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

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

MEMORANDUM OPINION AND ORDER

Adopted: November 9, 2004 **Released: November 12, 2004**

By the Commission:

I. INTRODUCTION

1. In this *Memorandum Opinion and Order* (*MO&O*), we consider a Petition for Reconsideration (Petition) filed on July 30, 2003, by the National Public Safety Telecommunications Council (NPSTC).[1] NPSTC requests us to reconsider certain of the technical rules in the *Memorandum Opinion and Order and Third Report and Order*, in which the Commission adopted licensing and service rules for the 4940-4990 MHz (4.9 GHz) band.[2] Herein, we grant the NPSTC petition in part by adopting new 4.9 GHz emission masks – one for high power operations (the DSRC-C mask)[3], and one for low power operations (the DSRC-A mask).[4] We also reaffirm our decisions in the *Third R&O* not to adopt a technology standard, and not to make regional planning[5] mandatory in the 4.9 GHz band.

[1] *See* Petition at 1. NPSTC is a federation of public safety associations that encourages and facilitates the implementation of recommendations of the Public Safety Wireless Advisory Committee (PSWAC) and the 700 MHz Public Safety National Coordination Committee (NCC).

[2] The 4.9 GHz Band Transferred from Federal Government Use, *Memorandum Opinion and Order and Third Report and Order*, 18 FCC Rcd 9152 (2003) (*Third R&O*).

[3] The DSRC (Dedicated Short Range Communications) masks A and C are contained in the ASTM International Standard E 2213-03, *Standard Specification for Telecommunications and Information Exchange Between Roadside and Vehicle Systems-5 GHz Band Dedicated Short Range Communications (DSRC) Medium Access Control (MAC) and Physical Layer (PHY) Specifications*. The ASTM standard was adopted in Amendment of the Commission's Rules Regarding Dedicated Short-Range Communication Services in the 5.850-5.925 GHz band (5.9 GHz band), *Report and Order*, 19 FCC Rcd 2458 (2004). *See* 47 C.F.R. §§ 90.379, 95.1509.

[4] *Id*.

[5] Under a regional planning scheme, the country is divided into regions that have autonomy to develop plans that appropriately meet their different communications needs. To facilitate the shared use of the 4.9 GHz band, each region may (but not must) submit guidelines to be used for sharing the spectrum within their respective regions. *See* 47 C.F.R. § 90.1211.

II. BACKGROUND

2. The 4.9 GHz band was transferred from Federal Government to non-Federal Government use in 1999, in accordance with the provisions of the Omnibus Budget Reconciliation Act.[6] In 2000, the Commission released a *Notice of Proposed Rulemaking* proposing to allocate the 4.9 GHz band to non-Government fixed and mobile services, and to allow flexible use of this band.[7] In 2002, the Commission adopted the fixed and mobile allocation, designated the band for use in support of public safety, and sought comment on the establishment of licensing and service rules for the 4.9 GHz band.[8] In the *Third R&O,* the Commission adopted service rules for use of this band and addressed petitions for reconsideration of its decision to prohibit aeronautical mobile operations in this band.[9]

3. The current NPSTC Petition urges us to adopt two different emission masks, one mask for low power operations, the other for high power operations.[10] NPSTC also proposes a technology standard for general and interoperability use in the 4.9 GHz band,[11] and seeks mandatory regional planning and the inclusion of a conflict resolution process in regional plans.[12] We received comments on the NPSTC proposals from equipment manufacturers, standards organizations, public safety licensees and others.[13]

4. In the *Second R&O and FNPRM,* the Commission sought comment on whether technical standards should be adopted for the 4.9 GHz band, and, if so, what standards would be appropriate.[14] The Commission then adopted a flexible band plan suited to emerging broadband technologies that could enhance public safety operations.[15] It also adopted an emission mask to minimize out-of-band emissions that could result in interference between 4.9 GHz devices.[16] This mask, currently incorporated into Section 90.210 of the Rules,[17] is referred to herein as the *Section 90.210 Mask*. The parameters of this

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

[7] The 4.9 GHz Band Transferred from Federal Government Use, *Notice of Proposed Rulemaking*, 15 FCC Rcd 4778 (2000).

