14969, 15070-71, para. 191 (2002) (*800 MHz Report and Order*) (designating Nextel Communications, Inc.;

(continued....)

representative of potential non-public safety users of the band, such as commercial spectrum users or industry associations?²⁴⁶ If so, which non-public safety entities are most representative of potential users, and thus, should designate a representative to serve on the committee? We note that the Commission has recently used selection committees for clearinghouses in the 3.45 GHz²⁴⁷ and 3.7 GHz bands.²⁴⁸ Should the Commission model its selection committee for the 4.9 GHz band on these committees? Alternatively, are the bands—or the nature of the entity being selected (a clearinghouse as opposed to a Band Manager)—too different to justify using substantially the same selection process? If so, how are the situations different and how should such differences be reflected in the selection process?

137. We tentatively conclude that the selection committee will be composed of an odd number of representatives to prevent deadlock. We seek comment on this structure, and also on the appropriate number of representatives that should serve on the selection committee. For example, the Commission chose nine entities in the 700 MHz proceeding and five entities in the 800 MHz proceeding.²⁴⁹ To aid in determining the appropriate selection committee size, we also seek comment on the specific number of representatives that should be designated from the different categories of entities, such as public safety and commercial users. For example, would it be sufficient to have nine members here—five representing the incumbent and public safety interests and four representing the prospective lessee and non-public safety interests? If not, what other interests or combinations of interests should be included? For example, would a selection committee composed of an even number of representatives from both public safety and non-public safety entities better represent the interests present in the band? What, if any, qualifications or experience should a member have in order to be selected? Are there any factors that would help ensure the selection committee is neutral and balanced from a competitive standpoint?

138. *Selection Committee Procedures.* Consistent with the 3.45 and 3.7 GHz proceedings, we tentatively conclude that the Bureaus will release a joint public notice announcing the entities that will comprise the selection committee and each selected entity would then nominate one individual to serve on the selection committee.²⁵⁰ We seek comment on this tentative conclusion.

139. In addition, as in the 700 MHz proceeding, we tentatively conclude that the selection committee must notify the Commission of the final process by which it will review applicants for the Band Manager position.²⁵¹ The Commission also asked the search committee in the 700 MHz proceeding to “ensure that the Clearinghouse meets relevant best practices and standards in its operation to ensure an effective and efficient transition.”²⁵² Consistent with this requirement, the 700 MHz band search committee submitted to the Commission a Request for Proposal and detailed instructions for filing

The Association of Public Safety Communications Officials-International; The Industrial Telecommunications Association; Southern LINC; and United Telecom Council to designate a representative).

²⁴⁶ In the 700 MHz proceeding, the Commission directed nine entities, which represented a mix of incumbents in the band and prospective flexible-use licensees, to designate a representative to serve on a search committee. *Expanding Flexible Use of the 3.7 to 4.2 GHz Band*, GN Docket No. 18-122, Report and Order and Order of Proposed Modification, 35 FCC Rcd 2343, 2450-52, paras. 273-283 (2020) (*700 MHz Report and Order*). In the 3.45 GHz band, the Commission asked WTB and OMD to develop a committee process like that in the 3.7 GHz proceeding. See *3.45 GHz Second Report and Order*, 36 FCC Rcd at 6045, para. 163.

²⁴⁷ *3.45 GHz Second Report and Order*, 36 FCC Rcd at 6045, para. 163; *3.45 GHz Search Committee PN*, 36 FCC Rcd at 12700.

²⁴⁸ 47 CFR § 27.1414(a)(1).

²⁴⁹ *700 MHz Report and Order*, 35 FCC Rcd at 2450, para. 274; see also *800 MHz Report and Order*, 19 FCC Rcd at 15070-71, para. 191.

²⁵⁰ *3.45 GHz Search Committee PN*, 36 FCC Rcd at 12700; *700 MHz Report and Order*, 35 FCC Rcd at 2450-51, para. 274.

²⁵¹ *700 MHz Report and Order*, 35 FCC Rcd at 2451, para. 275.

²⁵² *Id.*; 47 CFR § 27.1414(a)(2).

proposals to demonstrate it was fulfilling its responsibilities.²⁵³ Should we impose similar requirements on the selection committee for the 4.9 GHz band? Are there other requirements that we should impose on the selection committee? For example, should we require the selection committee, once representatives are designated, to certify that they have reviewed and understand the Commission's rules and requirements in this proceeding?

140. We also tentatively conclude that the selection committee should proceed by consensus. In the event that we select an even number of committee members, or if for some other reason there is a deadlock, we tentatively conclude that the selection committee should inform the Bureaus so that the Bureaus may consider additional measures. We seek comment on these tentative conclusions. Further, we seek input on how the Bureaus should resolve the deadlock. For example, should the Bureaus state that the selection committee must proceed by majority vote? Or should the Bureaus appoint an additional selection committee member? If the Bureaus must resolve deadlock, what is the appropriate resolution timeline?

141. *Commission Oversight of the Committee.* We propose that applications for the position of Band Manager will be evaluated by the selection committee on the basis of the applicant's ability to satisfy eligibility criteria established by the search committee, which it will devise based on the functions of the Band Manager, described above in the *Seventh Report and Order* and this *Ninth Further Notice of Proposed Rulemaking*, and any future items issued by the Commission or by the Bureaus.²⁵⁴ The Commission will then review the selection committee's decision to confirm it satisfies those criteria and that the Band Manager will be able to perform its required functions. We seek comment on this approach.

142. We seek comment generally on what oversight role by the Bureaus is appropriate to ensure the proper performance by the selection committee. We propose the committee must provide the Commission with its selection criteria in advance of its receipt of applications for the Band Manager position so that the Commission may review those criteria and advise the committee on them as appropriate. We propose that prospective Band Managers would be asked to submit to the selection committee, in addition to their qualifications, a general description of the frequency assignment methodology they propose to employ and would also submit their proposed plan for coordinating in the band. Should the selection committee also provide copies of all Band Manager applications to the Commission for its use as part of the review of the committee's processes? While we believe the selection committee will be well-equipped to evaluate applications and choose the appropriate Band Manager, we seek comment on ways the Commission can assist in and oversee that process.

D. Commission Oversight

143. Beyond our oversight of the selection committee, we also seek comment on the role the Commission and Bureaus should play in overseeing the Band Manager's decisions. While the Band Manager will not be a licensee of the Commission, our general authority over spectrum management forms the basis of our oversight of the Band Manager and its operations, including ensuring it fulfills its functions consistent with our rules. We therefore propose that we delegate to the Bureaus a general oversight responsibility, including the authority to address negligence, discrimination, or other errors or abuses by the Band Manager. We seek comment on this proposal, and on any other ways of ensuring that any discriminatory practices or abuses are properly mitigated and/or remedied, including any penalties which might be appropriate in cases of violations of our rules.

144. We additionally seek comment on oversight of the Band Manager on the basis of performance, such as the quality and timeliness of public safety coordination and non-public safety leasing recommendations. What performance standards would be useful metrics to oversee the Band

²⁵³ *Wireless Telecommunications Bureau Announces Relation Payment Clearinghouse Request for Proposal Selection Criteria, and Application Deadlines in the 3.7-4.2 GHz Band Transition*, GN Docket No. 18-122, Public Notice, 35 FCC Rcd 5768 (WTB 2020).

²⁵⁴ As discussed above in *supra* para. 22, the Bureaus will have authority to manage the selection committee process.

Manager based on performance? Specifically, what performance standards should be used when it comes to timeliness, such as the speed of providing a frequency recommendation, and quality, such as recommending the best available frequency? To the extent performance standards are adopted, are there any incentives or mechanisms, such as shot clocks, that would be appropriate to ensure the Band Manager is meeting or exceeding those standards? Alternatively, should the Commission only oversee the Band Manager's performance when specific complaints are submitted?²⁵⁵

145. We could also measure the performance of the Band Manager against any responsibilities we ultimately adopt based on those proposed above in the qualifications section. For example, where it appears that the Band Manager is not performing its duties in a manner consistent with the public interest obligations imposed in this proceeding, we tentatively conclude that the Commission or Bureaus may, on their own motion or at the public's request, conduct an inquiry into the Band Manager's performance.²⁵⁶ While we do not foresee initiating such an inquiry on the basis of isolated complaints, we anticipate beginning an inquiry if it appears that the Band Manager has established a pattern of failing to perform in accordance with the requirements adopted here or is otherwise acting contrary to the public interest. We seek comment on the Commission's role in overseeing the performance of the Band Manager.

146. We also seek comment on whether we should impose a specific term length for the Band Manager's appointment, or whether the Band Manager should instead serve until removal by the Commission. What are the advantages or disadvantages of either approach? Should a Band Manager whose term has expired be eligible to serve in that position again? If so, what type of renewal showing should the Band Manager be required to make?

147. Finally, we seek comment on the impact of a Band Manager being removed from its position, whether for cause or because of the end of its term. Should we reinstitute the selection committee to appoint a new Band Manager? What are the implications for any agreements entered into by the Band Manager in the event the entity serving in that role changes? Should we require that all such agreements specify a succession plan?

E. Other Considerations

1. Future Licensing of the Band

148. Under the current freeze on applications for new licenses in the 4.9 GHz band, which we retain here pending resolution of this *Ninth Further Notice*, no new licensees may enter the band but incumbents may file to modify their licenses or to license new points in a fixed system.²⁵⁷ We seek comment on how to address future licensing of the band, given our decision to adopt a Band Manager and taking into consideration the variety of different implementation issues on which we seek comment today.

