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

In the Matter of The 4.9 GHz Band Transferred from Federal Government Use	)))))	WT Docket No. 00-32

MEMORANDUM OPINION AND ORDER AND THIRD REPORT AND ORDER

Adopted: April 23, 2003 **Released: May 2, 2003**

By the Commission: Chairman Powell and Commissioner Martin issuing separate statements; Commissioner Copps approving in part, concurring in part and issuing a statement.

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I. INTRODUCTION

1. In this *Memorandum Opinion and Order and Third Report and Order* (*MO&O & Third R&O*), we establish licensing and service rules for the 4940-4990 MHz band (4.9 GHz band). In the *Second Report and Order and Further Notice of Proposed Rule Making* in this proceeding, the Commission allocated the fifty megahertz of spectrum in the 4.9 GHz band for fixed and mobile services (except aeronautical mobile service) and designated the band for use in support of public safety.[1] The Commission also sought comment on licensing and service rules, eligibility, and other technical issues concerning the 4.9 GHz band.[2] In this *MO&O and Third R&O*, we address petitions for reconsideration of the *Second Report and Order* (*Second R&O*), and adopt final rules arising from the proposals in the *Further Notice of Proposed Rule Making* (*FNPRM*).

2. By this action, we seek to promote effective public safety communications and innovation in wireless broadband services in support of public safety. The rules we adopt herein represent another step in the Commission's ongoing efforts to develop a regulatory framework in which to meet the current and future public safety communications needs. For example, the rules for the 4.9 GHz band that we adopt today are intended to accommodate a variety of new broadband applications such as high-speed digital technologies and wireless local area networks for incident scene management, dispatch operations and vehicular operations. Today's action also fosters interoperability by providing a regulatory framework in which traditional public safety entities can pursue strategic partnerships with both traditional public safety entities, such as the Federal Government, and non-traditional public safety entities, such as utilities and commercial entities, in support of their missions regarding homeland security and protection of life and property.

II. EXECUTIVE SUMMARY

3. We envision that the 4.9 GHz band will be able to accommodate a variety of broadband applications, including technologies and operations requiring varying bandwidths and operations that are both temporary and permanent in nature. Consequently, in this *MO&O & Third R&O,* we endeavor to provide 4.9 GHz band licensees with the maximum operational flexibility practicable and to encourage effective and efficient utilization of the spectrum. We believe that our actions herein make significant strides towards ensuring that agencies involved in the protection of life and property possess the communications resources needed to successfully carry out their mission.

4. In the *MO&O,* we deny petitions for reconsideration of the Commission's decision to prohibit aeronautical mobile operations in the 4.9 GHz band. We continue to believe that there is insufficient information demonstrating, as a general matter, that aeronautical mobile operations could be accommodated without adversely affecting radio astronomy operations. We nonetheless recognize the public safety community's interest in utilizing the 4.9 GHz band for aeronautical mobile operations and provide a mechanism whereby such operations could be allowed on a case-by-case basis provided that there is a sufficient technical showing made that the proposed operations would not interfere with in-band and adjacent band radio astronomy operations.

[1] The 4.9 GHz Band Transferred from Federal Government Use, *Second Report and Order and Further Notice of Proposed Rule Making*, WT Docket No. 00-32, 17 FCC Rcd 3955, 3955 ¶ 1 (2002) (*Second R&O and FNPRM*).

[2] *Id.*

5. In the *Third R&O,* we establish licensing and service rules for the 4.9 GHz band. The major decisions we reach are as follows:

- We limit eligibility for licensing in the 4.9 GHz band to those entities providing "public safety services" wherein public safety services are defined as services:

  (A) the sole or principal purpose of which is to protect the safety of life, health, or property;
  (B) that are provided
    (i) by State or local government entities; or
    (ii) by nongovernmental organizations that are authorized by a government entity whose primary mission is the provision of such services; and
  (C) that are not made commercially available to the public by the provider.

- We permit broadband mobile operations, fixed hotspot use, and temporary fixed links on a primary basis in the band. Furthermore, we allow fixed point-to-point operations on a secondary basis.

- We establish a "jurisdictional" geographical licensing approach for operations in the band, whereby licensees will be authorized to operate in those geographic areas over which they have jurisdiction and will be required to cooperate in use of the spectrum.

III. BACKGROUND

6. Formerly, the 4.9 GHz band was allocated in the United States to Federal Government fixed and mobile services.[3] The band has been used for fixed services such as conventional point-to-point microwave, tactical radio relay, and high power tropospheric scatter systems, and for mobile services such as control of remote piloted vehicles, video and data telemetry links, target drone control links, fleet defense systems, and tethered aerostat systems.[4]

7. The 4.9 GHz band was transferred from Federal Government to non-Government use in 1999, in accordance with the provisions of the Omnibus Budget Reconciliation Act.[5] In 2000, the Commission released a *Notice of Proposed Rulemaking* (*First NPRM*) proposing to allocate the 4.9 GHz band to non-Government fixed and mobile services, excluding aeronautical mobile service, on a co-primary basis and to allow for flexible use of the band.[6] The Commission also tentatively concluded not to designate the band to public safety use.[7] The *Second R&O* adopted the fixed and mobile allocation proposal.[8] However, the Commission also concluded that the public interest would be best served by

[3] *Id.* at 3957 ¶ 3. For a fuller discussion of the history of the 4.9 GHz band and this proceeding, see *id.* at 3957-61 ¶¶ 3-7.

[4] *Id.* at 3957 ¶ 3.

[5] Omnibus Budget Reconciliation Act of 1993, Pub. L. No. 103-66, 107 Stat. 312 (OBRA-93).

[6] *See* The 4.9 GHz Band Transferred from Federal Government Use, *Notice of Proposed Rulemaking*, WT Docket No. 00-32, 15 FCC Rcd 4778, 4786 ¶ 16 (2000) (*First NPRM)*.

[7] *Id.*

[8] *See Second R&O and FNPRM*, 17 FCC Rcd at 3966 ¶ 23.

designating the 4.9 GHz band for use in support of public safety. Numerous state, county, local government and national public safety associations persuasively argued that a public safety designation would enable responders to carry out critical and urgent missions more effectively, and would provide a safer environment for emergency responders.[9] Further, the Commission believed that such an approach would be in furtherance of its statutory obligation to oversee wire and radio communications "for the purpose of promoting safety of life and property through the use of wire and radio communication."[10]

8. In the *FNPRM*, released concurrently with the *Second R&O*, the Commission sought comment on the establishment of licensing and service rules for the 4.9 GHz band. In this connection, the Commission sought comment on defining eligibility to use the band, and developing a record on specific segmentation or channeling plans for use of the band.[11] Further, it requested comment on the impact of adjacent band U.S. Navy operations on operations in the 4.9 GHz band, as well as suggestions on how to utilize the band in a manner that would not interfere with adjacent band radio astronomy operations.[12]

IV. MEMORANDUM OPINION AND ORDER

9. The Commission's allocation of the 4.9 GHz band to fixed and mobile services specifically excluded aeronautical mobile service.[13] The Commission reasoned that such exclusion was necessary in order to protect radio astronomy observations in this band.[14] The Los Angeles County Sheriff's Department (LASD) and Microwave Radio Communications (MRC) (collectively "Petitioners") seek reconsideration of the Commission's decision to prohibit aeronautical mobile uses in the 4.9 GHz band.[15] They state that pubic safety organizations have a significant need for airborne and land mobile video transmitters,[16] and in particular, for helicopter video downlink capabilities.[17] Cornell University, which operates the world's largest single dish radio telescope in Arecibo, Puerto Rico, and the National

[9] *Id.* at 3967 ¶ 23.

[10] *Id.*

[11] *Id.* at 3956 ¶ 2.

[12] *Id.* at 3956-57 ¶ 2.

[13] *Id.* at 3955 ¶ 1.

[14] *Id.* at 3961 ¶ 9.

[15] Los Angeles County Sheriff's Department Petition for Reconsideration, filed May 9, 2002 (*LASD Petition*); Microwave Radio Communications Petition for Reconsideration, filed May 8, 2002 (*MRC Petition*). MRC is a company that provides television organizations and public safety groups with point-to-point microwave systems for video transport. Motorola and the Association of Public Safety Communications Officials-International (APCO) also support aeronautical mobile services in the 4.9 GHz band. *See Ex Parte* Letter from Steve B. Sharkey Director, Spectrum Standards and Strategy, Motorola to Marlene H. Dortch, Secretary, Federal Communications Commission, dated Jan. 16, 2003; *Ex Parte* Letter from Robert M. Gurss, Shook, Hardy, and Bacon, LLP to Marlene H. Dortch, Secretary, Federal Communications Commission, dated Jan. 9, 2003.

[16] *MRC Petition* at 1.

[17] *LASD Petition* at 1.

Academy of Sciences (NAS), oppose the LASD and MRC Petitions due to their concern that radio astronomy equipment is extremely vulnerable to interference from unwanted emissions.[18]

10. In response to the LASD and MRC Petitions, we now revisit our determination to prohibit aeronautical mobile uses in the 4.9 GHz band. Based on the record before us, we can not conclude, as a general matter, that aeronautical mobile uses can be conducted in the 4.9 GHz band without adversely affecting radio astronomy operations that are entitled to protection. In this regard, we note that the transfer of this spectrum from Federal Government to non-Government use was conditioned on excluding air-to-ground or space-to-Earth links from the entire 4.9 GHz band in order to protect radio astronomy operations in the 4950-4990 MHz sub-band and the upper adjacent 4990-5000 MHz band.[19] Consequently, in the *Second R&*O, the Commission decided to prohibit aeronautical mobile operations in the 4.9 GHz band because the record did not contain a sufficient demonstration that such services could operate while protecting these radio astronomy operations.[20]

11. We continue to have concerns about permitting aeronautical mobile operations in the 4.9 GHz band. To adopt a general rule, we would have to assume a scenario where the intended airborne operations would be in close enough proximity to interfere with radio astronomy operations. MRC posits that a significant portion of the interference potential can be addressed through the use of directional antennas on helicopters.[21] MRC also suggests that use of a directional antenna would need to be coupled with geographic and altitude limitations. According to NAS, there is no single geographic separation distance that would properly protect each of its sites.[22] Weighing all of these factors, we do not believe that we could fashion a general rule that would adequately protect radio astronomy operations in all scenarios. We also are concerned that any general rule would be so restrictive as to limit the utility of pursuing aeronautical mobile operations in the 4.9 GHz band. Thus, we decline to permit aeronautical mobile operations generally in this band. We believe that this approach is consistent with Footnotes US257[23] and S5.149.[24] Finally, we must take into consideration the number of public safety entities that

[18] Cornell University Opposition, filed July 1, 2002 at 3-4 (*Cornell Opposition*); National Academy of Sciences Opposition, filed July 1, 2002 at 2 (*NAS Opposition*).

[19] *See Second R&O and FNPRM*, 17 FCC Rcd at 3961 ¶ 9.

[20] *See id.* at 3962 ¶ 9.

[21] MRC Reply to Opposition for Petition for Reconsideration, filed on July 11, 2002 at 4.

[22] *NAS Opposition* at 5.

[23] The *Second R&O and FNPRM* merged Footnote US257 into Footnote US311 and added three additional radio astronomy zones. Footnote US311 states that "[e]very practicable effort will be made to avoid the assignment of frequencies in the bands 1350-1400 MHz and 4950-4990 MHz to stations in the fixed and mobile services that could interfere with radio astronomy observations." Table of Frequency Allocations, 47 C.F.R § 2.106 n.US311.

[24] International footnote S5.149 states that "administrations are urged to take all practicable steps to protect the radio astronomy service from harmful interference," because "emissions from spaceborne or airborne stations can be particularly serious sources of interference to the radio astronomy service. Table of Frequency Allocations, 47 C.F.R § 2.106 n.S5.149. This international footnote has previously been added domestically to both the Government and non-Government Tables, thus effecting its protection to radio astronomy observatories domestically. *See Second R&O and FNPRM*, 17 FCC Rcd at 3957 n.7.

would likely employ video from helicopters. If the number is limited, as the record suggests, a case-by-case approach may be more appropriate.[25]

12. We nonetheless recognize that airborne use, and, in particular, video transmissions from helicopters could assist public safety entities in performing their critical missions. Further, to the extent, that we could establish a regulatory framework that could accommodate such uses without jeopardizing radio astronomy operations, we believe that doing so would be consistent with the Commission's goal of supporting homeland security. We, however, are mindful of our obligation to protect radio astronomy operations. After reviewing the record in this proceeding and balancing the competing interests, we believe we should provide a mechanism by which entities licensed in the 4.9 GHz band could obtain authority to conduct airborne operations in the 4.9 GHz band. At this time, we believe the most appropriate and prudent approach would be to review these requests on a case-by-case basis through our waiver process. We believe that this approach is warranted in this context for two reasons. First, the relatively small number of commenters who filed comments in support of the Petitions suggests that there is limited interest in pursuing such operations, thus a case-by-case approach would not require significant Commission resources.[26] Second, the record suggests that there may be certain contexts where aeronautical mobile operations can be conducted while protecting radio astronomy operations.[27]

13. Thus, an entity seeking to use the band for airborne operations must file a waiver request attached to an application to modify its license authorizing it to use the 4.9 GHz band generally[28] to also authorize airborne operations. The waiver request should provide all the technical parameters of the proposed operation and should include a technical showing, using established criteria,[29] demonstrating that the proposed operations will not cause interference to any radio astronomy operations. Any such request must also demonstrate how the intended airborne operations will protect other 4.9 GHz band operations.[30] We plan to coordinate any requests for airborne operations with the National Telecommunication and Information Administration (NTIA) prior to taking action on such requests.[31]

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[25] While commenters were generally supportive of aeronautical mobile operations, only a small number of jurisdictions expressed interest in employing such operations. *See* APCO Comments in Response to Petitions For Reconsideration and Clarification at 2; City of Chicago, Office of Emergency Management and Communications Comments at 1; City of Phoenix, Arizona (Phoenix) Comments at 2; Office of the Chief Technology Officer, Government of the District of Columbia (DCCTO) Comments at 7-8; Public Safety Wireless Network (PSWN) Comments at 5-6.

[26] *See* n.25, *supra.*

[27] For example, aeronautical operations may be possible in the 4940-4950 MHz portion of the band, so long as "appropriate out-of-band emission protections are adopted." *See, e.g., Cornell Opposition* at 1*; NAS Opposition* at 1.

[28] *See generally* discussion at para. 27*, infra.*

[29] By established criteria, we refer to the interference threshold levels contained in ITU-R Recom. RA.769-1.