[8] The 4.9 GHz Band Transferred from Federal Government Use, *Second Report and Order and Further Notice of Proposed Rule Making*, 17 FCC Rcd 3955 (2002) (*Second R&O and FNPRM*).

[9] *See Third R&O,* 18 FCC Rcd at 9152.

[10] *See* Petition at 5. In the *Third R&O*, the Commission adopted a single emission mask. *Third R&O,* 18 FCC Rcd at 9174.

[11] *See* Petition at 11, 18. "Interoperability" is an essential communications link within public safety and public service wireless communication systems, which permits units from two or more different entities to interact with one another, exchanging information according to a prescribed method, in order to achieve predictable results. *See* 47 C.F.R. § 90.7.

[12] *See* Petition at 5.

[13] *See generally* comments of: PacketHop; the New York State Office for Technology Statewide Wireless Network; Motorola Inc.; Proxim Corporation; Cisco Systems, Inc.; and IEEE 802.18 Group. The IEEE 802.18 Group is the Radio Regulatory Technical Advisory Group within the IEEE Local and Metropolitan area Networks Standards Committee (IEEE 802 and LMSC IEEE 802). IEEE 802 functions as a consensus-based industry-standards body, producing standards for wireless networking devices, including wireless local area networks (WLANs), wireless personal area networks (WPANs), and wireless metropolitan area networks (Wireless MANs).

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

[15] *See Third R&O,* 18 FCC Rcd at 9172 ¶ 48.

[16] *Id.* at 9174 ¶ 54.

[17] 47 C.F.R. § 90.210.

mask were derived from recommendations from the two parties commenting on the emission mask, Motorola, Inc. (Motorola) and the Association of Public-Safety Communications Officials-International, Inc. (APCO).[18]

III. DISCUSSION

A. Emission Mask

5. *Background.* In the instant Petition, NPSTC submits that the *Section 90.210 Mask* is unnecessarily restrictive and would add significantly to the cost of 4.9 GHz equipment, thereby potentially delaying public safety's use of the band.[19] It argues that public safety must leverage currently available (*i.e.,* "commercial-off-the-shelf" (COTS)) technologies used in adjacent bands, such as the 5.4 GHz Unlicensed National Information Infrastructure (U-NII) unlicensed band[20] and the Intelligent Transportation System (ITS) band.[21] NPSTC indicates that the current mask would prohibit any significant transfer of technology from the equipment used in these bands. For example, NPSTC contends that the more restrictive mask would hamper the ability of 4.9 GHz equipment to use chipsets employed in equipment designed for the U-NII or ITS bands.[22]

6. As a substitute for the *Section 90.210 Mask*, NPSTC recommends that the Commission adopt the DSRC-A and DSRC-C masks applicable to ITS equipment.[23] It proposes the DSRC-A mask for low power 4.9 GHz devices with transmitter output power of 20 dBm or less, and recommends the DSRC-C mask for higher power 4.9 GHz devices with transmitter power output greater than 20 dBm. It also contends that adoption of these emission masks could enable manufacture of devices that could operate in the 4.9 GHz band, the ITS band and the U-NII band, thus providing the public safety community access to these bands using a single, low-cost, device.[24]

7. In its comments, PacketHop, Inc. (PacketHop), a supplier of mobile broadband *ad hoc* networking and applications for public safety, states that adopting NPSTC's recommendations would create incentives for IEEE 802.11 manufacturers[25] to leverage their current technical skills and

[18] Motorola recommendations include emissions masks for the 5, 10, 15 and 20 MHz channels. *See* Motorola *ex parte* presentation dated Jan. 15, 2003. APCO recommends an emission mask for one megahertz channels. *See* APCO *ex parte* presentation dated Feb. 4, 2003.

[19] *See* Petition at 4.