149. Should the Commission fully lift the freeze and allow any eligible public safety entity to obtain a license in the band? If so, what role should the Band Manager play in the issuance of new licenses, as opposed to simply coordinating new systems? Going forward, how could new licensees impact any existing leases, either in the form of consents or the underlying lease rights? Should new licensees be treated differently from incumbent licensees with regards to lease consent and revenue rights? Given the potential for revenue-generation from 4.9 GHz licenses under our new leasing system, are there additional buildout or other requirements we should place on new licensees to avoid spectrum warehousing?

150. Alternatively, should we instead require that new public safety deployments be under the auspices of an existing license, either an overlapping county or local jurisdiction, or pursuant to a

²⁵⁵ *Frequency Coordination in the Private Land Mobile Radio Services*, PR Docket No. 83-737, Notice of Proposed Rulemaking, 49 Fed. Reg. 45454, 45458, para. 23 (1984).

²⁵⁶ *Frequency Coordination in the Private Land Mobile Radio Services*, PR Docket No. 83-737, Report and Order, 103 FCC 2d 1093, 1155-56, para. 127 (1986).

²⁵⁷ *See supra* para. 70.

statewide license? This would enable new, locally controlled, public safety systems to be deployed, subject to our frequency coordination rules and Band Manager approval, without the creation of new licensees and new consent rights. Under this proposal, new systems would be treated as new deployments by an incumbent for purposes of protection from non-public safety operations. Is this preferable to a system of new licensure? What are the advantages and disadvantages of such a model?

151. Regardless of whether we permit new licenses to be issued in the 4.9 GHz band generally, we propose that the Commission would allow state entities to obtain statewide licenses where such a license does not currently exist.²⁵⁸ We seek comment on this tentative conclusion, and on whether there is a preferable alternative to other means of allowing access to the band where it is not currently licensed.

2. Aeronautical Mobile Use

152. The Commission's existing rules prohibit aeronautical mobile operations in the 4.9 GHz band,²⁵⁹ although some aeronautical operations have been approved on a case-by-case basis via waiver.²⁶⁰ Recognizing that aeronautical mobile transmissions pose a challenge to radio astronomy observatories (RAS),²⁶¹ the Commission proposed in the *Sixth Further Notice* in this proceeding to allow crewed aeronautical mobile use for public safety purposes, not including unmanned aircraft systems (UAS), in the lowest five megahertz of the band with altitude and other technical limitations.²⁶² Public safety parties, API and ENTLEC, FPL, and TDD supported allowing aeronautical mobile on a coordinated basis.²⁶³ CORF opposed aeronautical mobile use, including by UAS, due to potential interference problems for RAS that operate in the 4950-4990 MHz band, but specified provisions to protect observatories if the Commission allows aeronautical mobile use.²⁶⁴

153. Because we, through the *Seventh Report and Order* and *Ninth Further Notice*, are working to adopt a comprehensive coordination framework for public safety and non-public safety use,

²⁵⁸ The following states/territories are not covered by a statewide license: American Samoa, Georgia, Iowa, Kansas, the Northern Mariana Islands, and South Dakota.

²⁵⁹ 47 CFR §§ 2.106, 90.1205(c).

²⁶⁰ See, e.g., call signs WQCQ391 (DeKalb County Police Department), WQCP515 (Commonwealth of Massachusetts Department of State Police), WQCQ392 (Fayette County Sheriff's Office), WQDD311 (Seattle Police Department), WQGX352 (Westchester County Department of Public Safety), WPYU857 (City of Chicago), WQCQ393 (Glendale, City of), WQJE424 (City of Long Beach), WQLF531 (County of Los Angeles), WQNS910 (Pomona Police Department).

²⁶¹ "[A]dministrations should bear in mind that the radio astronomy service is extremely susceptible to interference from space and airborne transmitters." ITU Radio Regulations, Art. 29.12 (2020).

²⁶² *Sixth Further Notice*, 33 FCC Rcd at 3266-70, paras. 12-24.

²⁶³ APCO Nov. 29, 2021, Comments at 5; NPSTC Nov. 29, 2021, Comments at 10, 12 (explaining "[l]aw enforcement agencies operate helicopters and fixed wing aircraft using video cameras to help locate missing persons and to assess accident scenes and natural disasters. Aeronautical operations can also benefit the fire service in viewing or mapping the extent of wildland fires and certain details on structure fires as they progress."); IACP Nov. 29, 2021, Comments at 6; Maryland et al. Nov. 29, 2021, Comments at 8 (stating "[w]e believe that this is a task for the states to manage in a manner similar to the Commission's action to establish 700 MHz air-to-ground rules"); STARNet Nov. 24, 2021, Comments at 7; IAFC Dec. 20, 2021, Reply at 5; API and ENTELEC Dec. 20, 2021, Comments at 5; TDD Nov. 29, 2021, Comments at 3; FPL Nov. 29, 2021, Comments at 2-5; FPL Nov. 9, 2022, *Ex Parte* at 1.

²⁶⁴ CORF Nov. 26, 2021, Comments at 5-9. Specifically, CORF supported the 5 megahertz guard band between aeronautical mobile and radio astronomy operations and the 1,500 foot altitude limit, conditioned on a 100 km exclusion zone around any observatory listed in footnotes US 385 or US161. It also supported only allowing low power devices aboard aircraft, and suggested that applicants should be required to "provide a description of their operations to demonstrate that such operations will protect radio astronomy (and other terrestrial uses) from interference." *Id.*

we defer this issue and seek comment on whether the Band Manager could coordinate potential aeronautical mobile use of the band. Commenters should focus in particular on CORF's concerns about interference to radio astronomy. We seek comment on whether the Band Manager would be equipped to ensure any aeronautical mobile use fully protects these important operations, based on the criteria CORF provided in its comments.²⁶⁵ Should we adopt a buffer zone around radio astronomy operations (such as the 100km proposal by CORF)?²⁶⁶ Should the Band Manager be required to work with radio astronomy operators to ensure non-interference, or is it equipped to do so on its own? What sorts of requirements should be put on the Band Manager to ensure protection for RAS from any aeronautical mobile signals?

154. The *Eighth Further Notice* specifically excluded consideration of UAS operations from the aeronautical mobile proposal.²⁶⁷ We seek comment on whether the new Band Manager framework presents new opportunities for these operations in the band.²⁶⁸ Should we permit UAS operations in the band if we allow aeronautical mobile operations generally?²⁶⁹ Commenters should specifically address concerns raised by CORF and explain why any restrictions on unmanned operations would prevent harmful interference to RAS.²⁷⁰

3. Digital Equity and Inclusion

155. Finally, the Commission, as part of its continuing effort to advance digital equity for all,²⁷¹ 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 considerations²⁷² and benefits (if any) that may be associated with the proposals and issues discussed herein. Specifically, we seek comment on how our proposals may promote or inhibit advances in diversity, equity, inclusion, and accessibility, as well the scope of the Commission's relevant legal authority.

²⁶⁵ *Id.*

²⁶⁶ *Id.*

²⁶⁷ *Sixth Further Notice*, 33 FCC Rcd at 3268, para. 19 (stating “it would be premature at this time” to permit UAS, but seeking comment on “the potential for the 4.9 GHz band to support possible future UAS payload operations”); *Eighth Further Notice*, 36 FCC Rcd at 15053, para. 60 (seeking comment on “allow[ing] manned aeronautical mobile, not including unmanned aeronautical systems (UAS)”).

²⁶⁸ *See, e.g.*, Letter from Ari Q Fitzgerald, Counsel to Florida Power & Light Company to Marlene Dortch, Secretary, FCC, WP Docket No. 07-100 (Mar. 29, 2022) (urging the Commission to permit UAS operations in the 4.9 GHz band).

²⁶⁹ The Federal Aviation Administration (FAA) has authority over matters of aviation safety, and is tasked by statute with the safe integration of UAS into the National Airspace System. *See* 49 U.S.C. § 44802. Accordingly, any potential UAS operation permitted in the 4.9 GHz band would be subject to applicable FAA rules.

²⁷⁰ For example, it may be desirable to restrict UAS operation to specific use cases to minimize interference potential.

²⁷¹ 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.

²⁷² The term “equity” is used here consistent with Executive Order 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* Exec. Order No. 13985, 86 Fed. Reg. 7009, Executive Order on Advancing Racial Equity and Support for Underserved Communities Through the Federal Government (Jan. 20, 2021).

V. PROCEDURAL MATTERS

156. *Paperwork Reduction Act Analysis.* This *Seventh Report and Order* may contain new or modified information collection requirements subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104-13. All such requirements will be submitted to the Office of Management and Budget (OMB) for review under Section 3507(d) of the PRA. OMB, the general public, and other Federal agencies will be invited to comment on any new or modified information collection requirements contained in this proceeding. In addition, we note that pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198, see 44 U.S.C. § 3506(c)(4), we previously sought specific comment on how the Commission might further reduce the information collection burden for small business concerns with fewer than 25 employees.

157. In this present document, we have assessed the effects of our creation of a new Band Manager and the collection of new granular licensing information, as well as the new technical rules for the 4.9 GHz band, and find that they will have a small impact on small governmental entities which are currently 4.9 GHz licensees, mainly related to the collection of data about existing 4.9 GHz deployments.

158. This *Ninth Further Notice of Proposed Rulemaking* may contain new or modified information collection(s) subject to the Paperwork Reduction Act of 1995.²⁷³ All such new or modified information collection requirements will be submitted to OMB for review under section 3507(d) of the PRA. OMB, the general public, and other federal agencies are invited to comment on any new or modified information collection requirements contained in this proceeding. In addition, pursuant to the Small Business Paperwork Relief Act of 2002,²⁷⁴ we seek specific comment on how we might “further reduce the information collection burden for small business concerns with fewer than 25 employees.”²⁷⁵

159. *Regulatory Flexibility Act.* The Regulatory Flexibility Act of 1980, as amended (RFA)²⁷⁶ 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.”²⁷⁷ Accordingly, the Commission has prepared a Final Regulatory Flexibility Analysis (FRFA) concerning the potential impact of the rule and policy changes adopted in the *Seventh Report and Order* on small entities. The FRFA is set forth in Appendix D.