[30] We reserve discretion to revisit the issue of whether to pursue a rulemaking proceeding regarding an aeronautical mobile service allocation in the 4.9 GHz band in the event that the level of interest in providing aeronautical mobile services increases, or if government and/or industry entities are able to develop technical standards that sufficiently protect radio astronomy without unduly restricting airborne operations.

[31] The Communications Act assigns joint jurisdiction for spectrum management to the FCC and the NTIA at the Department of Commerce. The FCC is responsible for non-Government users (*e.g.* broadcast, commercial, public safety, and state and local government users, etc.) and NTIA is responsible for federal users. The majority of spectrum is shared between Government and non-Government users, in which case the FCC and NTIA must coordinate spectrum policy.

We delegate authority to the Wireless Telecommunications Bureau and the Office of Engineering and Technology to act on such requests.

14. Finally, we deny MRC's alternative request for "clarification" that Section 90.423 of our Rules[32] "permits airborne use of the 4940-4990 MHz band from low flying aircraft."[33] While Section 90.423(a) allows for some aeronautical uses under certain circumstances,[34] it specifically allows for such uses "except as may be provided in other sections of this part with respect to operation on specific frequencies."[35] Thus, Section 90.423 does not trump express prohibitions on aeronautical operations contained elsewhere in our rules. Because our final rules expressly prohibit aeronautical mobile operations,[36] Section 90.423 will not permit such use as requested by MRC.

V. THIRD REPORT AND ORDER

A. Eligibility to Use the 4.9 GHz Band

15. *Background.* In the *FNPRM,* the Commission sought comment on whether eligibility to use the 4.9 GHz band should be limited to traditional public safety entities,[37] or whether eligibility should be expanded to include additional entities involved in the provision of other public safety-related services.[38] The Commission also sought comment on whether to allow commercial operations in the band.[39] Finally, the Commission sought comment on whether Federal Government entities should be able to use this spectrum.[40]

16. *Discussion.* After reviewing the record in this proceeding, we conclude that the eligibility criteria for use of the 4.9 GHz band should ensure that the band will be used for communications in support of public safety operations. We also believe that such criteria should be sufficiently flexible to provide a variety of entities access to the 4.9 GHz band, particularly if allowing such entities access would increase the effectiveness of public safety communications, foster interoperability and further ongoing and future homeland security initiatives. We believe that these objectives will be best accomplished by basing the eligibility criteria on the "public safety services" definition implemented by Section 90.523 of our rules.[41] Under this definition, "public safety services" are services—

[32] 47 C.F.R. § 90.423.

[33] *MRC Petition* at 7.

[34] 47 C.F.R. § 90.423(a).

[35] *Id.*

[36] *See* Appendix A, Section 90.1205.

[37] *See Second R&O and FNPRM*, 17 FCC Rcd at 3971 ¶¶ 31-34.

[38] Such additional public safety services would include private internal radio services used by State and local governments and non-government entities, and emergency road services provided by not-for-profit organizations, provided that they are used to protect the safety of life, health, or property, and are not made commercially available to the public. 47 U.S.C. § 309(j)(2).

[39] *See Second R&O and FNPRM*, 17 FCC Rcd at 3972 ¶ 36.

[40] *Id.* at 3973 ¶ 38.

[41] *See* 47 C.F.R. § 90.523.

(A) the sole or principal purpose of which is to protect the safety of life, health, or property;
(B) that are provided
(i) by State or local government entities; or
(ii) by nongovernmental organizations that are authorized by a government entity whose primary mission is the provision of such services; and
(C) that are not made commercially available to the public by the provider.[42]

17. When the Commission enacted Section 90.523, it adopted a three-pronged test to determine eligibility: (1) purpose of use; (2) identity of licensee; and (3) compliance with noncommercial *proviso*.[43] The purpose of the spectrum use must be for services the sole or principal purpose of which is to protect the safety of life, health, or property.[44] With regard to the identity of the licensee, all state or local governmental entities are included in this definition.[45] Nongovernmental organizations are eligible if approved by a state or local government entity whose mission is the oversight of or provision of public safety services.[46] Section 90.523(b) requires that nongovernmental organizations (NGOs) obtain written approval from the governmental entity having jurisdiction over the area to be served.[47] The Commission did not attempt to delineate every type of nongovernmental organization that would be eligible, because "there are countless variations on how NGO use might present itself among states and localities nationwide. We believe that the certification from one of our licensees provides a reasonable measure of confidence that the NGO has received authorization from a governmental entity that is appropriate under the circumstances."[48] However, it indicated that entities such as utilities and pipelines were examples of potential NGO licensees.[49] Finally, under the noncommercial *proviso*, commercial entities are not disqualified *per se* by their commercial status,[50] but entities are not eligible for licensing in the context of public safety services that they make commercially available to the public,[51] including the provision of public safety radio service to public safety subscribers for a fee.[52]

[42] *Id; see also* 47 U.S.C. § 337(f)(1).

[43] The Development of Operational, Technical and Spectrum Requirements for Meeting Federal, State and Local Public Safety Agency Communication Requirements Through the Year 2010, *First Report and Order and Third Notice of Proposed Rulemaking*, WT Docket No. 96-86, 14 FCC Rcd 152, 178-88 ¶¶ 48-72 (1998) (*700 MHz First R&O and Third NPRM)*; *see also* The Development of Operational, Technical and Spectrum Requirements for Meeting Federal, State and Local Public Safety Agency Communication Requirements Through the Year 2010, *Second Memorandum Opinion and Order*, WT Docket No. 96-86, 15 FCC Rcd 16844, 16861 ¶ 36 (2000) (*700 MHz Second MO&O*).

[44] *700 MHz First R&O and Third NPRM*, 14 FCC Rcd at 178 ¶ 49.

[45] *Id.* at 180 ¶ 54; *see also* 47 C.F.R. § 90.523(a).

[46] *700 MHz First R&O and Third NPRM*, 14 FCC Rcd at 181 ¶ 55.

[47] *See* 47 C.F.R. § 90.523(b); *see also 700 MHz First R&O and Third NPRM*, 14 FCC Rcd at 181 ¶ 56.

[48] *700 MHz First R&O and Third NPRM*, 14 FCC Rcd at 181 ¶ 56.

[49] *Id.* at 188 ¶ 72.

[50] *Id.*

[51] *Id.* at 187 ¶¶ 71-72.

[52] *700 MHz Second MO&O*, 15 FCC Rcd at 16862 ¶ 39.

18. The record establishes a dedicated need for the 4.9 GHz band to support public safety operations as traditionally defined.[53] As the Commission noted in the *Second R&O*, the public safety community consistently states that because its uses primarily involve emergency situations, it needs dedicated spectrum that will be reliably available without delay.[54] We note that the propagation characteristics of this spectrum and small service contours for mobile units equate to good reuse capabilities in the band.[55] Nonetheless, the interest of some utility commenters in using the 4.9 GHz band for day-to-day broadband data and video maintenance and repair activities[56] raises public safety concerns about prospective congestion due to significant non-emergency use.[57] Furthermore, given that we anticipate that the band will be used for data and other broadband purposes that could utilize as much as 20 megahertz of spectrum per transmission,[58] expanded eligibility would lead to congestion in the band, hence increasing the possibility of interference to mission-critical operations, particularly in urban areas.[59]

19. We therefore must balance the competing interests for access to the 4.9 GHz band. In the first instance, we are persuaded that it is critical that traditional public safety entities have immediate and reliable access to the spectrum. Moreover, after reviewing the comments submitted by public safety officials and considering the various uses that will be permitted in the band,[60] we are now persuaded that there will be considerable activity in the band, even with a user pool primarily limited to traditional public safety entities. In addition, we believe that traditional public safety entities are better poised to be most knowledgeable about other users and/or uses that would be supportive of public safety operations. In this regard, we reject the possibility, posed in the *FNPRM*, of somehow dividing the 4.9 GHz band and granting licenses to non-traditional public safety entities on a partial or restricted basis.[61] Atheros Communications, Inc. (Atheros) asserts that certain new technologies could permit multiple classes of users, including public safety entities, critical infrastructure and commercial entities to all share use of the 4.9 GHz band without hindering public safety communications.[62] Under this approach, an entity's license

[53] APCO Comments at 3; City of New York (NYC) Comments at 4; Phoenix Comments at 1-2; DCCTO Comments at 2-3; Illinois Fire Chiefs Association Comments at 1; International Association of Fire Chiefs, Inc. and International Municipal Signal Association Comments at 2; Motorola, Inc. (Motorola) Comments at 8-9; New York City Transit Authority (NYCTA) Comments at 10; PSWN Comments at 5.

[54] *See Second R&O and FNPRM*, 17 FCC Rcd at 3969 ¶ 28 (citing Letter to the Honorable Michael K. Powell, Chairman, Federal Communications Commission, from Ralph Mendoza, Chief of Police, Fort Worth Police Department, dated May 9, 2001; Letter to the Honorable Michael K. Powell, Chairman, Federal Communications Commission, from Gerald R. Whitman, Chief of Police, Denver Police Department, dated June 14, 2001; Letter to the Honorable Michael K. Powell, Chairman, Federal Communications Commission, from Al A. Philippus, Chief of Police, City of San Antonio Police Department, dated June 14, 2001).

[55] *See* paras. 51-52, *infra.*

[56] Cinergy Corporation & Consumers Energy Company (Cinergy & Consumers) Comments at 9-11.

[57] APCO Comments at 4.

[58] *See* para. 39, *infra.*

[59] *Id.* at 3-4; Industrial Telecommunications Association, Inc. (ITA) Reply Comments at 4; Motorola Reply Comments at 3, 5; DCCTO Comments at 4.

[60] *See* discussion of fixed and mobile uses at paras. 33-34, *infra*.

[61] *See Second R&O and FNPRM*, 17 FCC Rcd at 3972 ¶ 35.

[62] Atheros Comments at 8-9.

would determine the priority level at which an entity could contend for access to the spectrum, and whenever higher priority level traffic requires spectrum, radios operating at a lower priority level would not be capable of transmitting.[63] We note, however, that there is disagreement as to whether such technology will be sufficient to serve multiple public safety services in the presence of non-public safety entity users.[64] Furthermore, we share the Public Safety Wireless Network's (PSWN) concern that any malfunction of these technologies could put critical public safety communications at risk, thereby jeopardizing lives and property.[65] The risks inherent in relying on these technologies to ensure that public safety entities enjoy unhindered coverage are simply not outweighed by the benefits of expanding the eligibility pool for the band.

20. For the same reasons, we decline to license commercial uses of this spectrum. Commenters were largely opposed to commercial operations in the band on the basis that commercial uses would increase the likelihood of harmful interference to public safety missions vital to the safety of life and property.[66] To the extent that expanding eligibility may have the benefit of reducing equipment costs[67] or maximizing spectrum usage, we believe that such benefits are outweighed by the potential for public safety entities not being able to gain immediate access to or experience interference to their operations in the band. Furthermore, we note that the broadband technologies that will most likely be used in the band are already in use in the nearby unlicensed 5 GHz consumer band (U-NII band), thereby facilitating equipment economies of scale.[68] Thus, we conclude that the eligibility criteria for licensing of the 4.9 GHz band should be limited to entities providing public safety services as defined in Section 90.523 of the Commission's Rules.

21. Similarly, we do not believe that permitting unlicensed commercial uses pursuant to Part 15 of our rules is an appropriate mechanism for increasing access to the spectrum in this context. We acknowledge that Part 15 permits similar use of broadband technologies in the nearby 5725-5850 MHz band,[69] and that permitting such use could increase spectral efficiency. However, we conclude that the low power limits adopted for 4.9 GHz devices to promote frequency reuse result in susceptibility to interference from uncoordinated users. Because public safety devices may be operating with peak transmit powers as low as 100 mW,[70] we believe that the 1 watt power level authorized for Part 15 devices would cause undue interference to public safety operations. Moreover, the lack of identifiable

[63] *Id*. at 9.

[64] *See* Motorola Reply Comments at 4.

[65] PSWN Comments at 3.

[66] *See, e.g.*, PSWN Comments at 6: APCO Reply Comments at 6.

[67] *See* LMS Wireless Late-Filed Ex Parte Reply Comments at 6; Atheros Communications, Inc. (Atheros) Comments at 5-6.

[68] *See* Atheros Comments at 3.

[69] *See* 47 CFR § 15.247. We note, however, that Section 15.205 does not permit Part 15 operations in the band 4.5-5.15 GHz.

[70] *See* discussion at paras. 51-52, *infra*.

users would hinder efforts to resolve interference problems. This could have tragic consequences to public safety operations. Therefore, we decline to permit unlicensed Part 15 operations in this band.[71]

22. We will, however, endeavor to increase spectrum utilization and enhance equipment economies of scale by allowing public safety entities to enter into sharing agreements or other arrangements with entities performing operations in support of public safety. As noted in the *FNPRM*, utilities, railroads, and similar entities may be directly involved in an emergency and may need to interact with the traditional public safety service providers.[72] In addition, many public safety commenters acknowledged the importance of interoperability with such entities during both times of emergency and non-emergency and seek the authority to delegate access to the 4.9 GHz band to such entities as needed.[73] As the Commission has noted previously in a separate proceeding, although the primary function of certain organizations, such as the power, petroleum, and railroad industries,

> is not necessarily to provide public safety services, the nature of their day-to-day operations provides little or no margin for error and in emergencies they can take on an almost quasi-public safety function. Any failure in their ability to communicate by radio could have severe consequences on the public welfare.[74]

Therefore, we conclude that permitting 4.9 GHz licensees to enter into sharing arrangements with entities not eligible for their own licenses is in the public interest. We will not place any limitation on what type of entity may be a party to such sharing arrangements; rather, we afford traditional public safety providers that are licensed in the 4.9 GHz band flexibility to exercise their discretion regarding what entities in their jurisdiction operate in support of public safety.

23. We will, however, require that the use of the 4.9 GHz band by entities other than traditional public safety entities (both entities with licenses obtained pursuant to a governmental entity's written approval, and non-licensed participants in sharing arrangements) be in support of public safety. We encourage public safety entities to explore strategic partnerships, but we emphasize that the object of such arrangements must be to improve public safety communications, rather than the expansion of non-public safety systems. We will not at this time attempt to definitively categorize various communications as public safety or non-public safety. In this regard, we believe that a bright-line distinction would be difficult to draw and might unduly inhibit use of the subject spectrum that could benefit the public welfare. We believe that traditional public safety licensees will be in the best position to determine whether certain sharing arrangements would benefit their public safety communications. Nonetheless, we reiterate that the non-public safety entity's use of the 4.9 GHz band must be in support of public safety,

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[71] Further, we do not believe that prohibiting unlicensed Part 15 commercial operations in this band will have a deleterious effect on innovation and access to spectrum in the Part 15 context. Our belief is premised on the notion that it is likely that unlicensed Part 15 commercial operations will be permitted in the 5.470-5.725 GHz band. *See* U.S. Department of Commerce, National Telecommunications and Information Administration, "Agreement Reached Regarding U.S. Position on 5 GHz Wireless Access Devices," ("WRC-03 Agreement"), rel. Jan. 31, 2003, (available at http://www.ntia.doc.gov/ntiahome/press/2003/5ghzagreement.htm.).