[20] *See* Revision of Parts 2 and 15 of the Commission's Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5.4 GHz band, *Report and Order*, 18 FCC Rcd 24484 (2003). Part 15 of our Rules sets forth the technical requirements for U-NII technology and applications. *See* 47 C.F.R. §§ 15.401-15.407. These rules employ spectral power density limits, rather than emission masks, to limit in-band and out-of-band power. *See* 47 C.F.R. §15.407.

[21] ITS or Dedicated Short Range Communications (DSRC) systems operate in the 5.850-5.925 GHz band. *See* Amendment of the Commission's Rules Regarding Dedicated Short-Range Communication Services in the 5.850-5.925 GHz band (5.9 GHz band), *Report and Order*, 19 FCC Rcd 2458 (2004).

[22] Petition at 5.

[23] *Id.* at 6. *See also* NPSTC further comments filed Oct. 2, 2003. *See* also 47 C.F.R. § 90.379 and § 95.1509.

[24] Petition at 5-11.

[25] By use of this term, we refer to manufacturers that produce equipment compliant with IEEE 802.11. IEEE 802.11 is a family of specifications developed by the IEEE for wireless local area network (LAN) technology. 802.11 specifies an over-the-air interface between a wireless client and a base station or between two wireless clients. There are several specifications in the 802.11 family, including: 802.11, 802.11a and 802.11j. 802.11 applies to (continued….)

manufacturing techniques to develop new, low cost, reliable devices, built to a nationwide uniform technical standard. These devices, PacketHop claims, would give the public safety community access to affordable and interoperable equipment.[26] The IEEE 802.18 Group[27] submits that:

> The mask identified in the amended Rules 90.210 (l) [47 C.F.R. § 90.210] will explicitly preclude the use of widely available equipment compliant with IEEE 802.11a standards and that to meet the mask as currently specified would require the redesign of existing chipsets and equipment specifically for use in this band, creating a niche market that will result in much higher equipment costs with virtually no benefit to the Public Safety community.[28]

It further indicates:

> Use of the IEEE 802.11a channel mask [which is identical to the DSRC-A mask] will have minimal effect on in-band interference between channels and will permit the use of IEEE 802.11a compliant equipment.[29]

8. Motorola initially favored the use of the DSRC-C mask at power levels of 0 dBm or more, indicating that there are relatively straightforward and inexpensive ways to meet standards such as the *Section 90.210 Mask* and the DSRC-C mask, while still being able to take advantage of COTS technology.[30] It offered simulations purporting to show that use of the DSRC-A mask at power levels up to 20 dBm would result in excessive interference when multiple 4.9 GHz devices are used at the site of an incident.[31] Later, however, Motorola reached a consensus with NPSTC that the DSRC-A and DSRC-C masks were a reasonable regulatory substitute for the *Section 90.210 Mask,*[32] and that the DSRC-A mask should be used for low power devices while the more restrictive DSRC-C mask should be used for high power devices. However, NPSTC and Motorola reached no consensus on the definition of "high power" and "low power" in this context. Motorola argued that devices using powers greater than 8 dBm should be classified as high power; whereas NPSTC maintained that devices should be classified as "low power" if they employed powers of 20 dBm or less.[33]

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wireless LANs and provides 1 or 2 Mbps transmission in the 2.4 GHz band using either frequency hopping spread spectrum or direct sequence spread spectrum. 802.11a is an extension to 802.11 that applies to wireless LANs and provides up to 54 Mbps in the 5 GHz band. 802.11a uses an orthogonal frequency division multiplexing (OFDM) encoding scheme. The 802.11j standard incorporates Japanese regulatory extensions to the 802.11 standard. It provides performance resembling 802.11a, but uses a different part of the 5 GHz spectrum.

[26] *See* PacketHop comments at 1.

[27] For a definition, *see* note 13, *supra.*

[28] *See* IEEE 802.18 Group comments at 2.

[29] *Id.* The IEEE 802.18 Group indicates that the DSRC-A mask proposed by NPSTC is identical to the 802.11a mask. IEEE 802.18 Group comments at 2. The technical standard for 802.11a equipment, IEEE Standard. 802.11a-1999, contains identical emission mask requirements.

[30] *See* Motorola comments at 5, including Appendix A.