160. We have also prepared an Initial Regulatory Flexibility Analysis (IRFA) concerning the potential impact of rule and policy change proposals in the *Ninth Further Notice* on small entities. The IRFA is set forth in Appendix E.

161. *Congressional Review Act.* The Commission has determined, and the Administrator of the Office of Information and Regulatory Affairs, Office of Management and Budget, concurs, that this rule is non-major under the Congressional Review Act, 5 U.S.C. § 804(2). The Commission will send a copy of the *Seventh Report and Order* to Congress and the Government Accountability Office pursuant to 5 U.S.C. § 801(a)(1)(A).

162. *Ex Parte Presentations.* The 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

²⁷³ Pub. L. No. 104-13.

²⁷⁴ Pub. L. No. 107-198.

²⁷⁵ 44 U.S.C. § 3506(c)(4).

²⁷⁶ 5 U.S.C. § 603. The RFA, 5 U.S.C. § 601 et seq., 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). The SBREFA was enacted as Title II of the Contract with America Advancement Act of 1996 (CWAAA).

²⁷⁷ 5 U.S.C. § 605(b).

applies). Persons making oral *ex parte* presentations are reminded that memoranda summarizing the presentation must: (1) list all persons attending or otherwise participating in the meeting at which the *ex parte* presentation was made, and (2) summarize all data presented and arguments made during the presentation. If the presentation consisted in whole or in part of the presentation of data or arguments already reflected in the presenter's written comments, memoranda or other filings in the proceeding, the presenter may provide citations to such data or arguments in his or her prior comments, memoranda, or other filings (specifying the relevant page and/or paragraph numbers where such data or arguments can be found) in lieu of summarizing them in the memorandum. Documents shown or given to Commission staff during *ex parte* meetings are deemed to be written *ex parte* presentations and must be filed consistent with rule 1.1206(b). In proceedings governed by rule 1.49(f) or for which the Commission has made available a method of electronic filing, written *ex parte* presentations and memoranda summarizing oral *ex parte* presentations, and all attachments thereto, must be filed through the electronic comment filing system available for that proceeding, and must be filed in their native format (e.g., .doc, .xml, .ppt, searchable .pdf). Participants in this proceeding should familiarize themselves with the Commission's *ex parte* rules.

163. *Comment Period and Filing Procedures.* Pursuant to sections 1.415 and 1.419 of the Commission's rules, 47 CFR §§ 1.415, 1.419, interested parties may file comments and reply comments on or before the dates indicated on the first page of this document. Comments may be filed using the Commission's Electronic Comment Filing System (ECFS). See *Electronic Filing of Documents in Rulemaking Proceedings*, 63 FR 24121 (1998). Commenters should refer to WP Docket No. 07-100 when filing in response to this *Ninth Further Notice of Proposed Rulemaking*.

- 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.
- 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 St NE, Washington, DC 20554.
- Effective March 19, 2020, and until further notice, the Commission no longer accepts any hand or messenger delivered filings. This is a temporary measure taken to help protect the health and safety of individuals, and to mitigate the transmission of COVID-19. 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>.
 - During the time the Commission's building is closed to the general public and until further notice, if more than one docket or rulemaking number appears in the caption of a proceeding, paper filers need not submit two additional copies for each additional docket or rulemaking number; an original and one copy are sufficient.
 - After COVID-19 restrictions are lifted, the Commission has established that hand-carried documents are to be filed at the Commission's office located at 9050 Junction Drive, Annapolis Junction, MD 20701. This will be the only location where hand-carried paper filings for the Commission will be accepted.²⁷⁸

²⁷⁸ See *Amendment of the Commission's Rules of Practice and Procedure*, Order, 35 FCC Rcd 5450 (OMD 2020).

164. *People with Disabilities.* To request materials in accessible formats for people with disabilities (Braille, large print, electronic files, audio format), send an e-mail to fcc504@fcc.gov or call the FCC's Consumer and Governmental Affairs Bureau at (202) 418-0530 (voice).

165. *Additional Information.* For additional information on this proceeding, contact Jon Markman of the Wireless Telecommunications Bureau, Mobility Division, at 202-418-7090 or Jonathan.Markman@fcc.gov, or Brian Marengo of the Public Safety and Homeland Security Bureau at 202-418-0838 or Brian.Marengo@fcc.gov.

VI. ORDERING CLAUSES

166. Accordingly, **IT IS ORDERED** that, pursuant to the authority found in sections 4(i), 302, 303(b), 303(f), 303(g), 303(r), 309(j), 316, and 405 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 302a, 303(b), 303(f), 303(g), 303(r), 309(j), 316, and 405, this *Seventh Report and Order and Ninth Further Notice of Proposed Rulemaking* **IS HEREBY ADOPTED**.

167. **IT IS FURTHER ORDERED** that this Report and Order SHALL BE EFFECTIVE 30 days after publication in the Federal Register. Compliance with section 90.175(g)(2) and section 90.1207(e)-(f) of the Commission's rules, 47 CFR § 90.175(g)(2) and 47 CFR § 90.1207(e)-(f), which may contain new or modified information collection requirements, will not be required until the date specified in the Public Notice to be issued by the Public Safety and Homeland Security Bureau and the Wireless Telecommunications Bureau announcing that the Office of Management and Budget has completed review of any information collection requirements associated with this Report and Order or that they have determined such review is not required, which date shall be no earlier than one year after the publication of this Report and Order in the Federal Register. The Commission directs the Public Safety and Homeland Security Bureau and the Wireless Telecommunications Bureau to announce the compliance date for section 90.175(g)(2) and section 90.1207(e)-(f) by subsequent Public Notice and to cause section 90.175 and section 90.1207 to be revised accordingly.

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

169. **IT IS FURTHER ORDERED** that the Commission **SHALL SEND** a copy of this *Seventh Report and Order* in a report to be sent to Congress and the Government Accountability Office pursuant to the Congressional Review Act, see 5 U.S.C. § 801(a)(1)(A).

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary

APPENDIX A**List of Commenters****(WP Docket No. 07-100)**

American Association of State Highway and Transportation Officials (AASHTO)
American Petroleum Institute and the Regulatory and Technology Committee of the Energy
Telecommunications and Electrical Association (API and ENTELEC)
APCO International (APCO)
Enterprise Wireless Alliance (EWA)
Federated Wireless, Inc. (Federated Wireless)
Florida Power & Light Company (FPL)
International Association of Chiefs of Police (IACP)
International Association of Fire Chiefs (IAFC)
National Academy of Sciences' Committee on Radio Frequencies (CORF)
National Public Safety Telecommunications Council (NPSTC)
Open Technology Institute at New America (OTI)
Pennsylvania State Police, Statewide Radio Network Division (STARNet)
Public Safety Spectrum Alliance (PSSA)
Regional Planning Committee Twenty (Region 20)
San Francisco Bay Area Rapid Transit District (BART)
State of California Department of Transportation (Caltrans)
State of California Governor's Office of Emergency Services (CalOES)
State of Maryland, District of Columbia Statewide Interoperability Coordinator, Pennsylvania State
Police, Iowa Statewide Interoperable Communications System Board, State of South Carolina
Department of Administration, and the State of Washington (Maryland et al.)
The Digital Decision (TDD)
Wireless Internet Service Providers Association (WISPA)

Reply Comments
(WP Docket No. 07-100)

Requests for Extension of Time

Land Mobile Communications Council (LMCC)
National Sheriffs' Association (NSA)

Reply Comments

Andrew Seybold Sr.
Andrew Woodman
Anna Courie
AT&T Services, Inc. (AT&T)
BART
Chief Mark W Light, (ret.)
Craig Scatola
Daniel Schwarzabach
Diana Smith Hill
Donna Covert
Dynamic Spectrum Alliance (DSA) [styled as comments]
DSA
Eddie Carrera
Edward Murawski
EWA
Federated Wireless
FPL
Garrett Gauntner
in the Matter of Amendment of Part 90 of Commission's Rules [sic, filer from Madisonville, TN]
in the Matter of Amendment of Part 90 of Commission's Rules [sic, filer from Phoenix, AZ]
IAFC
James Thomsen
Jennifer Veber
Jim Holthaus
Jonas Ostmeyer
Joshua Mastenbrook
Keith Tupper
Kelley Stransky
Kelley Stransky [second filing]
Ken Isom
Mark Kelly
Mary Hedges
Matthew Boggs
NSA
Open Technology Institute at New America and Public Knowledge (OTI and PK)
Oscar Mendoza, El Paso Independent School District Police Services
Ouachita Parish Fire Department
PSSA
RapidSOS Inc. (RapidSOS)
Region 20
Richard Tucker
Ross Shawn Rogers

Safer Buildings Coalition (SBC)
Samuel Tillery
Scott C Tallmadge, ENP
Scott Miller
State of Maryland, District of Columbia SWIC, Pennsylvania State Police, Regional Planning Committee
43 (Maryland et al.)
The Public Safety Network
Tim Sartin
T-Mobile USA, Inc. (T-Mobile)
Tony Maggio
Tracy Trott
Utilities Technology Council, Edison Electric Institute, National Rural Electric Cooperative Association
(UTC et al.)
Verizon
Victoria Vadnais
Western Fire Chiefs Association (WFCA)
William Carter Region 13 Chair
WISPA

Ex Partes

Alabama Sheriffs Association (ASA)
American Petroleum Institute (API), EWA, Forestry Conservation Communications Association (FCCA),
International Municipal Signal Association (IMSA), NSA, and Utilities Technology Council (UTC)
API and ENTELEC
Cisco Systems, Inc.
Daniel B. Schwarzbach on behalf of the Airborne Public Safety Association
Diana L Runge
Doug Blevins
EWA
FPL [four filings]
Florida Power & Light Company, Pacific Gas & Electric Company, Edison Electric Institute (FPL,
PG&E, EEI) [three filings]
Grundy County Emergency System Telephone Board (Grundy ESTB)
James May
Neil Horden for Horden Technology, LLC (HordenTech)
NPSTC
R. Shawn Rogers
Ray Zeisz
Region 21 700 MHz Planning Committee
Tennessee Sheriffs' Association (TSA)
TDD [five filings]
Tommy Oliveras CPM
Utilities Technology Council (UTC)
WISPA

APPENDIX B

Final Rules

For the reasons discussed in the preamble, the Federal Communications Commission amends 47 CFR part 90 as follows:

PART 90 – PRIVATE LAND MOBILE RADIO SERVICES

1. The authority citation for Part 90 continues to read as follows:

AUTHORITY: 47 U.S.C. 154(i), 161, 303(g), 303(r), 332(c)(7), 1401-1473.