[72] *Second R&O and FNPRM*, 17 FCC Rcd at 3971 ¶ 33.

[73] *See* NYC Comments at 4; Phoenix Comments at 3; DCCTO Comments at 1, 4. We also note that the railroad industry has expressed an interest in such partnerships. *See* American Association of Railroads Comments at 4.

[74] Implementation of Sections 309(j) and 337 of the Communications Act of 1934, as Amended, *Report and Order and Further Notice of Proposed Rule Making*, WT Docket No. 99-87, 15 FCC Rcd 22709, 22746 ¶ 76 (2000).

and that communications with no nexus to the safety of life, health, or property are not permitted in the 4.9 GHz band.

24. We are optimistic that the mutual need for interaction will foster cooperation and sharing arrangements, and we encourage state and local public safety organizations to work with critical infrastructure industry to ensure that in times of crisis they too have access to this critical spectrum resource. We believe the facilitation of such arrangements by the rules we adopt today will be in the public interest and result in the most efficient and flexible use of the 4.9 GHz band. Such arrangements will allow public safety entities to retain primary control of the band while facilitating useful strategic partnerships and cooperation. This should encourage spectrum efficiencies while allowing public safety entities to utilize wireless broadband applications in a regulatory environment in which they have reliable and immediate access to the 4.9 GHz band.

25. Similarly, we adopt the proposal in the *FNPRM* to permit Federal Government entities to enter into sharing agreements with public safety licensees to use this spectrum.[75] The Commission noted that although it does not license Federal Government entities to use non-Government spectrum, Federal agencies play a vital role in providing public safety related services to the American people.[76] We continue to believe that both Federal Government and non-Government public safety entities are potential participants in incident-scene emergency operations, and could benefit from the same broadband communications technologies contemplated for this band. Additionally, all comments on this subject were in favor of sharing agreements between licensees and Federal Government users.[77] Therefore, we will permit licensees to enter into agreements with Federal entities to use the 4.9 GHz band.[78]

B. Licensing

26. *Background.* In the *FNPRM*, the Commission sought comment on licensing schemes for the 4.9 GHz band.[79] Specifically, the Commission set forth some advantages and disadvantages of several licensing schemes, and asked commenters to address whether it should implement one of those approaches.[80] It also sought alternative proposals.[81]

27. *Discussion.* Upon consideration of the characteristics of the 4.9 GHz band and the contemplated uses thereof, we agree with the Association of Public Safety Officials-International (APCO) and the National Public Safety Telecommunications Council (NPSTC)[82] that a geographic licensing

[75] *See Second R&O and FNPRM*, 17 FCC Rcd at 3973 ¶ 38.

[76] *See id.* at 3956 n.2. Although Section 305 of the Act precludes the Commission from licensing stations belonging to and operated by the federal Government, NTIA, the entity empowered with managing federal use of spectrum, agrees that such restrictions do not bar federal entities from use of spectrum managed by the Commission. *See 700 MHz First R&O and Third NPRM* , 14 FCC Rcd at 185 ¶¶ 64-66.

[77] DCCTO Comments at 5; Motorola Comments at 8.

[78] *See 700 MHz First R&O and Third NPRM*, 14 FCC Rcd at 185 ¶ 67 (permitting Federal Government use of 700 MHz public safety spectrum).

[79] *See Second R&O and FNPRM*, 17 FCC Rcd at 3975 ¶ 45.

[80] *Id.* at 3976-79 ¶¶ 46-58.

[81] *Id.* at 3976 ¶ 46.

[82] APCO Comments at 10-11; The National Public Safety Telecommunications Council (NPSTC) Comments at 8.

scheme based on a public safety entity's legal jurisdictional area of operation is most appropriate for all operations in the band, with the exception of fixed point-to-point operations. Pursuant to this approach, an entity that meets the eligibility criteria discussed above could seek a non-exclusive license to operate in the geographical area encompassed by its political boundaries or jurisdiction, or the jurisdiction of the governmental entity authorizing a non-governmental entity.[83] The jurisdictional areas will include all states, counties, cities, towns, municipalities, etc., and will encompass every geographical area that has an established public safety entity. Licensees will be authorized to utilize the entire fifty megahertz of the 4.9 GHz band spectrum within their jurisdictions. Additionally, licensees choosing to employ fixed point-to-point operations in the band will be required to obtain a separate individual license for each station of operation. Licenses will be available immediately upon effectiveness of the applicable rules established herein.[84]

28. Under the licensing scheme we adopt today, all frequencies will be shared among licensees, and adjacent and co-located licensees are required to cooperate and coordinate in use of the spectrum. 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.[85] We believe that the decisions made herein, including the authorization of sharing arrangements, permitting licensees to use the entire spectrum, frequency utilization procedures,[86] low power limits, and the nature of public safety operations in general will all facilitate this sharing requirement.[87] We also note that all 4.9 GHz band licensees and users will be bound by Section 90.173(b) of our rules, which requires applicants and licensees to cooperate in the selection and use of frequencies so as to reduce interference and maximize effective use of authorized facilities.[88] Licensees of stations suffering or causing harmful interference are expected to cooperate and resolve this problem by mutually satisfactory arrangements.[89]

29. For similar reasons, we disagree with those commenters[90] that favor authorization by rule without individual licensing (i.e. blanket licensing).[91] We agree with commenters such as APCO and Cinergy Corporation and Consumers Energy Company (Cinergy & Consumers) that public safety entities require the certainty provided by a coordination process, and that having named licensees is essential to

[83] This approach differs from the Commission's usual geographic licensing, where licensees are authorized to operate in pre-designated geographic areas. *See*, *e.g.,* Implementation of Sections 309(j) and 337 of the Communications Act of 1934 as Amended, *Notice of Proposed Rule Making*, WT Docket No. 99-87, 14 FCC Rcd 5206, 5237 n.185 (1999).

[84] In light of the construction requirements we adopt today, licensees should be mindful not to obtain their licenses prematurely. *See* Appendix A, Section 90.155.

[85] APCO Ex Parte Presentation, January 8, 2003.

[86] *See* Section V-D, Frequency Utilization, *infra.*

[87] The regulations for operations in the 4.9 GHz band will be contained in Part 90 of our Rules. *See* para. 36, *infra.*

[88] 47 C.F.R. § 90.173(b).

[89] *Id.* We nonetheless note that in those situations where parties cannot resolve the matter amongst themselves, and which we hope will be few, the Commission will act as the final arbiter in resolving the dispute(s).

[90] Atheros Comments at 13; PSWN Comments at 12.

[91] *See Second R&O and FNPRM*, 17 FCC Rcd at 3977 ¶ 50.

enable users to cooperate with each other as discussed above.[92] As Cinergy & Consumers point out, "public safety entities should not be required to conduct their critical communications on unlicensed spectrum that is subject to interference from other licensed or unlicensed devices...."[93]

30. We also disagree with commenters that a state licensing scheme[94] would be advantageous here.[95] Given the short range of 4.9 GHz band operations, we do not see any benefit to requiring state governments to oversee the operations of all potential users in the band. Nor do we see a need to impose an additional layer of regulation for licensees.[96] Therefore, we decline to mandate any further state involvement.

31. Lastly, we note that the U.S. Government currently does not have an agreement with the governments of Canada and Mexico for the current use of the 4940-4990 MHz frequency band along the border regions. However, we note that licensees may be subject to future treaties or agreements between the U.S. and other countries for use in the border regions pursuant to Section 1.923(f) of the Commission's Rules. Until such time, licensees near the border must protect stations in Canada and Mexico.

C. Fixed and Mobile Use of the 4.9 GHz Band

32. *Background.* In the *Second R&O*, the Commission allocated the 4.9 GHz band for both fixed and non-aeronautical mobile operations.[97] Although commenters to the *First NPRM* advocated only the use of spectrally-efficient low-power wireless portable or mobile broadband technologies in the 4.9 GHz band, the Commission expressed concern that prohibiting fixed uses in the band would restrict licensee flexibility and could prohibit future technologies that could benefit public safety.[98] Mobile broadband technologies envisioned for the band were intended for short-range communications that would allow for reuse of the spectrum at nearby locations.[99] The Commission sought comment on how to prevent a spectrally-inefficient allocation of the band.[100] The Commission also sought comment on which rule part(s) should contain the licensing and service rules governing the 4.9 GHz band.[101]

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[92] APCO Comments at 10; Cinergy & Consumers Comments at 26.

[93] Cinergy & Consumers Comments at 25.

[94] Pursuant to a state licensing scheme, licenses to use the 4.9 GHz band would be given directly to each state. Each state would then administer the spectrum within its jurisdiction. This task would include authorizing individual entities to utilize the spectrum, and would also entail coordinating use of the spectrum among licensees. *Second R&O and FNPRM*, 17 FCC Rcd at 3976 ¶ 47.

[95] New York State Office of Technology (NYSOT) Comments at 8; PSWN Comments at 11.

[96] As APCO points out, most public safety operations occur at local rather than at state levels. APCO Comments at 11.

[97] *See Second R&O and FNPRM*, 17 FCC Rcd at 3961 ¶ 9.

[98] *See id.* at 3973 ¶ 39.

[99] *See id.*

[100] *See id.* at 3974 ¶ 40.

[101] *See id.* at 3974 ¶ 41.

33. *Discussion.* In addition to the broadband mobile services the Commission originally contemplated for the band, we will permit "hot spot" operations, *i.e.*, automatic high speed file transfers from "hot spots" to mobile units, such as transfers of maps, building layouts, emergency medical service files, and wanted or missing person images. Additionally, we will permit operation of temporary fixed links (*i.e.* operations lasting one year or less[102]) in the 4.9 GHz band, which will provide public safety entities with an additional tool for responding to emergency situations. Commenters expressed overwhelming support for such uses, noting a need for spectrum to support short-term fixed facilities set up for large scale or high impact public safety situations.[103] We believe these actions will promote spectrum utilization and spectrum efficiency in the 4.9 GHz band.

34. Moreover, we will permit traditional, fixed point-to-point microwave operations on a secondary basis.[104] Such operations could support backhaul or backbone communications links. We agree with DCCTO that public safety entities should be empowered to manage their own use of the spectrum,[105] and believe that each user should have maximum autonomy to use the spectrum as suits its particular needs. For example, we expect that in rural areas, there may be a greater need for public safety operations covering larger distances. On the other hand, public safety officials in larger cities may have a greater need for mobile and hot spot uses. Allowing users to customize use of the band to suit their individual needs yields optimal user flexibility as well as spectral efficiency. We believe that permitting such operations only on a non-interference basis addresses the concerns of those commenters[106] who opposed such operations on the grounds that traditional or backhaul microwave operations would exhaust available frequencies and relegate safety operations to unlicensed bands that are shared with other uses.[107]

35. We also believe that the permitted uses are appropriate in light of the licensing scheme that will be implemented for the band. As stated above, each license will cover a particular licensee's geographic jurisdiction. In the event of overlapping jurisdictions, mutual cooperation among licensees should prevent interference before it occurs. That is, we expect that licensees will coordinate their uses with one another in overlapping and adjacent jurisdictions, and that such coordination may yield an outcome where fixed uses can be accommodated. Furthermore, relegating traditional fixed uses to

[102] 47 C.F.R. § 101.3.

[103] APCO Comments at 5; Cinergy & Consumers Comments at 5; DCCTO Comments at 5-6; Motorola Comments at 7; NPSTC Comments at 4; UTC Comments at 5. APCO states that the 4.9 GHz band would have been invaluable to establishing short haul data links between management support teams and those in the field after the terrorist attacks of September 11, 2001. APCO Comments at 6.

[104] We note that such fixed uses were slated for the 4635-4685 MHz band, for which the 4.9 GHz band was substituted. The Department of Commerce originally reallocated the 4660-4685 MHz band from Federal to non-Federal Government use, and identified the lower adjacent 4635-4660 MHz band, among others, for additional transfer effective January 1, 1997. *See Spectrum Reallocation Final Report, Response to Title VI – Omnibus Budget Reconciliation Act of 1993*, U.S. Department of Commerce, NTIA Special Publication 95-32 (Feb. 1995) (*Final Report.* Thereafter, in March 1999, pursuant to Section 6001(a)(3) of OBRA-93, the Department of Commerce notified the Commission that the Government was reclaiming the 4635-4685 MHz band and identified the 4.9 GHz band as substitute spectrum for transfer to non-Government use. *See* OBRA-93, § 6001(a)(3), as codified at 47 U.S.C. §§ 924(b), 926.

[105] *See* DCCTO Reply Comments at 5.

[106] APCO Comments at 6; Motorola Comments at 7.

[107] *See* NYC Comments at 8; Phoenix Comments at 2.

secondary status will further help to ensure that the mobile uses are not subsumed by traditional microwave operations.

36. Finally, we agree with Atheros and MRC that the regulations for all operations in the 4.9 GHz band should be contained in Part 90 of our Rules.[108] Inasmuch as the uses envisioned for the band are largely mobile in nature, we believe that the service is properly regulated with other land mobile services. As MRC points out,[109] Part 90 already covers the use of mobile portable frequencies by public safety entities.[110] Moreover, to the extent that fixed uses will be permitted in the band, we note that Part 90 also contains provisions for fixed transmitters.[111] Thus, Part 90 is the most appropriate rule part in which to regulate the 4.9 GHz band.

D. Frequency Utilization

37. *Background.* In the *FNPRM*, the Commission sought comment on the appropriate channel plan for the fifty megahertz of spectrum in the 4.9 GHz band.[112] It sought comment on various plans proposed in response to the *First NPRM*, and solicited alternative plans.[113] The Commission also asked whether, in the event fixed operations were permitted in the band, some specific portion of the spectrum should be designated for fixed operations.[114]

38. *Discussion.* After reviewing the record in this proceeding, we believe that adopting a frequency utilization plan will be beneficial from an operational perspective, and will not unduly restrict the flexibility of 4.9 GHz band licensees and users. As stated above, licensees will be authorized to operate on the entire 50 megahertz of spectrum that comprises the 4.9 GHz band.[115] Adopting a frequency utilization plan will facilitate spectrum sharing by confining individual transmissions to specific frequencies thereby leaving other frequencies open for simultaneous transmissions.[116]

39. The frequency utilization plan will consist of ten one-megahertz channels and eight five-megahertz channels that can be combined to a maximum of twenty megahertz, which provides users with maximum flexibility to employ existing technologies, while leaving the door open for the implementation of future broadband technologies in the band.[117] The one megahertz channels will be useful for narrow bandwidth operations such as slow scan short-term video surveillance where broadcast quality signals are unnecessary. Further, use of the narrow channels, where possible, will help to preserve battery life and

[108] *See* MRC Comments at 4; Atheros Comments at 10.