[31] *Id.* Appendix B.

[32] *See* Motorola *ex parte* letter dated Sept. 13, 2004 at 1.

[33] *See* NPSTC reply comments at 12.

9. Ultimately, on September 10, 2004, NPSTC filed an *ex parte* document that included a set of recommended rules that put the "high power" breakpoint at 20 dBm.[34] On the next business day, Motorola filed an *ex parte* letter stating that while it continued to believe that an 8 dBm breakpoint was more appropriate, "Motorola and NPSTC concur on the rules needed if a 20 dBm breakpoint is used."[35]

10. *Decision.* We recognize that benefits would accrue to public safety agencies if they could use 4.9 GHz devices adapted from COTS technologies in nearby bands. In particular, leveraging such technologies could result in savings for state and local governments and provide the potential for deployment of dual-band devices that make Internet access available via the U-NII band adjacent to the 4.9 GHz band. We are persuaded by the comments submitted that we may safely adopt the DSRC-A and DSRC-C masks[36] in lieu of the *Section 90.210 Mask* currently in our Rules, and, therefore, will not burden public safety agencies with unnecessary costs for 4.9 GHz devices.

11. We are encouraged that Motorola and NPSTC reached consensus on the rules proposed by NPSTC.[37] However, after review of the submissions by all parties, we believe that 20 dBm is, in fact, the appropriate breakpoint. This power level strikes a reasonable balance between interference avoidance and 4.9 GHz equipment affordability.[38]

12. Our decision to adopt a 20 dBm breakpoint is also grounded on the fact that even consumer equipment in this frequency range is relatively tolerant of interference. The DSRC-A mask is identical to the mask defined in the widely-used 802.11 "Wi-Fi" standard for equipment used for in-home wireless LANs and found in consumer "hotspots" in businesses ranging from coffee shops to airports. The adjacent channel rejection (ACR) of an 802.11 receiver, using Orthogonal Frequency Division Multiplexing (OFDM), is defined by data throughput as a function of the level of adjacent channel interference. For example, an 802.11 receiver can sustain data throughput of 48 Mbits/s in the presence of an equal-power adjacent channel signal and a throughput of 6 Mbits/s when the adjacent channel signal is 16 dB higher.[39] Thus, adjacent channel interference in these systems is a "graceful degradation" of data throughput, although loss of service can eventually result at higher levels of adjacent channel interference. Moreover, the potential for interference can be anticipated and taken into account in the placement of 4.9 GHz devices at the scene of an incident.

13. In assessing the proper breakpoint for requiring the more restrictive emission mask, we were mindful that, although 4.9 GHz equipment operating at power levels of 8 dBm or less may be adequate for consumer applications, the reliability requirements of public safety communications favor

[34] *See* NPSTC *ex parte* letter dated Sept. 10, 2004 at 1-2.

[35] *See* Motorola *ex parte* letter dated Sept. 13, 2004 at 1.

[36] *See* comments of: PacketHop at 1; the New York State Office for Technology Statewide Wireless Network at 4; Cisco Systems, Inc. at 2; and IEEE 802.18 Group at 2.

[37] *See* Motorola *ex parte* letter dated Sept. 13, 2004 at 1.

[38] Motorola indicates that incorporating a more restrictive emission mask for 4.9 GHz devices would cost only about $3.00 per device for additional components. *See* Motorola *ex parte* filing, Aug. 19, 2004 at 19; *see also Motorola* ex parte letter dated Aug. 30, 2004. We note, however, that component cost is not the only factor which affects the ultimate cost of such devices. We note that Motorola does not take into account factors such as design expense, testing, retooling, inventory management, and the loss of economies of scale inherent in producing specialized equipment for a public safety market, which, although significant, is substantially smaller, by orders of magnitude, than the general consumer market. *See, e.g.*, 4.9 GHz Open Standards Coalition *ex parte* filing, Aug. 23, 2004.