2. Amend § 90.155 by revising paragraph (a) to read as follows:

§ 90.155 Time in which station must be placed in operation.

(a) All stations authorized under this part, except as provided in §§ 90.528, 90.529, 90.629, 90.631(f), 90.665, and 90.685 must be placed in operation within twelve (12) months from the date of grant or the authorization cancels automatically and must be returned to the Commission.

* * * * *

3. Amend § 90.175 by revising paragraph (g) and removing paragraph (j)(22).

The revision reads as follows:

§ 90.175 Frequency coordinator requirements.

* * * * *

(g) *For frequencies between 1427-1432 MHz and 4940-4990 MHz:* A statement is required as follows.

(1) *For frequencies between 1427-1432 MHz:* A statement is required from the coordinator recommending the most appropriate frequency, operating power and area of operation in accordance with the requirements of § 90.259(b).

(2) *For frequencies between 4940-4990 MHz:* A statement is required from the nationwide band manager recommending the most appropriate channel(s), bandwidth, operating power, and any other technical parameter which promotes robust and efficient use of the band while minimizing interference based on the standard for harmful interference specified in § 90.1211(a).

(3) *Compliance date.* Paragraph (g)(2) of this section may contain information collection and/or recordkeeping requirements. Compliance with paragraph (g)(2) will not be required until this paragraph (g)(3) is removed or contains a compliance date, which will not occur until the date specified in a final rule published by the FCC announcing that the Office of Management and Budget has completed review of any information collection requirements associated with paragraph (g)(2) of this section or that they have determined such review is not required, which date shall be no earlier than [INSERT date 1 YEAR after DATE OF PUBLICATION IN THE FEDERAL REGISTER].

* * * * *

4. Amend § 90.1207 by revising paragraph (d) and adding paragraphs (e), (f), and (g) to read as follows:

§ 90.1207 Licensing.

* * * * *

(d) Permanent fixed point-to-point and point-to-multipoint stations in the 4940-4990 MHz band must be licensed individually on a site-by-site basis. Such fixed stations are accorded primary status. Permanent fixed point-to-point and point-to-multipoint stations must use directional antennas with gains greater than 9 dBi.

(e) Applications for license in the 4940-4990 MHz band must include the following technical information.

(1) The license for base/mobile, mobile-only or temporary fixed (1 year or less) stations will specify, among other parameters, the following technical information:

(i) Coordinates (base).

(ii) Antenna height-to-tip (base and temporary fixed).

(iii) Antenna height above average terrain (base).

(iv) Center frequency, emission designator, and ERP.

(v) Number of units (mobile and temporary fixed).

(vi) Area of operation (mobile and temporary fixed), which shall be limited to the geographic area encompassing the legal jurisdiction of the licensee or, in case of a nongovernmental organization, the legal jurisdiction of the state or local governmental entity supporting the nongovernmental organization. However, applicants may define their areas of operation outside of their areas of legal jurisdiction to assist public safety operations with the permission of the jurisdiction(s) in which the mobile and/or temporary fixed stations are to be operated.

(2) The license for permanent fixed point-to-point, point-to-multipoint and fixed receiver stations must include, among other parameters, the following technical information:

(i) Transmitting station coordinates.

(ii) Frequencies and polarizations.

(iii) For the transmitting equipment, the tolerance, effective isotropic radiated power, emission designator, and type of modulation (digital).

(iv) For the transmitting antenna(s), the model, gain, antenna center line height(s) above ground level and ground elevation above mean sea level.

(v) Receiving station coordinates.

(vi) For the receiving antenna(s), the model, gain, antenna center line height(s) above ground level and ground elevation above mean sea level.

(vii) Path azimuth and distance.

(f) Licensees holding active authorizations for the 4940-4990 MHz band on [INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER] shall file the complete site-by-site information described in paragraph (e) of this section for their existing radio systems in the Commission's Universal Licensing System by the compliance date specified in paragraph (g) of this section.

(g) Paragraphs (e) and (f) of this section may contain information collection and/or recordkeeping requirements. Compliance with paragraphs (e) and (f) will not be required until this paragraph (g) is removed or contains a compliance date, which will not occur until the date specified in a final rule published by the FCC announcing that the Office of Management and Budget has completed review of any information collection requirements associated with paragraphs (e) and (f) of this section or that they have determined such review is not required, which date shall be no earlier than [INSERT DATE 1 YEAR AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

5. Amend § 90.1209 by revising paragraph (d) to read as follows:

§ 90.1209 Policies governing the use of the 4940-4990 MHz band.

* * * * *

(d) Stations must be placed into operation within twelve (12) months from the date of grant in

accordance with § 90.155. Licensees of temporary fixed stations must place at least one such station in operation within twelve months of license grant.

6. Amend § 90.1213 by revising paragraphs (a) introductory text and (b) to read as follows:

§ 90.1213 Band plan.

(a) The following table lists center frequencies for channels in the 4940-4990 MHz band. Channel numbers 1 through 5 and 14 through 18 are 1 MHz bandwidth channels, and channel numbers 6 through 13 are 5 MHz bandwidth channels.

* * * * *

(b) The channels listed in the table in paragraph (a) of this section may be aggregated in any manner up to 50 MHz for wider bandwidth operation. Nonetheless, applicants should request no more bandwidth than necessary for a particular use.

7. Amend § 90.1215 by revising the introductory text and paragraph (a)(1) and adding paragraph (f) to read as follows:

§ 90.1215 Power limits.

Except as provided in paragraph (f) of this section, the transmitting power of stations operating in the 4940-4990 MHz band must not exceed the maximum limits in this section.

(a)(1) For base, mobile, and temporary fixed operations, the maximum conducted output power must not exceed:

Table 1 to Paragraph (a)(1)

Channel bandwidth (MHz)	Low power maximum conducted output power (dBm)	High power maximum conducted output power (dBm)
1	7	20
5	14	27
10	17	30
15	18.8	31.8
20	20	33
30	21.8	34.8
40	23	36
50	24	37

* * * * *

(f) The transmitting power of permanent fixed point-to-point and point-to-multipoint stations operating in the 4940-4990 MHz band must not exceed the maximum limits in this paragraph (f). Moreover, applicants should request no more power than necessary for a particular use.

(1) The maximum equivalent isotropically radiated power (EIRP), as referenced to an isotropic radiator, must not exceed 55 dBW (85 dBm).

(2) For path lengths shorter than 17 kilometers, the EIRP shall not exceed the value derived from the following equation: $\text{New EIRP limit} = 55 \text{ dBW} - 40 \cdot \log(17/B) \text{ dBW}$, where B = the actual path length in kilometers.

8. Add § 90.1217 to subpart Y to read as follows:

§ 90.1217 4.9 GHz Band Manager.

The 4.9 GHz Band Manager will have the following three primary responsibilities:

- (a) Frequency coordination for public safety applications;
- (b) Incentivizing the use of the latest commercially available technologies, including 5G; and
- (c) Facilitating non-public safety use of the 4.9 GHz band.

APPENDIX C

Final Regulatory Flexibility Analysis

1. As required by the Regulatory Flexibility Act of 1980, as amended (RFA),¹ an Initial Regulatory Flexibility Analysis (IRFA) was incorporated in the *Eighth Further Notice of Proposed Rulemaking (Eighth FNPRM)* in October 2021.² The Commission sought written public comment on the proposals in the *Eighth 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 Final Rules

2. In the *Seventh Report and Order*, the Commission takes a number of actions to advance its goals for a comprehensive and integrated approach to the 4.9 GHz band which emphasizes public safety needs while spurring innovation and driving down costs in the band. As an initial matter, the Commission establishes a nationwide Band Manager which will coordinate public safety operations in the band, ensuring protection of public safety operations, and promoting more efficient use of spectrum resources while facilitating non-public safety use of the band through spectrum leasing. The Commission also adopts its proposal to collect more granular data on public safety deployments in the Commission's Universal Licensing System (ULS) and provide incumbent licensees a one-year period to submit the necessary technical detail. Furthermore, the Commission adopts formal frequency coordination procedures for public safety applicants seeking to license new or modify existing facilities in the band and assigns authority to the Band Manager to perform the frequency coordination function. Additionally, the Commission adopts certain technical rules it sought comment on in the *Eighth Further Notice* to increase use of the band while declining to adopt technical standards to promote interoperability or a spectrum management role for Regional Planning Committees (RPCs). Finally, the Commission retains the freeze for all applicants who are not already 4.9 GHz licensees. Consequently, the rules we adopt in the *Seventh Report and Order* further our goal to maximize use of the 4.9 GHz band to support public safety while opening the door for limited non-public safety use and a more robust equipment market.