[109] MRC Comments at 4.

[110] *See* 47 C.F.R. § 90.20.

[111] *See, e.g.,* 47 C.F.R. §§ 90.20(d)(75), 90.235.

[112] *See Second R&O and FNPRM*, 17 FCC Rcd at 3974 ¶ 42.

[113] *See id.* at 3974-75 ¶¶ 42-43.

[114] *See id.* at 3975 ¶ 43.

[115] *See* para. 27, *supra.*

[116] That is, adoption of a channel plan reduces the risk that one user will select a frequency that effectively blocks other users on both sides.

[117] *See* APCO Comments at 8.

support denser deployments.[118] On the other hand, for wireless local area network (WLAN)[119] and personal area network (PAN)[120] uses where a higher bandwidth will be required, channels can be combined to meet those requirements. In this regard, we would expect licensees who employ wideband systems (i.e. more than 5 megahertz) to utilize the wider (5 MHz) channels first, rather than combining the one megahertz channels. Furthermore, we note that the use of smaller channels that can be combined into a number of different combinations accommodates the requests of different commenters. For example, MRC seeks nine or ten megahertz channels,[121] while others seek a configuration of twenty to twenty-five megahertz channels.[122] Thus, we believe that the combination of adopting smaller channels and permitting aggregation results in a plan that best addresses commenter concerns for present and future applications. Furthermore, inasmuch as permanent point-to-point operations will be secondary in the band, we find it unnecessary to designate a specific portion of the band for fixed operations. Unlike an exclusive licensing context where the Commission has utilized channelization as a licensing tool, we use channels in this context to serve a different purpose. Specifically, we are establishing channels in this shared spectrum environment as an effective first step to minimize interference.

40. In addition, we believe that the use of channels here will also simplify coordination, which will be mandatory amongst users in the same geographic area. Along these lines, we agree with commenters[123] who favor the use of regional planning committees.[124] APCO believes that such an approach would encourage coordination, increase responsiveness to the unique local needs of the public safety community, and establish procedures for emergency scene coordination.[125] Motorola agrees with APCO that, because public safety agencies nationwide have coordination procedures in place, local coordination in the band will not be unduly burdensome.[126] We agree. Accordingly, we will require that within six months of the effective date of the rules adopted herein, the 700 MHz band regional planning committees (RPCs) must have a meeting for the express purpose of initiating consideration of

[118] Atheros Comments at 11.

[119] A wireless local area network is a flexible data communication system implemented as an extension to, or as an alternative for, a wired local area network within a building or campus.

[120] A personal area network is a wireless device that can form instant ad hoc networks without any wired network connectivity, typically over a short range. Such devices provide wireless, hands-free links between portable or mobile transceivers and numerous devices such as headsets, portable computing devices, video cameras, thermal imagers, sensors and 3D locators, often integrated into specialized helmets and suits, enabling very localized team and coverage around an officer or vehicle.

[121] MRC Comments at 3.

[122] NYSOT Comments at 10; NYC Comments at 8; Phoenix Comments at 2.

[123] NYC Comments at 8; NPSTC Comments at 8; NYCTA Comments at 11; United Telecom Council (UTC) Comments at 6.

[124] Under a regional planning licensing scheme, which the Commission used in both the 700 and 800 MHz public safety bands, the nation is divided into regions that have the autonomy to develop plans that meet their different communications needs. *Second R&O and FNPRM*, 17 FCC Rcd at 3978 ¶ 53.

[125] APCO Comments at 11-12. In an *ex parte* presentation, APCO clarified that regional planning committees for the 4.9 GHz band need not duplicate the 700 & 800 MHz models and such committees could hold lesser roles, such as maintaining databases of users in a particular region. APCO Ex Parte Presentation, January 8, 2003.

[126] Motorola Ex Parte Presentation, January 15, 2003.

coordination procedures for the 4.9 GHz band.[127] Within twelve months of the effective date of the rules adopted herein, each RPC must provide the FCC with a copy of its plan. The plan should identify coordination procedures for both fixed and mobile operations, including but not limited to, mechanisms for incident management protocols, interference avoidance and interoperability. We envision that such plan could be done either on a regional basis or on a national basis through industry formulation of a best practices coordination plan. We also believe that any coordination plan for the 4.9 GHz band should contain express procedures affording specific flexibility to accommodate dynamic spectrum utilization in response to immediate public safety communications needs.

41. We believe that the combination of our frequency utilization plan and use of the RPCs as described above will facilitate effective coordination of operations in the band. We note that planning committees may do very well in urban areas where there are numerous public safety jurisdictions within a given area, whereas in rural areas, where there is further distance between public safety jurisdictions, less formal procedures may accomplish the same coordination goals. Additionally, with regard to emergency and incident scenes, we expect that RPCs will establish procedures to allow an incident commander to take control of emergency operations, including communications issues, consistent with procedures established by adjacent and overlapping jurisdictions.

42. We also recognize that there may be instances in which a 700 MHz RPC may be unable to perform the aforementioned functions either due to resource or time constraints. Thus, we believe the prudent course of action is to implement a default coordination obligation in the event an RPC fails to meet either of the deadlines specified above. Specifically, in those circumstances, 4.9 GHz band licensees must cooperate in the sharing of the 4.9 GHz band and coordinate their 4.9 GHz operations on an *ad hoc* basis. As we have already noted, all such licensees are under a continuing obligation to cooperate in the selection and use of 4.9 GHz frequencies.[128] Moreover, we also note that in the event a 700 MHz RPC does not establish a plan governing coordination procedures, 4.9 GHz band licensees would not be precluded from voluntarily establishing a local 4.9 GHz planning committee, appointing one or more band managers or other coordinator(s), or implementing other procedures to facilitate effective coordination of operations in the band.

E. Interference Issues

1. U.S. Navy Operations

43. *Background.* The Commission noted in the *FNPRM* that the U.S. Navy conducts Cooperative Engagement Capability (CEC) operations in nine training areas in the band immediately below the 4.9 GHz band, and that the Navy's CEC system, particularly its aeronautical mobile operations below the 4.9 GHz band, may inhibit use of the lower portion of the 4.9 GHz band in large areas along the East, West, and Gulf Coasts, as far as 394 kilometers (245 miles) from the CEC sites.[129] Furthermore, the Commission noted that the Department of Defense reserves the right, after coordinating with NTIA and the Commission, to expand permanently the designated training areas and utilize the full power mode and full band capability.[130] Given the high power at which the CEC system operates, the Commission expressed concern that use of the CEC system could cause interference to public safety systems, and

[127] *700 MHz First R&O and Third NPRM* , 14 FCC Rcd at 263-65 Appendix D.

[128] *See* discussion at para. 26, *supra*.

[129] *See* Appendix C, detailing the nine CEC training areas as well as the emission characteristics of this system.

[130] *See Second R&O and FNPRM*, 17 FCC Rcd at 3980 ¶ 59.

sought comment on prospective measures to mitigate such interference.[131] It also sought comment on its tentative conclusion that the low power operations contemplated for the band will not interfere with the CEC system.[132]

44. *Discussion.* Commenters agree that the operations contemplated for the 4.9 GHz band will not interfere with CEC operations.[133] Commenters urged us to devise methods to mitigate CEC interference to public safety systems.[134] We believe that the actions taken herein collectively offer some solutions to potential interference from CEC operations. For example, because licenses will be issued for the entire spectrum, in areas where Navy operations cause interference to certain portions of the band, licensees will be able to use other portions of the band that are not similarly encumbered. Furthermore, the licensee sharing and cooperation requirement should also serve to mitigate interference concerns, because we expect that during this process, licensees will factor any band encumbrances into their planning for use of the band. Therefore, we will not adopt any specific interference mitigation requirements at this time. However, as operations in the band develop, both the Commission and licensees may determine other approaches to further mitigate any CEC interference concerns, and we explicitly reserve discretion to revisit this issue at a later time.

2. Radio Astronomy Operations

45. *Background.* In the *Second R&O*, the Commission noted that the 4990-5000 MHz band is allocated to radio astronomy service on a primary basis, both internationally and in the United States.[135] Footnote US74 of the Table of Frequency Allocations requires protection to radio astronomy services from extraband radiation only to the extent that such radiation exceeds the level that would be present if the offending station were operating in compliance with the technical standards or criteria applicable to the service in which it operates.[136] In the *FNPRM*, the Commission requested comment on what, if any, restrictions may be needed on new users in the 4.9 GHz band to protect the adjacent 4990-5000 MHz band radio astronomy operations.[137]

46. *Discussion.* We conclude that no additional restrictions are needed. The National Academy of Sciences, through the National Research Council's Committee on Radio Frequencies (CORF), and the National Radio Astronomy Observatory are concerned that operations in the 4.9 GHz band may interfere with adjacent band radio astronomy operations.[138] In support of its assertions, CORF has included an interference prediction calculation based on the recommendations in ITU-R P.1546 (P.1546) and the

[131] *See id.* at 3980-81 ¶¶ 60-61.

[132] *See id.* at 3980 ¶ 60.

[133] Motorola Comments at 16; PSWN Comments at 13.

[134] NYC Comments at 9; PSWN Comments at 13.

[135] *Second R&O and FNPRM*, 17 FCC Rcd at 3965 ¶ 18. We note that the 4950-4990 MHz band is also allocated to space research (passive) and Earth Exploration Satellite (passive) on a secondary basis. *See* 47. C.F.R. § 2.106 n. 5.339.

[136] *See* Table of Frequency Allocations, 47 C.F.R. § 2.106 n.US74.

[137] *Second R&O and FNPRM*, 17 FCC Rcd at 3981 ¶ 62.

[138] National Academy of Sciences' Committee on Radio Frequencies (CORF) Comments at 1; National Radio Astronomy Observatory Comments at 2.

limits set forth in ITU-R RA.769-1 (RA.769-1).[139] For the following reasons, we do not find an interference prediction based on P.1546 and RA.769-1 to be persuasive. First, the recommendations in P.1546 describe a method for point-to-area predictions for terrestrial services in the frequency range 30-3000 MHz, which does not encompass the subject band 4940-4990 MHz. Second, the predictions are not based on actual terrain data, which should be used for such calculations, especially at this frequency range, which depends on radio line-of-site for accurate path predictions. Third, many of the public safety applications will be low power mobile operations. They will also be utilizing antennas at or near ground level, and therefore, there will be limited cases where the public safety transmitter will be line-of-site with radio astronomy. Fourth, the interference calculations of RA.769-1 assume an interfering antenna 19 degrees from the mainbeam of the radio astronomy antenna at point which a typical radio astronomy antenna has a 0 dBi gain. We believe that while it is possible, it is unlikely that an unobstructed line-of-site condition within 19 degrees of the mainbeam of a radio astronomy antenna would occur due to the fact that the public safety antennas will be near ground level. Thus, it is unlikely that terrestrial-based operations in the 4.9 GHz band would reach radio astronomy receivers. Accordingly, we decline to place any restrictions on public safety operations to protect those radio astronomy sites contained in footnote US74. We will, however, require 4.9 GHz band licensees to protect radio astronomy observatories to the extent required in footnote US74. Furthermore, as discussed above, we will continue to prohibit aeronautical mobile operations absent a clear showing that such operations will not interfere with radio astronomy operations.[140]

F. Technical Rules for Mobile Equipment

1. Broadband Technologies

47. *Background.* Due to a number of proposals to set technical standards requiring a specific technology in the 4.9 GHz band, in the *Second R&O*, the Commission sought comment[141] on whether to require equipment manufactured for use in the 4.9 GHz band to meet widely contemplated, spectrally efficient broadband standards such as Institute of Electrical and Electronics Engineering standard 802.11a (IEEE 802.11a) and European Telecommunications Standardization Institute (ETSI) Broadband Radio Access Network (BRAN) High Performance Local Area Network number two (HiperLAN2).[142] Recognizing that certain regulatory goals could warrant the use of particular standards, including incident scene interoperability and the accommodation of the peak demand that occurs during multiple emergencies, the Commission asked commenters to address whether the specification of particular standards would promote such regulatory goals.[143]

48. *Discussion.* We decline to require any particular broadband technology for equipment in the 4.9 GHz band. While some commenters were supportive of the IEEE 802.11a standard because it is ideal for the mobile applications envisioned for the band,[144] at this time, we do not believe that the desirability of a particular standard is sufficient reason to impose such standard on licensees and manufacturers, or to

[139] *See* CORF Comments at 4-5.

[140] *See* paras. 12-13, *supra.*

[141] *See Second R&O and FNPRM*, 17 FCC Rcd at 3982 ¶ 65.

[142] The American National Standards Institute (ANSI) has not yet approved HiperLAN2.

[143] *Second R&O and FNPRM*, 17 FCC Rcd at 3981 ¶ 63.

[144] Atheros Comments at 3; NYC Comments at 11.

depart from our long standing goals of minimal regulation and licensee flexibility.[145] We note that notwithstanding their support for the 802.11a standard, commenters also urged that we adopt a flexible band plan that would accommodate other emerging broadband technologies.[146] However, the adoption of any particular standard could preclude newer technologies, and hence impose restrictions on users that would impede their ability to benefit from future equipment that enhances public safety operations. Moreover, inasmuch as this is a new band, consideration must be given to the possibility that the current visions for the band may change, especially considering the wide flexibility that users have been afforded for operations in the band.

49. We also disagree with Atheros that there would be sufficient interoperability advantages to imposing a standard.[147] That is, we believe that the mandatory cooperation among licensees will go a long way towards attaining adjacent and cross-jurisdiction interoperability. Further, notwithstanding the cooperation requirements for the band, public safety officials throughout the nation are already engaged in substantial efforts to plan and coordinate operations with nearby jurisdictions. Therefore, we believe that interoperability goals can be attained without imposing equipment standards on users and manufacturers, especially in light of the fact that such an imposition may actually serve to hinder the ability of public safety entities from utilizing emerging technologies in the band. Accordingly, no particular equipment technologies will be imposed on equipment manufactured for use in the 4.9 GHz band.