[39] *See* IEEE Std 802.11a-1999, Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) specifications, High-speed physical layer in the 5 GHz Band, available for download on the IEEE website, http://standards.ieee.org/.

higher power levels, especially given propagation characteristics at these frequencies. Accordingly, were we to preclude use of higher power on affordable units using the DSRC-A mask, such devices could have so few applications that they might be unattractive to public safety agencies, which then would have to resort to specialized higher power units employing the DSRC-C mask -- if they could afford such units. By comparison, allowing the DSRC-A mask to be used for low-cost 4.9 GHz devices at power levels up to 20 dBm would provide enhanced reliability -- notably when obstructions are present between devices -- albeit with the possibility of some degradation in throughput if multiple systems are operated on adjacent channels in close proximity to one another. In sum, technical, economic and operational considerations have informed our decision that the DSRC-A mask should be permitted for power levels of 20 dBm and less, and that the DSRC-C mask should apply to all power levels in excess of 20 dBm**.**

B. Compatible Technology Standards

14. NPSTC contends that technology standards are necessary to provide roaming capability[40] and requests us to develop a "clear path" toward identification and adoption of a technology standard for general and interoperability use within the 4.9 GHz band.[41] NPSTC believes a standard could be developed within the next eighteen months[42] and that, once the standard is established, users should be given approximately three years, to migrate to the standard.[43]

15. In the *Second R&O and FNPRM,* the Commission sought comment on the adoption of two widely contemplated broadband standards available for wireless: LAN-IEEE standard 802.11a, and European Telecommunications Standardization Institute (ETSI) Broadband Radio Access Network (BRAN) High Performance Local Area Network number two (HiperLAN2).[44] In the comments, some parties recommended the adoption of the 802.11a standard because of its utility for mobile applications,[45] and others urged adoption of a flexible band plan that would accommodate other emerging broadband technologies.[46] Previously, the Commission found that considerations of minimal regulation and licensee flexibility outweighed any benefits that adoption of a single standard would confer.[47] It thus declined to adopt technology standards and stated that potential interference between devices using different standards could be minimized if licensees cooperated in the selection and use of channels.[48] NPSTC asks us to revisit that determination because, they maintain, differing technologies operating at the same site could generate interference that could disrupt communications. NPSTC believes this interference could be avoided by use of Internet Protocol-based (IP) applications that would allow users to "roam seamlessly across infrastructures (their own and others), with their traffic routed appropriately to its destination across an Internet-type backbone."[49]

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[40] *See* Petition at 14-15.

[41] *Id.* at 11.

[42] *Id.* at 15.

[43] *Id.* at 16.

[44] *Second R&O and FNPRM*, 17 FCC Rcd 3955, 3982 ¶ 65 (2002).

[45] *See Third R&O*, 18 FCC Rcd at 9172 ¶ 48.

[46] *Id*.

[47] *Id*.

[48] *See* 47 C.F.R. § 90.1209.

[49] *See* Petition at 14-15. Motorola also supports the development of a 4.9 GHz technology standard, claiming it would allow various equipment vendors to provide interoperable products. However, as Motorola concedes no (continued….)

16. *Decision.* We believe that there is an insufficient record to justify adoption of technical standards that would provide interoperability in the 4.9 GHz band. Moreover, the band is likely to be used for a variety of services that do not readily lend themselves to standardization or interoperability. Thus, for example, users may consider a fixed video camera and a mobile data terminal as distinctly separate applications without a need to interoperate: the video camera cannot display data and the mobile data terminal would not normally be used to display video from the camera. Also, were we to adopt a standard, it likely would cement the 4.9 GHz band in 2004 technology such that public safety would be denied the benefits of emerging broadband technologies. Finally, even were a standard realizable in eighteen months, as NPSTC suggests, we see no point in depriving the public safety community the use of the 4.9 GHz band in the interim in the hope that a useful standard could be adopted by that time.[50] We therefore reaffirm our determination in the *Third R&O* that interoperability technical standards for the 4.9 GHz band would be counterproductive.