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

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

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

4. 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.⁴

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

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 *Amendment of Part 90 of the Commission's Rules*, WP Docket No. 07-100, Order on Reconsideration and Eighth Further Notice of Proposed Rulemaking, 36 FCC Rcd 15032, Appendix C, (rel. Oct. 20, 2021) (*Order on Reconsideration or Eighth Further Notice*).

³ See 5 U.S.C. § 604.

⁴ See 5 U.S.C. § 604 (a)(3).

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

6. The RFA directs agencies to provide a description of, and where feasible, an estimate of the number of small entities that may be affected by the rules adopted herein.⁵ The RFA generally defines the term “small entity” as having the same meaning as the terms “small business,” “small organization,” and “small governmental jurisdiction.”⁶ In addition, the term “small business” has the same meaning as the term “small business concern” under the Small Business Act.⁷ 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 Small Business Administration (SBA).⁸

7. *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.⁹ 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.¹⁰ These types of small businesses represent 99.9% of all businesses in the United States which translates to 32.5 million businesses.¹¹

8. 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.”¹² 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.¹³ 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.¹⁴

⁵ See 5 U.S.C. § 604(a)(4).

⁶ 5 U.S.C. § 601(6).

⁷ 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.”

⁸ 15 U.S.C. § 632.

⁹ See 5 U.S.C. § 601(3)-(6).

¹⁰ 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).

¹¹ *Id.*

¹² 5 U.S.C. § 601(4).

¹³ The IRS benchmark is similar to the population of less than 50,000 benchmark in 5 U.S.C § 601(5) that is used to define a small governmental jurisdiction. Therefore, the IRS benchmark has been used to estimate the number small organizations in this small entity description. See Annual Electronic Filing Requirement for Small Exempt Organizations — Form 990-N (e-Postcard), “Who must file,” <https://www.irs.gov/charities-non-profits/annual-electronic-filing-requirement-for-small-exempt-organizations-form-990-n-e-postcard>. We note that the IRS data does not provide information on whether a small exempt organization is independently owned and operated or dominant in its field.

¹⁴ 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

(continued...)

9. 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 2017 Census of Governments¹⁶ indicate that there were 90,075 local governmental jurisdictions consisting of general purpose governments and special purpose governments in the United States.¹⁷ Of this number there were 36,931 general purpose governments (county¹⁸, municipal and town or township¹⁹) with populations of less than 50,000 and 12,040 special purpose governments - independent school districts²⁰ with enrollment populations of less than 50,000.²¹ Accordingly, based on the 2017 U.S. Census of Governments data, we estimate that at least 48,971 entities fall into the category of “small governmental jurisdictions.”²²

10. *Frequency Coordinators.* Frequency coordinators are entities or organizations certified by the Commission to recommend frequencies for use by licensees in the Private Land Mobile Radio Services (PLMR) that will most effectively meet the applicant's needs while minimizing interference to licensees already operating within a given frequency band. Neither the Commission nor the SBA have developed a small business size standard specifically applicable to spectrum frequency coordinators.

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.

¹⁵ 5 U.S.C. § 601(5).

¹⁶ 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>.

¹⁷ 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 Table 2. CG1700ORG02 Table Notes_Local Governments by Type and State_2017.

¹⁸ See U.S. Census Bureau, 2017 Census of Governments - Organization, 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.

¹⁹ See U.S. Census Bureau, 2017 Census of Governments - Organization, 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.

²⁰ See U.S. Census Bureau, 2017 Census of Governments - Organization, 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.

²¹ 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.

²² 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, and 10.

Business Associations²³ which comprises establishments primarily engaged in promoting the business interests of their member, is the closest applicable industry with a SBA small business size standard.²⁴

11. The SBA small business size standard for Business Associations classifies firms with annual receipts of \$8 million or less as small.²⁵ For this industry, U.S. Census Bureau data for 2017 show that there were 14,540 firms that operated for the entire year.²⁶ Of these firms, 11,215 had revenue of less than \$5 million.²⁷ Based on this data, the majority of firms in the Business Associations industry can be considered small. However, the Business Associations industry is very broad and does not include specific figures for firms that are engaged in frequency coordination. Thus, the Commission is unable to ascertain exactly how many of the frequency coordinators are classified as small entities under the SBA size standard. According to Commission data, there are 13 entities certified to perform frequency coordination functions under Part 90 of the Commission's rules.²⁸ For purposes of this FRFA the Commission estimates that a majority of the 13 FCC-certified frequency coordinators are small

12. *Private Land Mobile Radio Licensees.* Private land mobile radio (PLMR) systems serve an essential role in a vast range of industrial, business, land transportation, and public safety activities. Companies of all sizes operating in all U.S. business categories use these radios. Wireless Telecommunications Carriers (*except* Satellite)²⁹ which encompasses business entities engaged in radiotelephone communications, is the closest industry with an 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.³⁰ U.S. Census Bureau data for 2017 show that there were 2,893 firms that operated in this industry for the entire year.³¹ Of this number, 2,837 firms employed fewer than 250

²³ See U.S. Census Bureau, *2017 NAICS Definition*, "813910 Business Associations," <https://www.census.gov/naics/?input=813910&year=2017&details=813910>.

²⁴ See 13 CFR § 121.201, NAICS Code 813910.

²⁵ *Id.*

²⁶ See U.S. Census Bureau, *2017 Economic Census of the United States, Selected Sectors: Sales, Value of Shipments, or Revenue Size of Firms for the U.S.: 2017*, Table ID: EC1700SIZEREVFIRM, NAICS Code 813910, <https://data.census.gov/cedsci/table?y=2017&n=813910&tid=ECNSIZE2017.EC1700SIZEREVFIRM&hidePreview=false>.

²⁷ *Id.* The available U.S. Census Bureau data does not provide a more precise estimate of the number of firms that meet the SBA size standard. We note that the U.S. Census Bureau withheld publication of the number of firms that operated with sales/value of shipments/revenue in the individual category for less than \$100,000, to avoid disclosing data for individual companies (see Cell Notes for the sales/value of shipments/revenue in this category). Therefore, the number of firms with revenue that meet the SBA size standard would be higher than noted herein. We also note that according to the U.S. Census Bureau glossary, the terms receipts and revenues are used interchangeably, see https://www.census.gov/glossary/#term_ReceiptsRevenueServices.

²⁸ The Commission's records indicate that there are currently 13 frequency coordinators that would be affected by this rulemaking. See <https://www.fcc.gov/wireless/bureau-divisions/mobility-division/industrial-business/industrial-business-licensing#frequency-coordinators>.

²⁹ 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>.

³⁰ See 13 CFR § 121.201, NAICS Code 517312.

³¹ See U.S. Census Bureau, *2017 Economic Census of the United States, Employment Size of Firms for the U.S.: 2017*, Table ID: EC1700SIZEEMPfirm, NAICS Code 517312, <https://data.census.gov/cedsci/table?y=2017&n=517312&tid=ECNSIZE2017.EC1700SIZEEMPfirm&hidePreview=false>.

employees.³² Thus under the SBA size standard, the Commission estimates licensees in this industry can be considered small.

13. Based on Commission data as of December 14, 2021, there are approximately 387,370 active PLMR licenses.³³ Active PLMR licenses include 3,577 licenses in the 4.9 GHz band;³⁴ 19,011 licenses in the 800 MHz band;³⁵ and 2,716 licenses in the 900 MHz band.³⁶ Since the Commission does not collect data on the number of employees for licensees providing these services, at this time we are not able to estimate the number of licensees with active licenses that would qualify as small under the SBA's small business size standard. Nevertheless, the Commission believes that a substantial number of PLMR licensees are small entities.

14. *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.³⁷ 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.³⁸ The SBA small business size standard for this industry classifies businesses having 1,250 employees or less as small.³⁹ U.S. Census Bureau data for 2017 show that there were 656 firms in this industry that operated for the entire year.⁴⁰ Of this number, 624 firms had fewer than 250

³² *Id.* The available U.S. Census Bureau data does not provide a more precise estimate of the number of firms that meet the SBA size standard.

³³ Based on a FCC Universal Licensing System search on December 14, 2021, <https://wireless2.fcc.gov/UlsApp/UlsSearch/searchAdvanced.jsp>. Search parameters: Service Group = All, "Match only the following radio service(s)", Radio Service = GB, GE, GF, GI, GJ, GO, GP, GU, IG, IQ, PA, PW, QM, QQ, RS, SG, SL, SP, SY, YB, YE, YF, YG, YI, YJ, YO, YP, YU, YW; Authorization Type = All; Status = Active. We note that the number of active licenses does not equate to the number of licensees. A licensee can have one or more licenses.

³⁴ Based on a FCC Universal Licensing System search on December 14, 2021, <https://wireless2.fcc.gov/UlsApp/UlsSearch/searchAdvanced.jsp>. Search parameters: Service Group = All, "Match only the following radio service(s)", Radio Service = PA; Authorization Type = All; Status = Active. We note that the number of active licenses does not equate to the number of licensees. A licensee can have one or more licenses.

³⁵ Based on a FCC Universal Licensing System search on December 14, 2021, <https://wireless2.fcc.gov/UlsApp/UlsSearch/searchAdvanced.jsp>. Search parameters: Service Group = All, "Match only the following radio service(s)", Radio Service = GB, GE, GF, GJ, GM, GO, GP, YB, YE, YF, YJ, YM, YO, YP, YX; Authorization Type = All; Status = Active. We note that the number of active licenses does not equate to the number of licensees. A licensee can have one or more licenses.

³⁶ Based on a FCC Universal Licensing System search on December 14, 2021, <https://wireless2.fcc.gov/UlsApp/UlsSearch/searchAdvanced.jsp>. Search parameters: Service Group = All, "Match only the following radio service(s)", Radio Service = GI, GR, GU, YD, YS, YU; Authorization Type = All; Status = Active. We note that the number of active licenses does not equate to the number of licensees. A licensee can have one or more licenses.