2. Power Limits

50. *Background.* In the *FNPRM*, commenters were asked to discuss whether the Commission should set power limits for mobile equipment in this band, and if so, what such limits should be.[148] The Commission sought comment on a Motorola proposal to set a 30 dBm (one watt) maximum transmitter power limit with a 20 dB maximum antenna gain, but also solicited other suggestions, and asked whether any power limit should be adopted.[149]

51. *Discussion.* Atheros concurs with Motorola's proposed one watt transmitter power limit, and 20 dB maximum antenna gain.[150] Motorola, however, now recommends a range of power limits from 20 dBm to 33 dBm, contingent on the bandwidth of the device, and limited by a spectral power density of 20 dBm per 1 MHz.[151] Motorola further recommends that the associated spectral power density be measured according to Part 15 measurement methods for U-NII devices.[152] Motorola also suggests an antenna gain limit of 9 dBi. [153]

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[145] *Second R&O and FNPRM*, 17 FCC Rcd at 3981 ¶ 63.

[146] APCO Comments at 7; NPSTC Comments at 5; PSWN Reply Comments at 6-7.

[147] Atheros Comments at 16.

[148] *Second R&O and FNPRM*, 17 FCC Rcd at 3982 ¶ 66.

[149] *Id*.

[150] Atheros Comments at 18.

[151] *See* Motorola Ex Parte Presentation, January 15, 2003.

[152] *See* Motorola Comments at 14.

[153] *See* Motorola Ex Parte Presentation at 3.

52. Motorola's power limit proposals are based on a spectral power density limit of 20 dBm per 1 MHz along with the antenna gain limits. This would allow 20 dBm (100 mW) for a 1 MHz signal and up to 33 dBm (2 watts) for a 20 MHz signal. We agree with Motorola that this sliding scale of power limits will both limit adjacent band interference by keeping the spectral power density of all users in the band relatively equivalent, and sufficient in-building penetration required by public safety users in some cases.[154] This is the case because many public safety commenters envision the use of wideband technologies such as 802.11a for use in PAN and vehicular area networks (VAN)[155] and incident scene situations which would utilize the full 20 MHz of aggregated spectrum.[156] For such uses, Motorola proposes a transmitter power output (TPO) limit of 33 dBm (2 watts), which would appear to provide a sufficient amount of power and the in-building penetration required. Therefore, we adopt Motorola's power limit proposals based on a spectral power density limit of 20 dBm per 1 MHz along with the antenna gain limits.

53. *Threshold Levels for Routine Environmental Evaluation*. Sections 2.1091 and 2.1093 of our rules list services and devices for which an environmental evaluation for RF exposure must be routinely performed.[157] DCCTO argues that power limits should be limited to values compatible with the RF exposure limits defined by the FCC to protect on-scene personnel.[158] We agree. Therefore, we will require that mobile and portable equipment for use in the 4940-4990 MHz frequency band be subject to the radiofrequency radiation exposure evaluation requirements of Sections 2.1091 and 2.1093 of our rules.

3. Emission Limits

54. In the *FNPRM*, the Commission asked commenters to address whether there were any technical standards that should be imposed on equipment operating in the 4.9 GHz band.[159] Upon consideration of this issue, we will require an out of band emissions mask on equipment manufactured for the 4.9 GHz band. We agree with Motorola that such a mask will improve the reliability and performance of distinct services such as WLAN, and PAN/VAN operating at different power levels in adjacent channels.[160] Some commenters have expressed an interest in a number of different uses for the band, including various video and data operations using differing technologies, data rates and video resolutions.[161] Consequently, we decline to adopt measurement procedures that are specific to any one

[154] See Motorola White Paper, dated July 31, 2001 at 23. Motorola states that a 1 watt maximum transmitter power is necessary to meet in-building coverage and reliability requirements.

[155] A vehicular area network is a wireless device that can form instant ad hoc networks without any wired network connectivity, typically over a short range. Such devices provide wireless, hands-free links between portable or mobile transceivers and numerous devices such as headsets, portable computing devices, video cameras, thermal imagers, sensors and 3D locators, often integrated into specialized helmets and suits, enabling very localized team and coverage around an officer or vehicle.

[156] *See* APCO Comments at 7; NYSOT Comments at 9; NYC Comments at 11; NPSTC Comments at 5.

[157] 47 C.F.R. §§ 2.1091 & 2.1093.

[158] DCCTO Comments at 7.

[159] *Second R&O and FNPRM*, 17 FCC Rcd at 3981 ¶ 63.

[160] *See* Motorola Comments at 13.

[161] *See* APCO Comments at 6; NYC Comments at 5-7.

particular technology. However, while we decline to adopt specific measurement procedures such as those that relate to Part 15 U-NII devices, it is important to note that equipment utilizing such technologies must be tested according to procedures acceptable to the Commission. In cases where relevant procedures have been defined by the FCC, these must be used. For example, the Commission recently released a *Public Notice* on an updated measurement procedure for U-NII devices.[162] In order to achieve compatibility of similar equipment between different manufacturers, it is important that similar measurement procedures, deemed acceptable to the Commission, be used for these technologies.

G. Technical Rules for Fixed Operations

55. *Background.* In the *FNPRM*, the Commission requested comment on technical limitations for fixed operations in the band.[163] It suggested an effective isotropic radiated power (EIRP) limit of 55 dBW limit for fixed operations, identical to the limit set for the 3700-4200 MHz and 5925-6425 MHz bands.[164] The Commission also asked questions regarding minimum path lengths, emission mask requirements and other technical limitations.[165]

56. *Discussion.* It is our intent in this proceeding to adopt service rules that promote both flexibility and compatibility. We agree with DCCTO that agencies will have different needs for fixed and/or mobile services.[166] Similarly, we believe that agencies will also have unique requirements within the fixed and mobile services. Therefore, with one partial exception, we decline to adopt fixed microwave service limits (based on Part 101 of our Rules) for fixed operations in the 4.9 GHz band that may not be compatible with limits on mobile equipment in the band. We feel it is more appropriate to require similar out of band restrictions regardless of the service to promote compatibility between the fixed and mobile services.

57. The one partial exception is the permitted power level. We agree with Atheros's proposal that similar power levels should be set for mobile and non point-to-point fixed uses, and that directional antennas should be required for fixed operations.[167] Therefore, rather than limiting fixed operations based on EIRP as the Commission proposed, we will apply the transmitter power limit that we adopted for mobile equipment[168] to fixed equipment as well. We believe that this will increase licensee flexibility, by permitting use of the same transmitter model for fixed and mobile operations. In order to avoid interference from fixed operations to mobile operations, we adopt a maximum antenna gain for point-to-point operations up to 26 dBi with no corresponding reduction in TPO for fixed operations, as proposed by Motorola.[169] This will allow the licensee to maximize power within their channel bandwidth and within the emission mask limitations of the channel. We believe that these limits will promote both flexibility and compatibility for the band. As discussed above, uses within a range of interference to other

[162] *See* n.71, *supra*.

[163] *Second R&O and FNPRM*, 17 FCC Rcd at 3982 ¶ 67.

[164] *See id.* at 3983 ¶ 68.

[165] *Id.*

[166] DCCTO Comments at 5-6.

[167] Atheros Comments at 10.

[168] *See* para. 52, *supra.*

[169] *See* Motorola Ex Parte Submission at 3.

licensees must be coordinated among licensees in advance. Furthermore, where a licensee is situated in an area where there are no overlapping licensees, we believe a licensee should be afforded flexibility to use higher power levels, especially if it has a greater need to employ fixed operations than mobile operations.

VI. PROCEDURAL MATTERS

A. Ex Parte Rules - Permit-But-Disclose Proceeding

58. This is a permit-but-disclose notice and comment rule making proceeding. *Ex parte* presentations are permitted, except during the Sunshine Agenda period, provided they are disclosed as provided in our rules.[170]

B. Regulatory Flexibility Act

59. The Regulatory Flexibility Act (RFA)[171] 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.[172] Accordingly, we have prepared a Final Regulatory Flexibility Analysis concerning the impact of the rule changes contained in the *Third R&O* on small entities. The Final Regulatory Flexibility Analysis is set forth in Appendix B.

C. Paperwork Reduction Act

60. This *Memorandum Opinion and Order and Third Report and Order* contains new or modified information collection(s) subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104-13. It will be submitted to the Office of Management and Budget (OMB) for review under Section 3507(d) of the PRA. OMB, the general public and other Federal agencies are invited to comment on the new or modified collection(s) contained in this proceeding.

D. Ordering Clauses

61. Accordingly, IT IS ORDERED that, pursuant to Sections 4(i), 303(r), and 403 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 303(r), 403, this *Report and Order* IS HEREBY ADOPTED.

62. IT IS FURTHER ORDERED that Parts 2 and 90 of the Commission's rules ARE AMENDED as specified in Appendix A and such rule amendments shall be effective 30 days after publication in the Federal Register.

63. IT IS FURTHER ORDERED, that the Chief, Wireless Telecommunications Bureau and the Chief, Office of Engineering and Technology, ARE GRANTED DELEGATED AUTHORITY to adjudicate waiver requests to utilize the 4.9 GHz band for aeronautical mobile operations.

64. IT IS FURTHER ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, SHALL SEND a copy of this *Memorandum Opinion and Order*

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[170] *See generally* 47 C.F.R. §§ 1.1202, 1.1203, 1.1206(a).

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

[172] 5 U.S.C. § 605(b).

and Third Report and Order, including the Final Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration.

F. Further Information

65. For further information, contact Tim Maguire, tmaguire@fcc.gov, or Genevieve Augustin, gaugusti@fcc.gov, Public Safety and Private Wireless Division, Wireless Telecommunications Bureau, (202) 418-0680, or TTY (202) 418-7233.

66. Alternative formats (computer diskette, large print, audiocassette and Braille) are available to persons with disabilities by contacting Brian Millin at (202) 418-7426, TTY (202) 418-7365, or at bmillin@fcc.gov. This *Memorandum Opinion and Order and Third Report and Order* can also be downloaded at: http://www.fcc.gov/dtf/.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary

APPENDIX A: FINAL RULES

Parts 2 and 90 of Title 47 of the Code of Federal Regulations are amended as follows:

I. PART 2 – FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

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

AUTHORITY: 47 U.S.C. 154, 302a, 303, and 336, unless otherwise noted.

2. Section 2.103 is amended by revising paragraph (b) to read as follows:

* * * * *

(b) Government stations may be authorized to use channels in the 764-776 MHz, 794-806 MHz and 4940-4990 MHz public safety bands with non-Government entities if the Commission finds such use necessary; where:

* * * * *

3. Section 2.1091 is amended by revising paragraph (c) as follows:

* * * * *

(c) Mobile devices that operate in the Cellular Radiotelephone Service, the Personal Communications Services, the Satellite Communications Services, the General Wireless Communications Service, the Wireless Communications Service, the Maritime Services, the 4.9 GHz Band Service and the Specialized Mobile Radio Service authorized under subpart H of part 22 of this chapter, part 24 of this chapter, part 25 of this chapter, part 26 of this chapter, part 27 of this chapter, part 80 of this chapter (ship earth stations devices only) and part 90 of this chapter are subject to routine environmental evaluation for RF exposure prior to equipment authorization or use if they operate at frequencies of 1.5 GHz or below and their effective radiated power (ERP) is 1.5 watts or more, or if they operate at frequencies above 1.5 GHz and their ERP is 3 watts or more. Unlicensed personal communications service devices, unlicensed millimeter wave devices and unlicensed NII devices authorized under § 15.253, § 15.255, and subparts D and E of part 15 of this chapter are also subject to routine environmental evaluation for RF exposure prior to equipment authorization or use if their ERP is 3 watts or more or if they meet the definition of a portable device as specified in § 2.1093 (b) requiring evaluation under the provisions of that section. All other mobile and unlicensed transmitting devices are categorically excluded from routine environmental evaluation for RF exposure prior to equipment authorization or use, except as specified in §§ 1.1307(c) and 1.1307(d) of this chapter. Applications for equipment authorization of mobile and unlicensed transmitting devices subject to routine environmental evaluation must contain a statement confirming compliance with the limits specified in paragraph (d) of this section as part of their application. Technical information showing the basis for this statement must be submitted to the Commission upon request.

* * * * *

4. Section 2.1093 is amended by revising paragraph (c) as follows:

* * * * *

(c) Portable devices that operate in the Cellular Radiotelephone Service, the Personal

Communications Service (PCS), the Satellite Communications Services, the General Wireless Communications Service, the Wireless Communications Service, the Maritime Services, the Specialized Mobile Radio Service, the 4.9 GHz Band Service, the Wireless Medical Telemetry Service (WMTS) and the Medical Implant Communications Service (MICS), authorized under subpart H of part 22 of this chapter, part 24 of this chapter, part 25 of this chapter, part 26 of this chapter, part 27 of this chapter, part 80 of this chapter (ship earth station devices only), part 90 of this chapter, subparts H and I of part 95, and unlicensed personal communication service, unlicensed NII devices and millimeter wave devices authorized under subparts D and E, § 15.253 and § 15.255 of part 15 of this chapter are subject to routine environmental evaluation for RF exposure prior to equipment authorization or use. All other portable transmitting devices are categorically excluded from routine environmental evaluation for RF exposure prior to equipment authorization or use, except as specified in §§ 1.1307(c) and 1.1307(d) of this chapter. Applications for equipment authorization of portable transmitting devices subject to routine environmental evaluation must contain a statement confirming compliance with the limits specified in paragraph (d) of this section as part of their application. Technical information showing the basis for this statement must be submitted to the Commission upon request.

* * * * *

II. PART 90 – PRIVATE LAND MOBILE RADIO SERVICES

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

AUTHORITY: Sections 4(i), 11, 303(g), 303(r) and 332(c)(7) of the Communications Act of 1934, as amended, 47 U.S.C. 154(i), 161, 303(g), 303(r), 332(c)(7).

6. Section 90.20 is amended by inserting the following in the table at paragraph (c)(3) before the entry referencing the 10,550 to 10,680 band, and adding a new paragraph (d)(85), to read as follows:

* * * * *

(c) * * * * *

(3) *Frequencies.* * * *

Frequency or band	Class of station(s)	Limitations	Coordinator
* * * * *	* * * * *	* * * * *	* * * * *
4940 to 4990	Fixed, base or mobile	85	* * * * *
* * * * *	* * * * *	* * * * *	

* * * * *

(d) * * * * *

(85) Subpart Y of this part contains rules for assignment of frequencies in the 4940-4990 MHz band.

* * * * *

7. Section 90.137 is amended by adding a new paragraph (c) to read as follows:

§90.137 Applications for operation at temporary locations.

* * * * *

(c) The provisions of this section do not apply to the 4940-4990 MHz band.

* * * * *

8. Section 90.155 is amended by revising paragraph (a) to read as follows:

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

(a) All stations authorized under this part, except as provided in §§ 90.629, 90.631(f), 90.665, 90.685 and 90.1209 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.

* * * * *

9. Section 90.175 is amended by revising paragraph (i) and adding a new paragraph (j)(17) to read as follows:

§ 90.175 Frequency coordination requirements.