C. Regional Planning

17. NPSTC supports mandatory regional planning and the inclusion of a conflict resolution process in regional plans. We disagree and reaffirm our decision in the *Third R&O.*[51] Our primary rationale for rejecting mandatory regional planning lies in the shared-use structure we have established for the 4.9 GHz band. Applicants that meet eligibility criteria will be granted a geographic area license for the entire fifty MHz of 4.9 GHz spectrum over a geographical area defined by the boundaries of their jurisdiction -- city, county, state, etc.[52] Licensees are required to coordinate their operations in the shared band to avoid interference, a common practice when joint operations are conducted.[53]

18. The functions served by Regional Planning Committees (RPCs)[54] in the public safety segments of the 700 MHz and 800 MHz bands entail the long-term planning for the use of specific channels by discrete licensees, in bands where public safety agencies are not granted a blanket license for the entire spectrum. Nonetheless, the Commission directed each 700 MHz RPC to consider coordination procedures for the 4.9 GHz band, and that each may submit to the Commission such a plan.[55] It envisioned that the plans would specify best practices for efficient use of the 4.9 GHz band, including, for example, procedures to allow an incident commander to take control of emergency communications

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standard has emerged that would provide the mix of frequency band, center frequencies, interoperability and detailed security features needed for 4.9 GHz band operations.

[50] *See* Petition at 15-16. Although NPSTC suggests that users of the 4.9 GHz band should be given three years to migrate to a new standard, it is questionable whether the typical user would invest in 4.9 GHz equipment that would be rendered obsolete within just a few years. *See id.*

[51] *Third R&O*, 18 FCC 9152 (2003).

[52] *Id.* at 9164 ¶¶ 27-28.

[53] *Id.* at 9164 ¶ 28.

[54] *See* note 5, *supra.*

[55] *Third R&O*, 18 FCC at 9169 ¶ 40. The due date for such plans was originally one year after the effective date of the current rules. *See id.* As the rules became effective on June 26, 2003, RPC plans were originally due on July 30, 2004. *See* The 4.9 GHz Band Transferred from Federal Use, *Order,* 19 FCC Rcd 152270 ¶ 1 (2004) (*Stay*). However, on June 26, 2004, the National Association of Regional Planning Committees (NARPC) filed a request to stay the July 30, 2004 deadline until twelve months after the Commission resolves the current Petition. *See* Letter dated June 24, 2004 from Chairman, Stephen T. Devine, Chairman, National Association of Regional Planning Committees (NARPC) to Marlene H. Dortch, FCC. On August 2, 2004, 2004, we released an order granting this stay until six months after the release date of the instant decision. *See Stay,* 19 FCC Rcd at 15270 ¶ 9.

pursuant to compacts made with adjacent and overlapping jurisdictions.[56] In the event an RPC does not submit such a plan, licensees must cooperate in the selection and use of channels in order to reduce interference and make the most effective use of authorized facilities.[57]

19. *Decision.* We continue to believe that the technical expertise resident in the RPCs may be quite useful to new 4.9 GHz licensees, and we encourage dialog between them. However, we have not been shown that coordination of 4.9 GHz operations will be facilitated by requiring 4.9 GHz licensees to make mandatory use of the RPCs. The principal task of RPCs is to coordinate selection of specific channels for use at static base stations (and their associated mobiles). However, given the whole-band licensing structure that we have established and the likelihood that deployment of 4.9 GHz equipment is likely to be dynamic rather than static, it would appear impractical to formulate, in advance, an optimum distribution of channel assignments that would be universally suitable for each incident. This is not to suggest that agencies should not coordinate use of channels at an incident, or not have a process for doing so. However, we believe that that task is best undertaken by local jurisdictions, and we thus are not prepared to mandate use of RPCs for a purpose markedly different from that for which they were formed.

20. Our decision essentially renders moot NPSTC's request that we require RPCs to establish procedures for resolving disputes over the use of 4.9 GHz frequencies. However, we are aware that 700 MHz and 800 MHz RPCs do have procedures for resolution of disputes among licensees using those bands. Accordingly, these RPCs may be well-equipped to mediate disputes arising between 4.9 GHz licensees, should such licensees voluntarily elect to submit such disputes to mediation. We do not believe, however, that the possibility of such requests for voluntary mediation is a sufficient reason to require RPCs to develop 4.9 GHz dispute resolution procedures and, accordingly, we decline NPSTC's request to do so.