³⁷ 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>.

³⁸ *Id.*

³⁹ See 13 CFR § 121.201, NAICS Code 334220.

⁴⁰ See U.S. Census Bureau, *2017 Economic Census of the United States, Employment Size of Firms for the U.S.: 2017*, Table ID: EC1700SIZEEMPFIEM, NAICS Code 334220, <https://data.census.gov/cedsci/table?y=2017&n=334220&tid=ECNSIZE2017.EC1700SIZEEMPFIEM&hidePrevious=false>.

employees.⁴¹ Thus, under the SBA size standard, the majority of firms in this industry can be considered small.

15. *Wireless Telecommunications Carriers (except Satellite)*. This industry comprises establishments engaged in operating and maintaining switching and transmission facilities to provide communications via the airwaves.⁴² 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.⁴³ The SBA size standard for this industry classifies a business as small if it has 1,500 or fewer employees.⁴⁴ U.S. Census Bureau data for 2017 show that there were 2,893 firms in this industry that operated for the entire year.⁴⁵ Of that number, 2,837 firms employed fewer than 250 employees.⁴⁶ 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.⁴⁷ Of these providers, the Commission estimates that 715 providers have 1,500 or fewer employees.⁴⁸ Consequently, using the SBA's small business size standard, most of these providers can be considered small entities.

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

16. *Band Manager*. In the *Seventh Report and Order*, the Commission adopted a single, nationwide framework for the 4.9 GHz band, that is centered around a new Band Manager, which will be equipped with additional information about the current public safety use of the band and empowered to work with public safety licensees to ensure efficient use of this spectrum and enable new, non-commercial operations on a secondary, preemptable basis. Once selected, the Band Manager will have three primary responsibilities: (1) frequency coordination; (2) incentivizing the use of the latest commercially available technologies, including 5G; and (3) facilitating secondary non-public safety use.

17. *Licensing Database*. In the *Seventh Report and Order*, the Commission adopts a requirement to collect more granular data on public safety deployments in ULS. We require small and other incumbent licensees and future applicants to supply complete microwave path data for fixed links, and to license base stations (currently authorized under the geographic license scheme) on a site-by-site basis. Specifically, we require applicants for and current licensees of point-to-point (P-P), point-to-multipoint (P-MP), and fixed receivers to provide the following information: transmitter and receiver antenna coordinates, azimuth (direction), polarization, beamwidth, physical dimensions, gain, and height above ground, as well as transmit details such as power, channel, bandwidth, and emissions. These requirements are consistent with existing Commission microwave radio service rules. We require

⁴¹ *Id.* The available U.S. Census Bureau data does not provide a more precise estimate of the number of firms that meet the SBA size standard.

⁴² 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>.

⁴³ *Id.*

⁴⁴ See 13 CFR § 121.201, NAICS Code 517312.

⁴⁵ See U.S. Census Bureau, *2017 Economic Census of the United States, Employment Size of Firms for the U.S.: 2017*, Table ID: EC1700SIZEEMPFIEM, NAICS Code 517312, <https://data.census.gov/cedsci/table?y=2017&n=517312&tid=ECNSIZE2017.EC1700SIZEEMPFIEM&hidePreview=false>.

⁴⁶ *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.

⁴⁷ Federal-State Joint Board on Universal Service, *Universal Service Monitoring Report* at 26, Table 1.12 (2021), <https://docs.fcc.gov/pubId.lic/attachments/DOC-379181A1.pdf>.

⁴⁸ *Id.*

applicants for and current licensees of base/mobile operations to provide the following information: coordinates (base), height above average terrain (base), number of units (mobile), mobile area of operation, power, channels, and emissions. These requirements are consistent with existing Commission private land mobile radio service rules.

18. The Commission directed the Public Safety and Homeland Security Bureau and the Wireless Telecommunications Bureau to make necessary enhancements to ULS and announce by public notice when ULS is prepared to accept more granular data on public safety operations in the 4.9 GHz band. Incumbent licensees and future applicants seeking to license point-to-point, point-to-multi-point, and fixed receivers as well as base/mobile, mobile-only or temporary fixed operations are required to use FCC Form 601. There will not be any application fees associated with this information collection for public safety entities because they are exempt from application fees pursuant to 47 CFR § 1.1116(b).

19. The *Seventh Report and Order* gives incumbent geographic licensees one year to identify and submit the necessary technical data into the ULS, including P-P links, P-MP hubs, fixed receivers, base stations, and mobiles that are not currently licensed site-by-site. We believe that collecting this data will improve the level of interference protection licensees receive in the band; and will create a more predictable and transparent spectrum environment for any current and future users of the band, including potential non-public safety users. The Commission estimates the average burden for each applicant completing FCC Form 601 and associated schedules to be 1.25 hours, which includes “the time to read the instructions, look through existing records, gather and maintain required data, and actually complete and review the form or response.”⁴⁹

20. *Frequency Coordination.* In the *Seventh Report and Order*, the Commission adopts a part 90 formal frequency coordination requirement for public safety applicants seeking to license facilities in the 4.9 GHz band and assigns nationwide authority to the Band Manager to perform the coordination function. Specifically, the Band Manager will review applications from public safety entities seeking to license facilities in the 4.9 GHz band before they are filed with the Commission. It will perform an interference analysis and recommend to applicants the most appropriate channel(s), bandwidth, operating power, area of operation (if mobile or temporary fixed operation is requested), or any other technical criteria which promotes robust use of the band while minimizing interference to incumbent licensees. Furthermore, once a Band Manager is in place, all applications filed with the Commission via ULS which seek to license new facilities or modify existing facilities in the 4.9 GHz band must include a showing of frequency coordination by the Band Manager. Finally, we allow the Band Manager to outsource the interference analysis portion of its frequency coordination duties to third parties.

21. *Non-Public Safety Use of the Band.* We amended our rules in the *Seventh Report and Order* to allow non-public safety use of the band by small and other non-public safety operators as authorized by the Band Manager. Non-public safety operations are required to fully protect and, when necessary, abide by preemption rules regarding the public safety operations which will remain the primary use of the band. Non-public safety operators will not be licensed. Licensed operations will remain exclusively in support of public safety. Further, the Band Manager will centrally coordinate non-public safety access and will create a standardized set of rules and contractual provisions for such access by small and other non-public safety operators, which will ensure that public safety retains priority and preemption rights.

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

22. The RFA requires an agency to provide, “a description of the steps the agency has taken to minimize the significant economic impact on small entities . . . including a statement of the factual, policy, and legal reasons for selecting the alternative adopted in the final rule and why each one of the

⁴⁹ See FCC Form 601 at 1, available at <https://www.fcc.gov/sites/default/files/fcc-form-601.pdf>.

other significant alternatives to the rule considered by the agency which affect the impact on small entities was rejected.”⁵⁰

23. The Commission’s actions in the *Seventh Report and Order* require small and other public safety incumbents and future applicants for the 4.9 GHz band to submit more granular data on FCC Form 601, however, the economic impact will be minimized since, as noted above, there aren’t any application fees associated with filing this information in the ULS. We have also taken steps to minimize the burden of submitting the data by collecting the technical information on forms which licensees in the public safety community are already familiar with because they use these same forms to file license applications in other frequency bands. Furthermore, we provide small and other incumbent licensees a one-year period to submit the necessary technical details into the ULS. As we note in the *Seventh Report and Order*, collecting the additional technical data on public safety operations will benefit public safety licensees operating in the band because it will improve interference protection and give public safety licensees more confidence in the band without adding a significant burden on licensees or applicants to submit the data.

24. While small and other public safety applicants seeking to license facilities in the 4.9 GHz band will be subject to formal frequency coordination procedures, the economic impact will be minimized since we adopt a frequency coordination process which public safety licensees operating PLMR facilities in other frequency bands are familiar. Once in place, the formal frequency coordination process will ensure the efficient assignment and use of spectrum by public safety licensees while minimizing interference to incumbent public safety licensees. Consequently, the frequency coordination process will improve interference protection and give public safety licensees more confidence in the band without adding a significant burden on applicants.

25. The Commission considered but declined to adopt a more active form of frequency coordination for public safety operations in the 4.9 GHz band, such as the automated frequency coordination in the 6 GHz band or the spectrum access system that facilitates dynamic spectrum sharing in the Citizens Broadband Radio Service (CBRS). No comments were filed specifically addressing the costs associated with more active forms of frequency coordination, both in terms of setup and implementation going forward, compared to traditional part 90 frequency coordination. Thus, given the lack of record on costs associated with more active forms of frequency coordination, and the likelihood of considerable disruption to small and other incumbent licensees caused by the need to upgrade or replace all of their equipment currently in use, the Commission determined the public interest is best served by adopting the part 90 frequency coordination framework which does not require any modification of or replacement to equipment currently in use in the band

26. In the *Seventh Report and Order* we also declined to adopt a spectrum management role at 4.9 GHz for RPCs given the lack of necessary funding and resources for RPCs nationwide, the lack of expertise in the types of technology likely to be deployed in the band, and a lack of consensus in the record that regional planning is consistent with our goal of establishing a national framework for the band. This decision imposes zero burdens and costs and thus imposes no significant economic impact on RPCs and the NRPC, all of which we estimate to be small entities.

27. Further, we believe our decision to allow small and other non-public safety operators use of the 4.9 GHz band as detailed in the *Seventh Report and Order* will provide economic benefits for small entities and strikes the proper balance between allowing localized control of 4.9 GHz band operations by public safety licensees and reducing interference, while also ensuring consistent, nationwide rules that will promote overall spectral efficiency, foster innovation, and drive down equipment costs.