* * * * *

(i) Applications for facilities near the Canadian border north of line A or east of line C in Alaska may require coordination with the Canadian government. See §1.928 of this Chapter.

(j) * * * * *

(17) Applications for frequencies in the 4940-4990 MHz band.

* * * * *

10. Section 90.205 is amended by redesignating paragraphs (o) through (q) as (p), (q), and (r) respectively, and adding a new paragraph (o) to read as follows:

§ 90.205 Power and antenna height limits.

* * * * *

(o) *4940-4990 MHz.* Limitations on power are specified in § 90.1215 of this part.

* * * * *

11. Section 90.210 is amended by adding an entry to the table in the undesignated paragraph, by redesignating paragraphs (l) and (m) and by adding a new paragraph (l) to read as follows:

* * * * *

§ 90.210 Emission masks.

Frequency band (MHz)	Mask for equipment with audio low pass filter	Mask for equipment without audio low pass filter
* * * * *	* * * * *	* * * * *
4940-4990 MHz	L……	L
* * * * *	* * * * *	* * * * *

* * * * *

(l) *Emission Mask L*. For transmitters operating in the 4940-4990 MHz frequency band, any emission must be attenuated below the output power of the transmitter as follows:

(1) On any frequency removed from the assigned frequency by more than 40 percent but less than 75 percent of the authorized bandwidth: At least 28 dB.

(2) On any frequency removed from the assigned frequency by more than 75 percent but less than 125 percent of the authorized bandwidth: At least 37 dB.

(3) On any frequency removed from the assigned frequency by more than 125 percent but less than 150 percent of the authorized bandwidth: At least 41 dB.

(4) On any frequency removed from the assigned frequency by more than 150 percent of the authorized bandwidth: At least 53 dB.

(5) On any frequency outside the channel bandwidth, the power spectral density of the device must meet the attenuation in the mask above or -53 dBm/MHz, whichever is the lesser attenuation.

(6) The zero dB reference is measured relative to the highest average power of the fundamental emission measured across the designated channel bandwidth using a resolution bandwidth of at least one percent of the occupied bandwidth of the fundamental emission. Emission levels are also based on the use of measurement instrumentation employing a resolution bandwidth of at least one percent of the occupied bandwidth.

* * * * *

12. A new Subpart Y is added to read as follows:

Subpart Y – Regulations Governing Licensing and Use of Frequencies in the 4940-4990 MHz Band.

§ 90.1201 Scope.

This subpart sets out the regulations governing use of the 4940-4990 MHz (4.9 GHz) band. It includes eligibility requirements, and specific operational and technical standards for stations licensed in this band. The rules in this subpart are to be read in conjunction with the applicable requirements

contained elsewhere in this part; however, in case of conflict, the provisions of this subpart shall govern with respect to licensing and operation in this band.

§ 90.1203 Eligibility.

(a) Entities providing public safety services as defined under section 90.523 of this part are eligible to hold a Commission license for systems operating in the 4940-4990 MHz band. All of the requirements and conditions set forth in that section also govern authorizations in the 4940-4990 MHz band.

(b) 4.9 GHz band licensees may enter into sharing agreements or other arrangements for use of the spectrum with entities that do not meet these eligibility requirements. However, all applications in the band are limited to operations in support of public safety.

§ 90.1205 Permissible operations.

(a) Unattended and continuous operation is permitted.

(b) Voice, data and video operations are permitted.

(c) Aeronautical mobile operations are prohibited.

§ 90.1207 Licensing.

(a) A 4940-4990 MHz band license gives the licensee authority to operate on any authorized channel in this band within its licensed area of operation. See § 90.1213 of this subpart. A 4940-4990 MHz band license will be issued for 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.

(b) Subject to § 90.1209 of this subpart, a 4940-4990 MHz band license gives the licensee authority to construct and operate any number of base stations anywhere within the area authorized by the license, except as follows:

(1) A station is required to be individually licensed if:
(i) International agreements require coordination;
(ii) Submission of an environmental assessment is required under § 1.1307 of this chapter; or
(iii) The station would affect the radio quiet zones under § 1.924 of this chapter.
(2) Any antenna structure that requires notification to the Federal Aviation Administration (FAA) must be registered with the Commission prior to construction under § 17.4 of this Chapter.

(c) A 4940-4990 MHz band license gives the licensee authority to operate mobile units (including portable and handheld units) and operate temporary (1 year or less) fixed stations anywhere within the area authorized by the license. Such licensees may operate mobile units and/or temporary fixed stations outside their authorized area to assist public safety operations with the permission of the jurisdiction in which the radio station is to be operated. Temporary fixed stations are subject to the requirements of paragraph (b) of this section.

(d) A 4940-4990 MHz band license does not give the licensee authority to operate permanent fixed point-to-point stations. Licensees choosing to operate such fixed stations must license them individually on a site-by-site basis. Such fixed operation will be authorized only on a secondary, non-interference basis to base, mobile and temporary fixed operations.

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

(a) Channels in this band are available on a shared basis only and will not be assigned for the exclusive use of any licensee.

(b) All licensees shall cooperate in the selection and use of channels in order to reduce interference and make the most effective use of the authorized facilities. Licensees of stations suffering or causing harmful interference are expected to cooperate and resolve this problem by mutually satisfactory arrangements. If licensees are unable to do so, the Commission may impose restrictions including specifying the transmitter power, antenna height, or area or hours of operation of the stations concerned. Further, the Commission may prohibit the use of any 4.9 GHz channel under a system license at a given geographical location when, in the judgment of the Commission, its use in that location is not in the public interest.

(c) Licensees will make every practical effort to protect radio astronomy operations as specified in Section 2.106, footnote US311.

(d) There is no time limit for which base and temporary fixed stations authorized under a 4940-4990 MHz band license must be placed in operation. Fixed point-to-point stations which are licensed on a site-by-site basis must be placed in operation within 18 months of the grant date or the authorization for that station cancels automatically.

§ 90.1211 Regional Plan.

(a) To facilitate the shared use of the 4.9 GHz band, each region may submit a plan on guidelines to be used for sharing the spectrum within the region. Any such plan must be submitted to the Commission within 12 months of the effective date of the rules.

(b) Such plans must incorporate the following common elements:

(1) Identification of the document as a plan for sharing the 4.9 GHz band with the region specified along with the names, business addresses, business telephone numbers and organizational affiliations of the chairperson(s) and all members of the planning committee.

(2) A summary of the major elements of the plan and an explanation of how all eligible entities within the region were given an opportunity to participate in the planning process and to have their positions heard and considered fairly.

(3) An explanation of how the plan was coordinated with adjacent regions.

(4) A description of the coordination procedures for both temporary fixed and mobile operations, including but not limited to, mechanisms for incident management protocols, interference avoidance and interoperability.

(c) Regional plans may be modified by submitting a written request, signed by the regional planning committee, to the Chief, Wireless Telecommunications Bureau. The request must contain the full text of the modification, and a certification that all eligible entities had a chance to participate in discussions concerning the modification and that any changes have been coordinated with adjacent regions.

§ 90.1213 Band plan.

The following channel center frequencies are permitted to be aggregated for channel bandwidths

of 5, 10, 15 or 20 MHz. Channel numbers 1-5 and 15-19 are 1 MHz channels and channels numbers 6-14 are 5 MHz channels.

Center Frequency (MHz)	Channel Nos.
4940.5	1
4941.5	2
4942.5	3
4943.5	4
4944.5	5
4947.5	6
4952.5	7
4957.5	8
4962.5	9
4967.5	10
4972.5	11
4977.5	12
4982.5	13
4985.5	14
4986.5	15
4987.5	16
4988.5	17
4989.5	18

§ 90.1215 Power limits.

The transmitting power of stations operating in the 4940-4990 MHz band must not exceed the maximum limits in this section.

(a) The peak transmit power should not exceed:

Channel Bandwidth (MHz)	Peak Transmitter Power (dBm)
1	20
5	27
10	30
15	31.8
20	33

Devices are also limited to a peak power spectral density of 20 dBm per 1 MHz. Devices using channel bandwidths other than those listed above are permitted; however, they are limited to a peak power spectral density of 20 dBm/MHz. If transmitting antennas of directional gain greater than 9 dBi are used, both the peak transmit power and the peak power spectral density should be reduced by the amount in decibels that the directional gain of the antenna exceeds 9 dBi. However, point-to-point or point-to-multipoint operation (both fixed and temporary-fixed rapid deployment) may employ transmitting antennas with directional gain up to 26 dBi without any corresponding reduction in the transmitter power or spectral density. Corresponding reduction in the peak transmit power and peak power spectral density should be the amount in decibels that the directional gain of the antenna exceeds 26 dBi.

(b) The peak transmit power is measured as a conducted emission over any interval of continuous transmission calibrated in terms of an rms-equivalent voltage. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. The measurement results shall be properly adjusted for any instrument limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, etc., so as to obtain a true peak measurement conforming to the definitions in this paragraph for the emission in question.

(c) The peak power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A resolution bandwidth less than the measurement bandwidth can be used, provided that the measured power is integrated to show total power over the measurement bandwidth. If the resolution bandwidth is approximately equal to the measurement bandwidth, and much less than the emission bandwidth of the equipment under test, the measured results shall be corrected to account for any difference between the resolution bandwidth of the test instrument and its actual noise bandwidth.

§ 90.1217 RF Hazards.

Licensees and manufacturers are subject to the radiofrequency radiation exposure requirements specified in § 1.1307(b), § 2.1091 and § 2.1093 of this chapter, as appropriate. Applications for equipment authorization of mobile or portable devices operating under this section must contain a statement confirming compliance with these requirements for both fundamental emissions and unwanted emissions. Technical information showing the basis for this statement must be submitted to the Commission upon request.

APPENDIX B: FINAL REGULATORY FLEXIBILITY ANALYSIS

1. As required by the Regulatory Flexibility Act (RFA),[173] an Initial Regulatory Flexibility Analysis (IRFA) was incorporated in the *Further Notice of Proposed Rule Making* (*Further Notice*).[174] The Commission sought written public comment on the proposals in the *Further Notice*, including comment on the IRFA. No comments were submitted specifically in response to the IRFA; we nonetheless discuss certain general comments below. This present Final Regulatory Flexibility Analysis (FRFA) conforms to the RFA.[175]

Need for, and Objectives of, the *Report and Order*:

2. In this *Memorandum Opinion and Order and Third Report and Order* (*Third Report and Order*), we adopt eligibility and service rules for the licensing and operation of fixed and mobile services in the 4.9 GHz band pursuant to the Omnibus Budget Reconciliation Act.[176] These rules provide 4.9 GHz band eligibles with maximum flexibility to employ a variety of new broadband applications such as high-speed digital technologies, wireless local area networks for incident scene management, dispatch operations and vehicular/personal communications. Additionally, public safety entities will be permitted to employ "hot spot" operations, temporary fixed links, and traditional backbone microwave operations in the band. The rules we adopt today ensure that public safety entities will enjoy the greatest possibility of unhindered use of this spectrum while fostering partnership opportunities with critical infrastructure and commercial entities and will fulfill our obligations as mandated by Congress to assign this spectrum for non-Government use.

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

3. No comments were submitted specifically in response to the IRFA. In general comments, however, some commenters expressed concern with our proposals to limit eligibility in the 4.9 GHz band to traditional public safety entities as defined by section 337(f) of the Communications Act.[177] For example, the Association of American Railroads urges us to adopt a definition of public safety services, pursuant to section 309(j)(2) of the Communications Act, that would allow critical infrastructure entities (CIEs) such as railroads and utility companies to acquire licenses in the 4.9 GHz band.[178] Although under the rules we adopt today, CIEs are not eligible to hold licenses in this band, we have considered the effect of these rule changes on small entities and considered other alternatives. In particular, we note that CIEs will have access to this spectrum through sharing agreements with public safety licensees. We believe that this item strikes an appropriate balance between competing spectrum needs and expect that our

[173] *See* 5 U.S.C. § 603. The RFA, *see* 5 U.S.C. § § 601-612, has been amended by the Contract With America Advancement Act of 1996, Pub. L. No. 104-121, 110 Stat. 847 (1996) (CWAAA). Title II of the CWAAA is the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA).

[174] The 4.9 GHz Band Transferred from Federal Government Use, *Second Report and Order and Further Notice of Proposed Rulemaking,* WT Docket No. 00-32, 17 FCC Rcd 3955, 3993 (Appendix C) (2002).

[175] *See* 5 U.S.C. § 604.

[176] Omnibus Budget Reconciliation Act of 1993, Pub. L. No. 103-66, 107 Stat. 312.

[177] *See MO&O and Third R&O,* sec. V(A), *supra.*

[178] Association of American Railroads Comments at 3.

actions will mostly benefit all entities subject to these rule changes, including small entities.

Description and Estimate of the Number of Small Entities To Which the Rules Will Apply:

4. The RFA directs agencies to provide a description of, and where feasible, an estimate of the number of small entities that may be affected by the proposed rules, if adopted.[179] The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction."[180] In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act.[181] 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).[182]

5. Nationwide, as of 1992, there were approximately 275,801 small organizations.[183] "Small governmental jurisdiction" generally means "governments of cities, counties, towns, townships, villages, school districts, or special districts, with a population of less than 50,000."[184] As of 1992, there were approximately 85,006 such jurisdictions in the United States.[185] This number includes 38,978 counties, cities, and towns; of these, 37,566, or ninety-six percent, have populations of fewer than 50,000.[186] The Census Bureau estimates that this ratio is approximately accurate for all governmental entities. Thus, of the 85,006 governmental entities, we estimate that 81,600 (ninety-one percent) are small entities.

6. The rules we adopt today will affect users of public safety radio services. These rules may also affect manufacturers of radio communications equipment. An analysis of the number of small businesses that may be affected follows. We also note that according to SBA data, there are approximately 4.44 million small businesses nationwide.

7. *Small Businesses Sharing Spectrum with Public Safety Radio Services and Governmental Entities*. As a general matter, Public Safety Radio Services include police, fire, local government, forestry

[179] 5 U.S.C. § 603(b)(3).

[180] 5 U.S.C. § 601(6).

[181] 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."

[182] 15 U.S.C. § 632.

[183] 1992 Economic Census, U.S. Bureau of the Census, Table 6 (special tabulation of data under contract to Office of Advocacy of the U.S. Small Business Administration).

[184] 5 U.S.C. § 601(5).

[185] U.S. Department of Commerce, Bureau of the Census, 1992 Census of Governments.