IV. PROCEDURAL MATTERS

A. Final Regulatory Flexibility Certification

21. As required by the Regulatory Flexibility Act (RFA), *see* 5 U.S.C. § 604, the Commission has prepared a Final Regulatory Flexibility Certification for this *Memorandum Opinion and Order* and is included as Appendix A.

B. Ordering Clauses

22. ACCORDINGLY, IT IS ORDERED that Part 90 of the Commission's Rules is amended as specified in Appendix B, effective 60 days after publication of this Memorandum Opinion and Order in the Federal Register.

23. IT IS FURTHER ORDERED pursuant to Sections 4(i), 303(r), and 405 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 303(r), 405, and Section 1.429 of the Commission's Rules, 47 C.F.R. § 1.429, that the petition for reconsideration filed by the National Public Safety Telecommunications Council is GRANTED IN PART and DENIED IN PART, to the extent set forth above.

[56] *Id.* at 9169 ¶ 41.

[57] *Third R&O*, 18 FCC at 9169.

24. 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*, including the Final Regulatory Flexibility Certification, to the Chief Counsel for Advocacy of the Small Business Administration.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary

APPENDIX A

FINAL REGULATORY FLEXIBILITY CERTIFICATION

1. As required by the Regulatory Flexibility Act (RFA),[58] a Final Regulatory Flexibility Analysis (FRFA) was incorporated in the *Third R&O.*[59] In view of the fact that we have adopted further rule amendments in this *Memorandum Opinion and Order (MO&O)*, we have included this Final Regulatory Flexibility Certification. This Certification conforms to the RFA.[60]

2. The RFA requires that regulatory flexibility analysis be prepared for rulemaking proceedings unless the agency certifies that "the rule will not, if promulgated, have a significant economic impact on a substantial number of small entities." The RFA generally defines "small entity" as having the same meaning as the term "small business," "small organization," and "small governmental jurisdiction." In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act. A small business concern is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the Small Business Administration (SBA).

3. This *MO&O* relaxes the technical emission limits adopted in the *3rd R&O* for devices operating in the band 4940-4990 MHz, to be used exclusively for public safety services. Our action may affect equipment manufacturers since technical equipment parameters are being changed. However, as service rules for the 4.9 GHz band have been recently adopted,[61] equipment has not yet been developed and certified under the Commission's rules.

4. Therefore, we certify that the requirements of this *MO&O* will not have a significant economic impact on a substantial number of small entities. The Commission will send a copy of the *MO&O,* including a copy of this final certification, in a report to Congress pursuant to the Congressional Review Act, *see* U.S.C. § 801(a)(1)(A). In addition, the *MO&O* and this certification will be sent to the Chief Counsel for Advocacy of the Small Business Administration, and will be published in the Federal Register. *See* U.S.C. § 605(b).

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

[59] The 4.9 GHz Band Transferred from Federal Government Use, *Memorandum Opinion and Order and Third Report and Order*, 18 FCC Rcd 9152 (2003) (*Third R&O*).

[60] *See* 5 U.S.C. § 604.

[61] *Third R&O,* 18 FCC Rcd 9152 (2003).

APPENDIX B

FINAL RULES

Part 90 of Title 47 of the Code of Federal Regulations, is revised to read as follows:

PART 90 – PRIVATE LAND MOBILE RADIO SERVICES

1. 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).

2. Section 90.210 is amended specifically by amending the entry in the table for the 4940-4990 MHz frequency band in the undesignated paragraph, by replacing paragraph (l), redesignating paragraphs (m) and (n) as paragraphs (n) and (o) and by adding a new paragraph (m) 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 or M……	L or M
* * * * *	* * * * *	* * * * *

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(l) *Emission Mask L*. For low power transmitters (20 dBm or less) operating in the 4940-4990 MHz frequency band, the power spectral density of the emissions must be attenuated below the output power of the transmitter as follows:

(1) On any frequency removed from the assigned frequency between 0 - 45 % of the authorized bandwidth (BW): 0 dB.