28. Finally, the Commission also considered but declined to: (1) impose an interoperability standard in light of the wide variety of uses and potential uses of the band, imposing such standards at this juncture could lead to fewer equipment options thereby potentially stifling innovation and contradicting

⁵⁰ 5 U.S.C. § 604(a)(6).

our goal of reducing equipment costs; (2) adopt our proposal to limit temporary P-P operations to thirty days maximum over a given path over a one-year period because such a limitation would limit flexibility in the band, and (3) adopt our proposal to require a minimum antenna gain for P-P antennas because commercially available antennas would be rendered non-compliant such a limitation could inhibit development of a robust and affordable equipment market for the band that leverages commercially available antennas and technologies.

G. Report to Congress

29. The Commission will send a copy of the *Seventh Report and Order and Ninth Further Notice*, including this FRFA, in a report to Congress pursuant to the Congressional Review Act.⁵¹ In addition, the Commission will send a copy of the *Seventh Report and Order and Ninth Further Notice*, including this FRFA, to the Chief Counsel for Advocacy of the SBA. A copy of the *Seventh Report and Order and Ninth Further Notice*, and FRFA (or summaries thereof) will also be published in the *Federal Register*.⁵²

⁵¹ See 5 U.S.C. § 801(a)(1)(A).

⁵² See 5 U.S.C. § 604(b).

APPENDIX D

Initial Regulatory Flexibility Analysis

1. As required by the Regulatory Flexibility Act of 1980, as amended (RFA),¹ 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 the *Ninth Further Notice of Proposed Rulemaking (Ninth Further Notice)*. Written public comments are requested on this IRFA. Comments must be identified as responses to the IRFA and must be filed by the deadlines for comments as specified in the *Ninth Further Notice*. The Commission will send a copy of the *Ninth Further Notice*, including this IRFA, to the Chief Counsel for Advocacy of the Small Business Administration (SBA).² In addition, the *Ninth Further Notice* and IRFA (or summaries thereof) will be published in the Federal Register.³

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

2. Having decided in the *Seventh Report and Order* that a nationwide Band Manager for the 4.9 GHz band is the best option for moving forward on a comprehensive nationwide, coordinated approach to the band, in the *Ninth Further Notice* the Commission seeks comment on the tentative conclusions, proposals and inquiries we put forth addressing the rights and responsibilities of the nationwide Band Manager regarding public safety and non-public safety operations, selection of the Band Manager, Commission oversight of the Band Manager and other considerations involving licensing and use of the band. More specifically, we seek comment in the *Ninth Further Notice* on an interference criteria for the Band Manager to apply as part of its frequency coordination duties. We also seek comment on the Band Manager mediating disputes, evaluating potential integration of the 4.9 GHz band with broadband networks used by public safety in other frequency bands, and facilitating the leasing of unused spectrum rights to non-public safety entities which includes two possible leasing models that could be implemented. We further seek comment on our proposals regarding the applicable rules for leasing arrangements, the required consents for non-public safety use of the band, funding of the Band Manager primarily by leasing revenues, allowing the Band Manager to charge licensees and applicants reasonable rates for its coordination services and the eligibility criteria to be used by the selection committee in its evaluation process for Band Manager applicants.

3. Finally, we seek comment on ensuring preemption rights for public safety licensees over non-public safety users, qualifications for any entity seeking the Band Manager position, a selection committee to select the Band Manager, the role of the Commission in overseeing the Band Manager as well as the contents of annual reports from the Band Manager, on future public safety licensing of the band and on aeronautical mobile use of the band.

4. In seeking comment on these issues, we believe the Commission can implement a nationwide framework for the 4.9 GHz band which ensures public safety operations continue to be prioritized while opening the band to additional users which will facilitate increased use of the band, encourage a more robust market for equipment and greater innovation, and at the same time protect public safety users from harmful interference.

B. Legal Basis

5. The proposed action is authorized pursuant to Sections 1, 4(i), 4(j), 4(o), 301, 303(b), 303(g), 303(r), 316, 332, and 403 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 154(i), 154(j), 154(o), 301, 303(b), 303(g), 303(r), 316, 332, and 403.

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 5 U.S.C. § 603(a).

³ See *id.*

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

6. 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 and policies, if adopted.⁴ The RFA generally defines the term “small entity” as having the same meaning as the terms “small business,” “small organization,” and “small governmental jurisdiction.”⁵ In addition, the term “small business” has the same meaning as the term “small business concern” under the Small Business Act.⁶ A “small business concern” is one 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.⁷

7. *Small Businesses, Small Organizations, Small Governmental Jurisdictions.* Our actions, over time, may affect small entities that are not easily categorized at present. We therefore describe here, at the outset, three broad groups of small entities that could be directly affected herein.⁸ First, while there are industry specific size standards for small businesses that are used in the regulatory flexibility analysis, according to data from the Small Business Administration’s (SBA) Office of Advocacy, in general a small business is an independent business having fewer than 500 employees.⁹ These types of small businesses represent 99.9% of all businesses in the United States, which translates to 32.5 million businesses.¹⁰

8. Next, the type of small entity described as a “small organization” is generally “any not-for-profit enterprise which is independently owned and operated and is not dominant in its field.”¹¹ The Internal Revenue Service (IRS) uses a revenue benchmark of \$50,000 or less to delineate its annual electronic filing requirements for small exempt organizations.¹² Nationwide, for tax year 2020, there were approximately 447,689 small exempt organizations in the U.S. reporting revenues of \$50,000 or less according to the registration and tax data for exempt organizations available from the IRS.¹³

⁴ 5 U.S.C. § 603(b)(3).

⁵ *See id.* § 601(6).

⁶ *See id.* § 601(3) (incorporating by reference the definition of “small-business concern” in the Small Business Act, 15 U.S.C. § 632). Pursuant to 5 U.S.C. § 601(3), the statutory definition of a small business applies “unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register.”

⁷ 15 U.S.C. § 632.

⁸ *See* 5 U.S.C. § 601(3)-(6).

⁹ *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).

¹⁰ *Id.*

¹¹ *See* 5 U.S.C. § 601(4).

¹² The IRS benchmark is similar to the population of less than 50,000 benchmark in 5 U.S.C § 601(5) that is used to define a small governmental jurisdiction. Therefore, the IRS benchmark has been used to estimate the number small organizations in this small entity description. *See* Annual Electronic Filing Requirement for Small Exempt Organizations — Form 990-N (e-Postcard), “Who must file,”

<https://www.irs.gov/charities-non-profits/annual-electronic-filing-requirement-for-small-exempt-organizations-form-990-n-e-postcard>. We note that the IRS data does not provide information on whether a small exempt organization is independently owned and operated or dominant in its field.

¹³ *See* Exempt Organizations Business Master File Extract (EO BMF), “CSV Files by Region,” <https://www.irs.gov/charities-non-profits/exempt-organizations-business-master-file-extract-eo-bmf>. The IRS Exempt Organization Business Master File (EO BMF) Extract provides information on all registered tax-

(continued....)

9. Finally, the small entity described as a “small governmental jurisdiction” is defined generally as “governments of cities, counties, towns, townships, villages, school districts, or special districts, with a population of less than fifty thousand.”¹⁴ U.S. Census Bureau data from the 2017 Census of Governments¹⁵ indicate that there were 90,075 local governmental jurisdictions consisting of general purpose governments and special purpose governments in the United States.¹⁶ Of this number there were 36,931 general purpose governments (county¹⁷, municipal and town or township¹⁸) with populations of less than 50,000 and 12,040 special purpose governments - independent school districts¹⁹ with enrollment populations of less than 50,000.²⁰ Accordingly, based on the 2017 U.S. Census of Governments data, we estimate that at least 48,971 entities fall into the category of “small governmental jurisdictions.”²¹

10. *Private Land Mobile Radio Licensees.* Private land mobile radio (PLMR) systems serve an essential role in a vast range of industrial, business, land transportation, and public safety activities. Companies of all sizes operating in all U.S. business categories use these radios. Wireless Telecommunications Carriers (*except* Satellite)²² which encompasses business entities engaged in

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) which includes the continental U.S., Alaska, and Hawaii. This data does not include information for Puerto Rico.

¹⁴ See 5 U.S.C. § 601(5).

¹⁵ 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>.

¹⁶ See U.S. Census Bureau, 2017 Census of Governments – Organization Table 2. Local Governments by Type and State: 2017 [CG1700ORG02], <https://www.census.gov/data/tables/2017/econ/gus/2017-governments.html>. Local governmental jurisdictions are made up of general purpose governments (county, municipal and town or township) and special purpose governments (special districts and independent school districts). See also tbl.2. CG1700ORG02 Table Notes_Local Governments by Type and State_2017.

¹⁷ See *id.* at tbl.5. County Governments by Population-Size Group and State: 2017 [CG1700ORG05], <https://www.census.gov/data/tables/2017/econ/gus/2017-governments.html>. There were 2,105 county governments with populations less than 50,000. This category does not include subcounty (municipal and township) governments.

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

¹⁹ See *id.* at tbl.10. Elementary and Secondary School Systems by Enrollment-Size Group and State: 2017 [CG1700ORG10], <https://www.census.gov/data/tables/2017/econ/gus/2017-governments.html>. There were 12,040 independent school districts with enrollment populations less than 50,000. See also tbl.4. Special-Purpose Local Governments by State Census Years 1942 to 2017 [CG1700ORG04], CG1700ORG04 Table Notes_Special Purpose Local Governments by State_Census Years 1942 to 2017.

²⁰ While the special purpose governments category also includes local special district governments, the 2017 Census of Governments data does not provide data aggregated based on population size for the special purpose governments category. Therefore, only data from independent school districts is included in the special purpose governments category.

²¹ This total is derived from the sum of the number of general purpose governments (county, municipal and town or township) with populations of less than 50,000 (36,931) and the number of special purpose governments - independent school districts with enrollment populations of less than 50,000 (12,040), from the 2017 Census of Governments - Organizations tbls.5, 6 & 10.