[186] *Id.*

conservation, highway maintenance, and emergency medical services.[187] Non-Federal governmental entities, as well as certain private businesses having sharing agreements with governmental entities, are potential licensees for these services in this proceeding. Neither the Commission nor the SBA has developed a definition of small businesses directed specifically toward the public service work at issue. Therefore, the applicable definition of small business is the definition under the SBA rules applicable to Cellular and other Wireless Telecommunications. This provides that a small business is a radiotelephone company employing no more than 1,500 persons.[188]

8. *Equipment Manufacturers*. We anticipate that at least six radio equipment manufacturers will be affected by our decisions in this proceeding. According to SBA regulations, a Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing businesses must have 750 or fewer employees in order to qualify as a small business concern.[189]

Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements:

9. Applicants for licenses to provide terrestrial fixed and mobile services in the 4.9 GHz band must submit license applications through the Universal Licensing System using FCC Form 601, and follow the service rules at 47 C.F.R. Part 90.[190]

Steps Taken to Minimize Significant Economic Impact on Small Entities, and Significant Alternatives Considered:

10. The RFA requires an agency to describe any significant 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 small entities; (3) the use of performance, rather than design standards; and (4) an exemption from coverage of the rule, or any part thereof, for small entities.[191]

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[187] *See* Subparts A and B of Part 90 of the Commission's Rules, 47 C.F.R. §§ 90.1-90.22. Police licensees include 26,608 licensees that serve state, county, and municipal enforcement through telephony (voice), telegraphy (code), and teletype and facsimile (printed material). Fire licensees include 22,677 licensees comprised of private volunteer or professional fire companies, as well as units under governmental control. Public Safety Radio Pool licensees also include 40,512 licensees that are state, county, or municipal entities that use radio for official purposes. There are also 7,325 forestry service licensees comprised of licensees from state departments of conservation and private forest organizations that set up communications networks among fire lookout towers and ground crews. The 9,480 state and local governments are highway maintenance licensees that provide emergency and routine communications to aid other public safety services to keep main roads safe for vehicular traffic. Emergency medical licensees (1,460) use these channels for emergency medical service communications related to the delivery of emergency medical treatment. Another 19,478 licensees include medical services, rescue organizations, veterinarians, handicapped persons, disaster relief organizations, school buses, beach patrols, establishments in isolated areas, communications standby facilities, and emergency repair of public communications facilities.

[188] 13 C.F.R. 121.201, NAICS code 513322.

[189] 13 C.F.R. § 121.201, NAICS code 334220.

[190] 47 C.F.R. § 1.913(a)(1); *see MO&O and Third R&O,* Appendix A, *supra.*

[191] *See* 5 U.S.C. § 603(c).

11. Regarding our decision to limit eligibility in the 4.9 GHz band to traditional public safety entities, *see* paras. 16-21, *supra*, we realize that certain commercial and critical infrastructure small business entities that might have wished to operate in this newly available spectrum may be adversely affected, in that they will not be able to obtain a license to operate in this band. This concern is mitigated, however, by the fact that we will allow public safety entities to enter into sharing agreements with entities performing operations in support of public safety. Moreover, we believe that in this instance, there is a compelling need for spectrum dedicated to public safety operations and that our approach here will ensure that such operations are not hampered by excessive frequency congestion. An alternative would be to expand the definition of public safety eligibles and/or to allow commercial use of the subject band; however, this would undermine our intention to promote public safety service in this band.

12. Regarding our decision to license the 4.9 GHz band via a jurisdictional licensing scheme, *see* paras. 27-31, *supra*, we do not believe that there will be any significant adverse impact on small entities. In fact, this approach will give public safety entities which are considered small entities under the RFA the ability to obtain licenses for the entire 50 MHz of spectrum in this band and to choose the types of operations that best suit their individual needs. An alternative would be to license this spectrum on a state-wide basis or to require the use of some type of formal frequency coordination committee. We do not believe, however, that frequency coordination would benefit licensees in all parts of the country, and state-wide licenses would not give smaller, local jurisdictions control over what types of operations might best suit their individual needs.

13. Regarding our decision to allow both fixed and mobile use, as well as point-to-point microwave operations on a secondary basis in the 4.9 GHz band, *see* paras. 33-36, *supra*, we do not anticipate any adverse affect on small entities. Instead, our approach here should benefit public safety entities by allowing greater flexibility in meeting each licensee's particular operational needs.

14. Regarding our decision to implement a frequency utilization plan in the 4.9 GHz band consisting of one and five MHz channels, *see* paras. 38-42, *supra*, we do not anticipate any adverse affect on small entities. In the event that public safety entities determine that greater channel bandwidths are needed, licensees may aggregate their channels.

15. Regarding our decision declining to require use of a particular technology for equipment in the 4.9 GHz band, *see* paras. 48-49, *supra*, we do not anticipate any adverse affect on small entities. We believe that the imposition of specific technology could impede the utilization of emerging technologies in the band and that greater flexibility is consequently warranted.

16. Our decisions regarding fixed and mobile technical standards, *see* paras. 56-57, *supra*, should not result in any adverse impact to small entities. Alternatively, we could have adopted higher or lower power and emissions limits, but we believe that the rules we adopt today strike an appropriate balance between offering licensees maximum flexibility in their utilization of the 4.9 GHz band and minimizing the risk of harmful interference.

Report to Congress:

The Commission will send a copy of this *MO&O and Third R&O*, including this FRFA, in a report to be

sent to Congress pursuant to the Congressional Review Act.[192] In addition, the Commission will send a copy of this *MO&O and Third R&O*, including this FRFA, to the Chief Counsel for Advocacy of the Small Business Administration. A copy of this *MO&O and Third R&O* and FRFA (or summaries thereof) will also be published in the *Federal Register*.[193]

[192] *See generally,* 5 U.S.C. § 801 (a)(1)(A).

[193] *See* 5 U.S.C. § 604(b).

APPENDIX C: GEOGRAPHIC AREAS WHERE DEPARTMENT OF DEFENSE COOPERATIVE ENGAGEMENT CAPABILITY (CEC) WILL BE USED FOR TRAINING IN ITS HIGH POWER, FULL BANDWIDTH MODE

CEC TRAINING AREA 1

Training Area 1 supports Atlantic Coast Exercises, and extends inland from, seaward from, and along the low water mark of a portion of the Mid-Atlantic and South-Atlantic coastline, and includes separate areas in Maryland (MD) and Virginia (VA).

INLAND PORTION: The inland portion of Training Area 1 extends westward from the low water mark of the Atlantic Ocean, and includes all of the area contained within the boundaries of the following counties and within the other identified areas in the indicated state:

Delaware: Sussex County
Maryland: Wicomico, Somerset, and Worcester Counties
Virginia: Accomack and Northampton Counties; all of the area east of the eastern most boundaries of Isle of Wight and Southampton Counties (includes the cities of Suffolk, Portsmouth, Chesapeake, Virginia Beach, Norfolk, and others)
North Carolina (NC): Currituck, Camden, Pasquotank, Perquimans, Tyrell, Dare, Hyde, Craven, Pamlico, Jones, Carteret, Onslow, Pender, New Hanover, and Brunswick Counties

Exercises within the above boundaries of the inland portion of Training Area 1 will include aircraft operating at altitudes to 30 thousand feet (kft), mobile ground based equipment, and permanent ground based equipment. Aircraft and mobile ground based equipment can be positioned anywhere in the defined area. Permanent ground based terminals are now located at Wallops Island, VA; Eastville, VA; and Dam Neck Fleet Combat Training Center-Atlantic, VA. Other permanent ground based terminals will be added within the above defined area as required. Other specific sites within the above defined area include, but are not limited to: Norfolk Naval Base, VA; Norfolk Naval Air Station (NAS), VA; Little Creek Naval Amphibious Base, VA; Oceana NAS, VA; Marine Corps Bogue Field, NC; and Cherry Point Marine Corps Air Station (MCAS), NC.

Permanent ground based terminals not within the above defined area operate within the legal boundaries of the Naval Surface Warfare Center at Dahlgren, VA; and the Patuxent River Naval Air Warfare Center, MD. A permanent ground based terminal also operates within a 5 nm radius of Reedville, VA.

SEAWARD PORTION: The seaward portion of Training Area 1 is bounded on the north by the line that extends eastward from the low water mark of the Atlantic Ocean along 38.914055 north decimal degrees of latitude. The western boundary of the seaward portion of Training Area 1 begins at the intersection of the low water mark of the Atlantic Ocean with 38.914055 north decimal degrees of latitude, extends generally southward and southwestward along the low water mark of the Atlantic Ocean to the intersection of the low water mark with 78.660000 west decimal degrees of longitude, and then continues southward along 78.660000 west decimal degrees of longitude. There is no eastern or southern boundary of the seaward portion of Training Area 1. Exercises in the seaward portion of Training Area 1 will include aircraft operating at altitudes to 30 kft and surface ships. These assets can be positioned anywhere within the defined area.

CEC TRAINING AREA 2

Training Area 2 supports Gulf Coast exercises. Training Area 2 extends inland from, seaward from, and along the low water mark of a portion of the Florida (FL), Alabama (AL), and Mississippi (MS) Gulf coastlines, and includes a separate area near Huntsville, AL and a separate area encompassing Pinellas County, FL.

INLAND PORTION: The inland portion of Training Area 2 extends northward from the low water mark of the Gulf of Mexico, and includes all of the areas contained within the boundaries of the following counties in the indicated state:

Florida: Bay, Washington, Holmes, Walton, Okaloosa, Santa Rosa, and Escambia
Alabama: Baldwin and Mobile
Mississippi: George, Pearl River, Stone, Jackson, Harrison, and Hancock

Exercises within the boundaries of the inland portion of Training Area 2 identified above will include aircraft operating at altitudes to 30 kft, mobile ground based equipment, and permanent ground based equipment. Aircraft and mobile ground based equipment can be positioned anywhere within the area defined above. Permanent ground based terminals will be added within the above defined area as required. Specific sites within the area identified above include, but are not limited to, Pensacola NAS, FL; Eglin Air Force Base (AFB), FL; and Tyndall AFB, FL.

Redstone Arsenal, located in Madison County, AL is included in Training Area 2. Mobile and ground based equipment will be located anywhere within the legal boundaries of Redstone Arsenal. Aircraft operating in the vicinity of Redstone Arsenal will maintain emissions at the lower defined power level and reduced bandwidth.

Pinellas County, FL is included in Training Area 2. Mobile and ground based equipment will be located anywhere within the legal boundaries of Pinellas County. Permanent ground based terminals are now located in the St. Petersburg, FL metropolitan area. Aircraft operating above Pinellas County, FL will maintain emissions at the lower defined power level and reduced bandwidth.

SEAWARD PORTION: The seaward portion of Training Area 2 is bounded on the east by the line that extends southward from the low water mark of the Gulf of Mexico along 85.400000 west decimal degrees of longitude. The northern boundary of the seaward portion of Training Area 2 begins at the intersection of the low water mark of the Gulf of Mexico with 85.400000 west decimal degrees of longitude, extends generally westward along the low water mark of the Gulf of Mexico to the intersection of the low water mark with 89.350000 west decimal degrees of longitude. The seaward portion of Training Area 2 is bounded on the west by the line that extends due southeast from the intersection of low water mark of the Gulf of Mexico with 89.350000 west decimal degrees of longitude. There is no southern boundary of the seaward portion of Training Area 2. Exercises in the seaward portion of Training Area 2 will include aircraft operating at altitudes to 30 kft and surface ships. These assets can be positioned anywhere within the defined area.

CEC TRAINING AREA 3

Training Area 3 supports Pacific Coast Exercises, and extends inland from, seaward from, and along the low water mark of a portion of the California (CA) mid and southern Pacific coastline.

INLAND PORTION: The inland portion of Training Area 3 extends eastward from the low water mark of the Pacific Ocean, and includes all of the land areas contained within the boundaries of Ventura and Santa

Barbara Counties in the state of California.

Exercises within the boundaries of the inland portion of Training Area 3 will include aircraft operating at altitudes to 30 kft, mobile ground based equipment, and permanent ground based equipment. Aircraft and mobile ground based equipment can be positioned anywhere within the area identified above. Permanent ground based terminals will be added within the area identified above as required. Specific sites within the identified area include, but are not limited to, Vandenberg AFB, CA; Point Magu NAS, CA; and Naval Surface Warfare Center at Port Hueneme, CA.

SEAWARD PORTION: The seaward portion of Training Area 3 is bounded on the north by the line that extends westward from the low water mark of the Pacific Ocean along 34.960000 north decimal degrees of latitude. The eastern boundary of the seaward portion of Training Area 3 begins at the intersection of the low water mark of the Pacific Ocean with 34.960000 north decimal degrees of latitude, extends generally southward and eastward along the low water mark of the Pacific Ocean to the intersection of the low water mark with 119.000000 west decimal degrees of longitude, then continues south along 119.000000 west decimal degrees of longitude. There is no southern or western boundary of the seaward portion of Training Area 3. Exercises in the seaward portion of Training Area 3 will include aircraft operating at altitudes to 30 kft and surface ships. These assets can be positioned anywhere within the defined area.

CEC TRAINING AREA 4

Training Area 4 supports Pacific Coast Exercises, and extends inland from, seaward from, and along the low water mark of a portion of the southern California Pacific coastline.

INLAND PORTION: The inland portion of Training Area 4 extends eastward from the low water mark of the Pacific Ocean, and includes all of the land areas contained within the boundaries of San Diego County in the state of California. Exercises within the boundaries of the inland portion of Training Area 4 will include aircraft operating at altitudes to 30 kft, mobile ground based equipment, and permanent ground based equipment. Aircraft and mobile ground based equipment can be positioned anywhere within the area identified above. Permanent ground based terminals will be added within the area defined above as required. Specific sites within the area defined above include, but are not limited to, Camp Pendleton Marine Corps Base, CA; Miramar NAS, CA; Coronado Naval Amphibious Base, CA; U.S. Naval Air Station North Island, CA; and at the Naval facilities located on the Point Loma, CA peninsula.

SEAWARD PORTION: The seaward portion of Training Area 4 is bounded on the north by the line that extends westward from the low water mark of the Pacific Ocean along 33.450000 north decimal degrees of latitude. The eastern boundary of the seaward portion of Training Area 4 begins at the intersection of the low water mark of the Pacific Ocean with 33.450000 north decimal degrees of latitude, extends generally southward and eastward along the low water mark of the Pacific Ocean to the intersection of the low water mark with 32.600000 north decimal degrees of latitude. The seaward portion of Training Area 4 is bounded on the south by the line that extends westward from the low water mark of the Pacific Ocean along 32.600000 north decimal degrees of latitude. There is no western boundary of the seaward portion of Training Area 4. Exercises in the seaward portion of Training Area 4 will include aircraft operating at altitudes to 30 kft and surface ships. These assets can be positioned anywhere within the defined area.