(2) On any frequency removed from the assigned frequency between 45 – 50 % of the authorized bandwidth: 219 log (% of (BW) / 45) dB.

(3) On any frequency removed from the assigned frequency between 50 - 55 % of the authorized bandwidth: 10 + 242 log (% of (BW) / 50) dB.

(4) On any frequency removed from the assigned frequency between 55 – 100 % of the authorized bandwidth: 20 + 31 log (% of (BW) / 55) dB attenuation.

(5) On any frequency removed from the assigned frequency between 100 – 150 % of the authorized bandwidth: 28 + 68 log (% of (BW) / 100) dB attenuation.

(6) On any frequency removed from the assigned frequency above 150 % of the authorized bandwidth: 50 dB.

(7) 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 and a video bandwidth of 30 kHz. The power spectral density is the power measured within the resolution bandwidth of the measurement device divided by the resolution bandwidth of the measurement device. Emission levels are also based on the use of measurement instrumentation employing a resolution bandwidth of at least one percent of the occupied bandwidth.

(m) *Emission Mask M*. For high power transmitters (greater that 20 dBm) operating in the 4940-4990 MHz frequency band, the power spectral density of the emissions must be attenuated below the output power of the transmitter as follows:

(1) On any frequency removed from the assigned frequency between 0 - 45 % of the authorized bandwidth (BW): 0 dB.

(2) On any frequency removed from the assigned frequency between 45 – 50 % of the authorized bandwidth: 568 log (% of (BW) / 45) dB.

(3) On any frequency removed from the assigned frequency between 50 - 55 % of the authorized bandwidth: 26 + 145 log (% of BW / 50) dB.

(4) On any frequency removed from the assigned frequency between 55 – 100 % of the authorized bandwidth: 32 + 31 log (% of (BW) / 55) dB.

(5) On any frequency removed from the assigned frequency between 100 – 150 % of the authorized bandwidth: 40 + 57 log (% of (BW) / 100) dB.

(6) On any frequency removed from the assigned frequency between above 150 % of the authorized bandwidth: 50 dB or 55 + 10 log (P) dB, whichever is the lesser attenuation.

(7) 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 and a video bandwidth of 30 kHz. The power spectral density is the power measured within the resolution bandwidth of the measurement device divided by the resolution bandwidth of the measurement device. Emission levels are also based on the use of measurement instrumentation employing a resolution bandwidth of at least one percent of the occupied bandwidth.

(Note: Low power devices may as an option, comply with paragraph (m).)

* * *

3. Section 90.1215 is amended to read as follows:

§ 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)	Low power peak transmitter power (dBm)	High power peak transmitter power (dBm)
1	7	20
5	14	27
10	17	30
15	18.8	31.8
20	20	33

(a) High power devices are also limited to a peak power spectral density of 21 dBm per one MHz. High power devices using channel bandwidths other than those listed above are permitted; however, they are limited to a peak power spectral density of 21 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, high power 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) Low power devices are also limited to a peak power spectral density of 8 dBm per one MHz. Low power devices using channel bandwidths other than those listed above are permitted; however, they are limited to a peak power spectral density of 8 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.

(c) 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.

(d) 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 one 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.

APPENDIX C

LIST OF PLEADINGS

Petition for Reconsideration

National Public Safety Telecommunications Council (NPSTC)

Comments

Cisco Systems, Inc. (Cisco)

Institute of Electrical and Electronics Engineering 802.18 Radio Regulatory Technical Advisory Group (IEEE 802 Group)

Motorola, Inc. (Motorola)

National Public Safety Telecommunications Council (NPSTC)

PacketHop, Inc. (PacketHop)

Proxim Corporation (Proxim)

`Reply Comments

National Public Safety Telecommunications Council (NPSTC)

New York State Office for Technology Statewide Wireless Network (SWN)

Ex Parte

Association of Public-Safety Communications Officials International, Inc. (APCO)

Motorola, Inc. (Motorola)

National Public Safety Telecommunications Council (NPSTC)