²² 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>.

radiotelephone communications, is the closest industry with an 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.²³ U.S. Census Bureau data for 2017 show that there were 2,893 firms that operated in this industry for the entire year.²⁴ Of this number, 2,837 firms employed fewer than 250 employees.²⁵ Thus under the SBA size standard, the Commission estimates licensees in this industry can be considered small.

11. Based on Commission data as of December 14, 2021, there are approximately 387,370 active PLMR licenses.²⁶ Active PLMR licenses include 3,577 licenses in the 4.9 GHz band;²⁷ 19,011 licenses in the 800 MHz band;²⁸ and 2,716 licenses in the 900 MHz band.²⁹ Since the Commission does not collect data on the number of employees for licensees providing these services, at this time we are not able to estimate the number of licensees with active licenses that would qualify as small under the SBA's small business size standard. Nevertheless, the Commission believes that a substantial number of PLMR licensees are small entities.

12. *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.³⁰ 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

²³ See 13 CFR § 121.201, NAICS Code 517312.

²⁴ See U.S. Census Bureau, *2017 Economic Census of the United States, Employment Size of Firms for the U.S.: 2017*, Table ID: EC1700SIZEEMPFIEM, NAICS Code 517312, <https://data.census.gov/cedsci/table?y=2017&n=517312&tid=ECNSIZE2017.EC1700SIZEEMPFIEM&hidePreview=false>.

²⁵ *Id.* The available U.S. Census Bureau data does not provide a more precise estimate of the number of firms that meet the SBA size standard.

²⁶ Based on a FCC Universal Licensing System search on December 14, 2021, <https://wireless2.fcc.gov/UlsApp/UlsSearch/searchAdvanced.jsp>. Search parameters: Service Group = All, "Match only the following radio service(s)", Radio Service = GB, GE, GF, GI, GJ, GO, GP, GU, IG, IQ, PA, PW, QM, QQ, RS, SG, SL, SP, SY, YB, YE, YF, YG, YI, YJ, YO, YP, YU, YW; Authorization Type = All; Status = Active. We note that the number of active licenses does not equate to the number of licensees. A licensee can have one or more licenses.

²⁷ Based on a FCC Universal Licensing System search on December 14, 2021, <https://wireless2.fcc.gov/UlsApp/UlsSearch/searchAdvanced.jsp>. Search parameters: Service Group = All, "Match only the following radio service(s)", Radio Service = PA; Authorization Type = All; Status = Active. We note that the number of active licenses does not equate to the number of licensees. A licensee can have one or more licenses.

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²⁹ Based on a FCC Universal Licensing System search on December 14, 2021, <https://wireless2.fcc.gov/UlsApp/UlsSearch/searchAdvanced.jsp>. Search parameters: Service Group = All, "Match only the following radio service(s)", Radio Service = GI, GR, GU, YD, YS, YU; Authorization Type = All; Status = Active. We note that the number of active licenses does not equate to the number of licensees. A licensee can have one or more licenses.

³⁰ 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>.

broadcasting equipment.³¹ The SBA small business size standard for this industry classifies businesses having 1,250 employees or less as small.³² U.S. Census Bureau data for 2017 show that there were 656 firms in this industry that operated for the entire year.³³ Of this number, 624 firms had fewer than 250 employees.³⁴ Thus, under the SBA size standard, the majority of firms in this industry can be considered small.

13. *Wireless Telecommunications Carriers (except Satellite)*. This industry comprises establishments engaged in operating and maintaining switching and transmission facilities to provide communications via the airwaves.³⁵ 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.³⁶ The SBA size standard for this industry classifies a business as small if it has 1,500 or fewer employees.³⁷ U.S. Census Bureau data for 2017 show that there were 2,893 firms in this industry that operated for the entire year.³⁸ Of that number, 2,837 firms employed fewer than 250 employees.³⁹ 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.⁴⁰ Of these providers, the Commission estimates that 715 providers have 1,500 or fewer employees.⁴¹ Consequently, using the SBA's small business size standard, most of these providers can be considered small entities.

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

14. The *Ninth Further Notice* may impose new or additional reporting or recordkeeping and/or other compliance obligations on small entities, if adopted. Based on Commission proposals in the *Ninth Further Notice*, small and other entities are likely to be subject to the requirement that all lease arrangements between public safety and non-public safety entities in the 4.9 GHz band comply with our secondary markets rules, if our proposal is adopted. Small and other entities are also likely to be subject

³¹ *Id.*

³² See 13 CFR § 121.201, NAICS Code 334220.

³³ See U.S. Census Bureau, *2017 Economic Census of the United States, Employment Size of Firms for the U.S.: 2017*, Table ID: EC1700SIZEEMPfirm, NAICS Code 334220, <https://data.census.gov/cedsci/table?y=2017&n=334220&tid=ECNSIZE2017.EC1700SIZEEMPfirm&hidePreview=false>.

³⁴ *Id.* The available U.S. Census Bureau data does not provide a more precise estimate of the number of firms that meet the SBA size standard.

³⁵ 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>.

³⁶ *Id.*

³⁷ See 13 CFR § 121.201, NAICS Code 517312.

³⁸ See U.S. Census Bureau, *2017 Economic Census of the United States, Employment Size of Firms for the U.S.: 2017*, Table ID: EC1700SIZEEMPfirm, NAICS Code 517312, <https://data.census.gov/cedsci/table?y=2017&n=517312&tid=ECNSIZE2017.EC1700SIZEEMPfirm&hidePreview=false>.

³⁹ *Id.* The available U.S. Census Bureau data does not provide a more precise estimate of the number of firms that meet the SBA size standard.

⁴⁰ Federal-State Joint Board on Universal Service, Universal Service Monitoring Report at 26, Table 1.12 (2021), <https://docs.fcc.gov/pubId.lic/attachments/DOC-379181A1.pdf>.

⁴¹ *Id.*

to compliance with our proposed requirement that all relevant public safety licensees must to consent to non-public safety operator use, if adopted.

15. We also seek comment on what role, if any, public safety licensees should have in reviewing and approving lease agreements being negotiated by the Band Manager. In particular, we seek comment on the benefits and costs of different models of licensee involvement in the leasing process. Further, we seek comment whether the Commission should permit the Band Manager to limit the categories of entities eligible for leased access, or whether such limitations would be contrary to the Commission's goals of ensuring fair access and efficient use of spectrum. The resolution of each of these matters may result in additional compliance obligations for small and other entities operating in the 4.9 GHz band.

16. In assessing the cost of compliance for small entities, at this time the Commission is not in a position to determine whether, if adopted, the proposals and matters upon which we seek comment will require small entities to hire professionals to comply and cannot quantify the cost of compliance with any of the potential rule changes that may be adopted. We expect the information we received in comments including where requested, cost and benefit analyses, to help the Commission identify and evaluate relevant compliance matters for small entities, including compliance costs and other burdens that may result from the proposals and inquiries we make in the *Ninth Further Notice*.

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

17. 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 or 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.”⁴²

18. Parties in the proceeding uniformly supported the goal of protecting current and future public safety licensees from interference but differ on how to define interference and which interference protection approach is most appropriate. Therefore, rather than imposing a standard on its own which could adversely impact small entities, in the *Ninth Further Notice* the Commission seeks further comment on specific criteria for protecting public safety licensees operating in the band from interference. Based on comments, we considered and seek comment on these alternative approaches, the threshold degradation approach of TIA-10, a propagation modeling approach used by part 90 frequency coordination for TDMA systems operating in the VHF band or contour overlap analysis as the basis for determining interference to public safety licensees operating in the 4.9 GHz band. In each case, we seek comment on whether the interference protection criteria would strike the right balance between allowing robust use of the band while protecting critical public safety communications. Further, in the *Ninth Further Notice* we invite the submission of other approaches and proposals with cost and benefit analyses to establish protection for public safety licensees operating in the 4.9 GHz band.

19. In the *Ninth Further Notice*, we also seek comment on ways to enable the Band Manager to facilitate the leasing of unused spectrum rights to non-public safety entities. We propose that all relevant public safety licensees would be required to consent to this arrangement but considered and seek comment on alternatives such as whether we should have exceptions to this general requirement and allow leasing in the absence of a given licensee's consent, for example after a period of non-responsiveness or if the licensee has conditioned its consent in a manner which violates our rules on compensation. Or whether we should have an exception for lack of consent if, we require certain licensees whose license area does not overlap with the lease area to consent.

⁴² 5 U.S.C. § 604(a)(6).

20. To safeguard small and other entities from discriminatory treatment, we seek comment in the *Ninth Further Notice* on what rules should be imposed on the Band Manager to ensure it administers leasing in a non-discriminatory manner. Our inquiry for non-discriminatory leasing rules explores specific lessees as well as the types of lessees and the nature of the operations they will conduct with the 4.9 GHz band. Finally, while we propose that the Band Manager fund itself from leasing revenue, to minimize the impact for small and other entities we considered and seek comment on whether there are any requirements we should put in place as to those fees, whether we should limit the fees charged by the Band Manager to public safety licensees and applicants, whether there are other funding sources for the Band Manager that our rules should contemplate, and how to approach revenues exceeding the Band Manager's costs for its services.

21. The Commission is hopeful that the comments it receives will specifically address matters impacting small entities and include data and analyses relating to these matters. Further, while the Commission believes the rules that are eventually adopted in this proceeding should benefit small entities, whether public safety licensees seeking interference protection in the band or non-public safety entities seeking access to valuable spectrum, 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 *Ninth Further Notice*. The Commission's evaluation of this information will shape the final alternatives it considers, the final conclusions it reaches, and any final actions it ultimately takes in this proceeding to minimize any significant economic impact that may occur on small entities.

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

22. None.