CEC TRAINING AREA 5

Training Area 5 includes all areas within the boundaries of the White Sands Missile Range, New Mexico and the Fort Bliss Military Reservation, Texas and New Mexico, to support the Joint Chiefs of Staff Roving Sands Exercise. The exercises will include aircraft flying at altitudes to 30 kft, mobile ground based equipment, and permanent ground based equipment. The assets can be positioned anywhere within the identified areas.

CEC TRAINING AREA 6

Training Area 6 includes the China Lake Naval Weapons Center, CA; Fort Irwin Military Reservation, CA; and Twentynine Palms Marine Corps Base, CA. The exercises will include aircraft flying at altitudes to 30 kft, mobile ground based equipment, and permanent ground based equipment. The assets can be positioned anywhere within the identified areas.

CEC TRAINING AREA 7

Training Area 7 supports Pacific training exercises. Training Area 7 includes all of the state of Hawaii and the Pacific Ocean waters surrounding the islands of Hawaii.

Exercises within the land boundaries of Training Area 7 will include aircraft operating at altitudes to 30 kft, mobile ground based equipment, and permanent ground based equipment. Aircraft and mobile ground based equipment can be positioned anywhere within the area. Permanent ground based terminals will be added as required. Specific sites within Training Area 7 include, but are not limited to, the Pacific Missile Range Facility on the Island of Kauai.

Exercises in the Pacific Ocean waters will include aircraft operating at altitudes to 30 kft and surface ships. These assets can be positioned anywhere. The waters of the Pacific Missile Range Facility are included.

CEC TRAINING AREA 8

Training Area 8 supports Atlantic Ocean and Caribbean Ocean training exercises. The area includes all of Puerto Rico; St. Thomas, Virgin Islands; and the ocean waters surrounding Puerto Rico and The Virgin Islands.

Exercises within the land boundaries of Training Area 8 include aircraft operating at altitudes to 30 kft, mobile ground based equipment, and permanent ground based equipment. Aircraft and mobile ground based equipment can be positioned anywhere within the area. A permanent ground based terminal is located on St. Thomas, Virgin Islands. Other permanent ground based terminals will be added as required. Specific sites within Area 8 include, but are not limited to, the Armed Forces Weapons Test Facility and the Navy Reservation, Vieques Island.

Exercises in the Atlantic Ocean and Caribbean Ocean waters will include aircraft operating at altitudes to 30 kft and surface ships. These assets can be positioned anywhere. The waters of the Armed Forces Weapons Test Facility are included.

CEC TRAINING AREA 9

Training Area 9 supports Atlantic Coast exercises. Training Area 9 extends inland from, seaward from, and along the low water mark of a portion of the South Carolina (SC) and Georgia (GA) Atlantic coastlines, and includes a separate area in the Jacksonville, FL metropolitan area.

INLAND PORTION: The inland portion of Training Area 9 extends westward from the low water mark of the Atlantic Ocean, and includes all of the areas contained within the boundaries of the following counties and facilities in the indicated state:

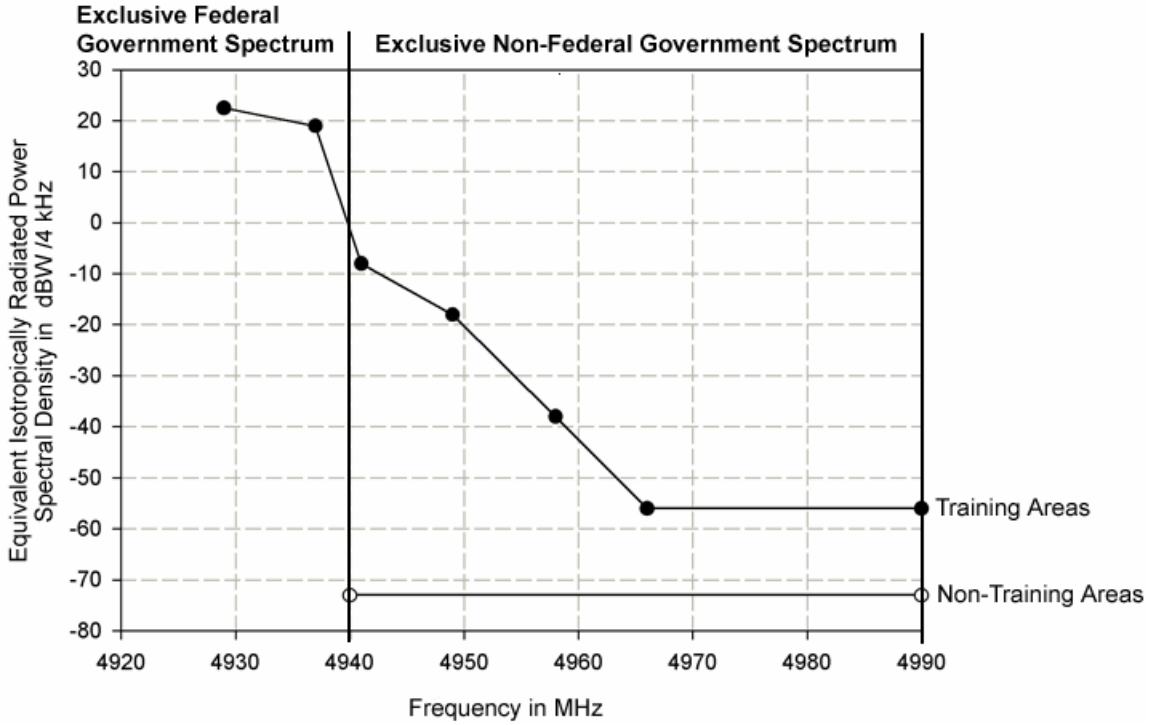
South Carolina: Beaufort and Jasper Counties
Georgia: Chatham, Bryan, Liberty, Long, and McIntosh Counties; Ft. Stewart U.S. Army Facility

Exercises within the boundaries of the inland portion of Training Area 9 will include aircraft operating at altitudes to 30 kft, mobile ground based equipment, and permanent ground based equipment. Aircraft and mobile ground based equipment can be positioned anywhere within the area defined above. Permanent ground based terminals will be added within the above defined area as required. Specific sites within the above defined area include, but are not limited to, Beaufort MCAS, SC; Wright Army Air Field, GA; and Hunter Army Air Field, GA. All of the area within the legal boundaries of Ft. Stewart U.S. Army Facility, GA is included.

Training Area 9 also includes the Jacksonville, FL metropolitan area. Mobile and ground based equipment will be located anywhere within the legal boundaries of the Jacksonville NAS, FL. Mobile, ground based, and ship based equipment will be located anywhere within the legal boundaries of the Mayport Naval Station, FL. Aircraft operating in the vicinity of Jacksonville, FL will maintain emissions at the lower defined level.

SEAWARD PORTION: The seaward portion of Training Area 9 is bounded on the north by the line that extends eastward from the low water mark of the Atlantic Ocean along 32.480000 north decimal degrees of latitude. The western boundary of the seaward portion of Training Area 9 begins at the intersection of the low water mark of the Atlantic Ocean with 32.480000 north decimal degrees of latitude, extends generally southward and southwestward along the low water mark of the Atlantic Ocean to the intersection of the low water mark with 31.370000 north decimal degrees of latitude. The seaward portion of Training Area 9 is bounded on the south by the line that extends eastward from the low water mark of the Atlantic Ocean along 31.370000 north decimal degrees of latitude. There is no eastern boundary of the seaward portion of Training Area 9. Exercises in the seaward portion of Training Area 9 will include aircraft operating at altitudes to 30 kft and surface ships. These assets can be positioned anywhere within the defined area.

CEC EMISSIONS ACROSS THE 4940-4990 MHz BAND



APPENDIX D: List of Commenters

Comments

Association of American Railroads
Association of Public Safety Communications Officials International, Inc.
Atheros Communications, Inc.
Chicago Emergency Management and Communications
Chicago Municipal Water Agency
Cinergy Corporation & Consumers Energy Company
District of Columbia Government, Office of the Chief Technology Officer
Illinois Fire Chiefs Association
International Association of Chiefs of Police, Major Cities Chiefs Association, National Sheriffs' Association, Major County Sheriffs' Association
International Association of Fire Chiefs, Inc. and International Municipal Signal Association
Microwave Radio Communications
Motorola, Inc.
National Academy of Sciences' Committee on Radio Frequencies
National Public Safety Telecommunications Council
National Radio Astronomy Observatory
New York, City of
New York City Transit Authority
New York State Office for Technology, Statewide Wireless Network
Phoenix, Arizona, City of
Public Safety Wireless Network
United Telecom Council
Warren C. Havens & Telesaurus Holdings GB, LLC
Wireless Ethernet Compatibility Alliance

Reply Comments

Association of Public Safety Communications Officials International, Inc.
District of Columbia Government, Office of the Chief Technology Officer
Industrial Telecommunications Association, Inc.
Motorola, Inc.
Public Safety Wireless Network (PSWN)
United Telecom Council (UTC)
Warren C. Havens & Telesaurus Holdings GB, LLC

Ex Parte or Late filed Comments

Association of Public Safety Communications Officials International, Inc.
Los Angeles County Sheriff's Department
Microwave Radio Communications
Motorola, Inc.
Society of Broadcast Engineers
United Telecom Council (UTC)
Warren C. Havens & Telesaurus Holdings GB, LLC

SEPARATE STATEMENT OF
CHAIRMAN MICHAEL K. POWELL

Re: The 4.9 GHz Band Transferred from Federal Government Use, Memorandum Opinion and Order and Third Report and Order, WT Docket No. 00-32

The service rules we adopt today provide an important broadband opportunity for public safety and homeland security. The Order makes available for licensing 50 MHz of spectrum that may be used for a variety of innovative applications, including the delivery of real time video from inside burning buildings, floor plans to police officers entering a hostile environment, and even videos from robots entering a collapsed mineshaft. Moreover, consistent with our continuing efforts to increase licensee flexibility, the rules we adopt afford state and local government licensees with the freedom to design flexible and innovative partnerships between the public and private sectors to facilitate deployment. In these difficult economic times for our first responders, this flexibility may be essential to building the infrastructure and developing the necessary equipment to deliver these new broadband applications. I urge state and local governments to work with one another and the critical infrastructure community to utilize fully this new spectrum opportunity to make all Americans safer.

SEPARATE STATEMENT OF
COMMISSIONER MICHAEL J. COPPS
Approving in Part, Concurring in Part

Re: The 4.9 GHz Band Transferred from Federal Government Use, Memorandum Opinion and Order and Third Report and Order, WT Docket No. 00-32

I am in strong support of establishing licensing and service rules for the 4.9 GHz band, and I believe that our action today will give public safety professionals across the country access to new spectrum and will further the trend of putting cutting-edge communications technologies to use in saving lives. I look forward to the development of new products designed to use the 4.9 GHz band. I commend the public safety community for pushing the Commission to take today's action and the bureaus for seeing the challenge through.

We have all been working to facilitate the ability of police departments, fire departments and utilities companies to interact using wireless technologies. Communications between these entities is, as we all understand now, critical in times of emergency. The 4.9 GHz band has the potential significantly to improve such communications, especially by allowing government public safety organizations to access utility companies' public safety oriented communications and monitoring activities.

I concur in part, however, because I am concerned that the Commission may at the same time be creating a bit of confusion and perhaps even future disputes by failing to protect against possible misuse of this band by private companies for non-public safety activities. We need to be vigilant to make sure this does not happen.

The way I read it, today's Order establishes a system whereby government users can enter into agreements to grant private companies access to public safety spectrum, for free, without adequate restrictions on how these private companies can use the spectrum.

While all operations in the band are supposed to be "limited to operations in support of public safety," the types of activities that are "in support of public safety" are not defined. The term "public safety services" ***is*** defined, but very broadly -- any service with the "principal purpose" of "protecting life, health, or property" is covered. Additionally, the text allows all types of private companies that are not utilities or in other public-safety oriented businesses to access the spectrum. That presumably means that 49% of a company's use of the band could be generally unrelated to public safety, and 51% could be used to protect the company's private facilities. If this result is indeed possible, I would have to ask: is this really the best use of our public safety spectrum?

I am somewhat reassured by the item, however, because a public safety entity must grant a private company permission before any of this can occur, and I believe that utilities companies are dedicated to public safety. So, most police departments and fire departments will not allow their 4.9 GHz spectrum to be used for inappropriate activities. And utility companies across the country are generally very dedicated to protecting public safety and often go beyond the call of duty to make their communities safer. Responsible companies will not take advantage of any vulnerabilities that might exist.

But we went through a similar experience with ITFS. Even though the majority of licensees use the spectrum with which we entrust them well, when the Commission leaves open the opportunity for abuse, there will be some who will take advantage of it. Just as every school did not use its ITFS spectrum responsibly, every public safety entity will not be an effective filter for misuse.

As I mentioned, nothing in our rules appears to restrict the private companies that can use this band to utility companies. So companies far less public safety oriented than utilities may be able to strike deals to use the spectrum for their own ends. And our "in support of public safety" language is overly porous. We must not allow any kind of abuse to undermine the promise of the 4.9 GHz band for the public safety activities of both governments and utilities.

Closing on a more positive note, I believe the item is generally a significant step forward in the Commission's ongoing efforts to enhance public safety throughout the land, and I thank the bureaus for bringing it to us this morning.

SEPARATE STATEMENT OF
COMMISSIONER KEVIN J. MARTIN

Re: The 4.9 GHz Band Transferred from Federal Government Use, Memorandum Opinion and Order and Third Report and Order, WT Docket No. 00-32

I am pleased to support this item, which establishes licensing and service rules for public safety use of the 4940-4990 MHz band (4.9 GHz band). This item responds to public safety's need for spectrum dedicated to high-speed data transmission. Numerous state, county, local government, and national public safety associations argued persuasively that use of the 4.9 GHz band for high-speed data transmission will enable responders to carry out critical missions in a way that ensures more effective service to their communities and provides a safer environment for emergency responders. In today's item, we adopt licensing and service rules to promote those goals.

The rules we adopt are intended to accommodate a variety of new public safety broadband applications, such as high speed on-site file transfers and specialized headsets equipped with video cameras and environmental sensors. For example, emergency personnel can use this spectrum to have instant access to maps, building layouts, emergency medical service files, and wanted or missing person images. Our rules also allow each user to have maximum autonomy to use the spectrum as suits its particular needs. Users in rural areas thus may choose to use the spectrum to cover larger distances, while users in cities may have a greater need for mobile and "hot spot" uses.

I am hopeful that the rules we adopt will help public safety personnel – which include law enforcement, fire fighters, SWAT teams, bomb squads, emergency medical providers, and others – carry out their missions in as safe and effective a manner as possible. These people, who must risk their lives to protect our own lives and property, deserve nothing less.