Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C.

In the Matter of	)	
	)	
The Development of Operational,	)	
Technical and Spectrum Requirements	)	
For Meeting Federal, State and Local	)	WT Docket No. 96-86
Public Safety Agency Communication	)	
Requirements Through the Year 2010	)	
	)	
Establishment of Rules and Requirements	)	
For Priority Access Service	)	

THIRD MEMORANDUM OPINION AND ORDER AND THIRD REPORT AND ORDER

Adopted: September 18, 2000 **Released: October 10, 2000**

By the Commission:

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I. INTRODUCTION

1. Twenty-four megahertz of spectrum is allocated for public safety services at 764-776 MHz and 794-806 MHz (hereinafter "the 700 MHz band").[1] On August 6, 1998, we adopted a *First Report and Order and Third Notice of Proposed Rule Making* that established a band plan and service rules for this spectrum.[2] Seventeen parties filed petitions for reconsideration and/or clarification ("Petition(s)") of decisions contained in the *First Report and Order*.[3] We addressed two of these Petitions in May 1999.[4] On July 21, 2000, we adopted a *Second Memorandum Opinion and Order* that addressed petitions for reconsideration of the *First Report and Order* concerning: (1) digital modulation requirement; (2) certain technical requirements—namely, transmitter power and antenna height, automatic power control, emission limits, frequency stability, wideband channel efficiency standards, and receiver standards; (3) protection criteria established between television and land mobile operations; (4) eligibility for licensing and alliances under Section 2.103(b) of our Rules,[5] and (5) administrative issues regarding regional planning, national planning, and frequency coordination.[6] In the *Second MO&O*,[7] we also deferred resolution of the reconsideration requests concerning digital standards in the 700 MHz band to the *Fourth Notice of Proposed Rule Making* in the captioned proceeding.[8]

2. The instant *Third Memorandum Opinion and Order* ("*Third MO&O*") addresses the remaining issues raised in the petitions for reconsideration of the *First Report and Order*; by presenting

[1] *See* Reallocation of Television Channels 60-69, the 746-806 MHz Band, ET Docket No. 97-157, *Report and Order*, 12 FCC Rcd 22,953 (1997) (*Reallocation Report and Order*).

[2] The Development of Operational, Technical and Spectrum Requirements for Meeting Federal, State and Local Public Safety Agency Communications Requirements Through the Year 2010, WT Docket No. 96-86, *First Report and Order and Third Notice of Proposed Rulemaking*, 14 FCC Rcd 152 (1998) (*recon. pending*) (referred to herein as "*First Report and Order*" or "*Third Notice*" as applicable).

[3] Fourteen parties filed oppositions to specific petitions and replies to the oppositions. A list of parties, with their acronyms, that filed Petitions, Oppositions, and Replies is contained in Appendix C.

[4] In May 1999 we addressed the Petitions for Reconsideration filed by the American National Standards Institute ("ANSI") and the Telecommunications Industry Association ("TIA") in this proceeding. *See* The Development of Operational, Technical and Spectrum Requirements for Meeting Federal, State and Local Public Safety Agency Communications Requirements Through the Year 2010, WT Docket No. 96-86, *Memorandum Opinion and Order on Reconsideration*, 14 FCC Rcd 8059 (1999) ("*First MO&O*").

[5] 47 C.F.R. § 2.103(b).

[6] The Development of Operational, Technical and Spectrum Requirements for Meeting Federal, State and Local Public Safety Agency Communications Requirements Through the Year 2010, WT Docket No. 96-86, *Second Memorandum Opinion and Order*, FCC 00–264 (rel. August 1, 2000) referred to herein as "*Second MO&*O").

[7] *See Second MO&O* at ¶ 1 citing Public Safety National Coordination Committee, Recommendations to the Federal Communications Commission for Technical and Operational Standards for Use of the 764-776 MHz and 794-806 MHz Public Safety Band Pending Development of Final Rules (Feb. 25, 2000) (NCC Recommendations). We recognized that the NCC Recommendations pertained to matters that are the subject of some of the Petitions and stated that we anticipated seeking public comment on the substance of the NCC Recommendations. *Id.*

[8] *See* The Development of Operational, Technical and Spectrum Requirements for Meeting Federal, State and Local Public Safety Agency Communication Requirements Through the Year 2010, WT Docket No. 96–86, *Fourth Notice of Proposed Rule Making*, FCC 00-271 (rel. August 2, 2000).

our decisions in response to those various portions of the petitions that address the: (1) band plan for the 700 MHz band,[9] and (2) low power narrowband devices for on-scene communication.[10]

3. In the *Third Report and Order* portion of this combined item, we address designation and licensing issues for the spectrum that we reserved in the *First Report and Order* to be "subject to the *Third Notice.*"[11] In addition, we adopt technical criteria for 700 MHz band operations to protect satellite-based global navigation systems from harmful interference. We also establish measures to promote interoperability on public safety channels below 512 MHz. Our actions today are additional steps toward the development of a flexible regulatory framework to meet vital current and future public safety communications needs.

II. EXECUTIVE SUMMARY

4. Band Plan We revise the band plan adopted in the *First Report and Order* to reposition the location of the narrowband and wideband channel groups for the general use, interoperability, and reserve spectrum. Upon review of the reconsideration requests, this new plan represents an improved layout and will promote better assignment and operational possibilities for the public safety community. We also authorize 48 narrowband channels for low power use for on-scene communication.

5. State License Rather than adopting 8.8 MHz for state planning and approval, we adopt a modified version of our proposal and will grant a single, geographic license directly to the states for up to a total of 2.4 megahertz for their needs. [12] We believe a state license complements the regional planning committees (RPCs),[13] streamlines administrative procedures,[14] and enhances spectrum efficiency.[15] Under this decision, each state (including U.S. territories, districts, and possessions) has the option to receive a statewide authorization to use this radio spectrum statewide for public safety services. This geographic license gives states a new tool for managing and planning the radio communication needs of state agencies.[16] The Governor of each state or his/her designee will have until December 31, 2001 (over one year from the effective date of this *Third Report and Order*) to apply for a state license. We believe that

[9] *First Report and Order*, 14 FCC Rcd at 164-177 ¶¶ 17-46. *See* Petitions of APCO, NPSTC, Motorola, and AASHTO *et al.*

[10] *See* STI Petition.

[11] Twenty–four comments, fifteen reply comments, and numerous ex parte presentations were received in response to the *Third Notice*. A list of parties, with their acronyms, that filed comments or reply comments is contained in Appendix D.

[12] By comparison, we decline to adopt a "State Licensing" approach that most commenters oppose under which states – rather than regional planning committees (RPCs) – would manage state, local, and Federal use of all or most of the 8.8 megahertz of spectrum reserved subject to the *Third Notice*.

[13] State systems and local city/county systems could work in tandem, possibly on joint systems, rather than competing for the same spectrum resources.

[14] States would apply for one geographic based license directly to the Commission by which they could initiate planning and deployment of their systems. Site-based licenses for wide-area networks are administratively burdensome due to the license modifications needed during build-out.

[15] State agencies would give each state greater latitude to develop shared networks employing more efficient technologies, such as, trunked systems.

[16] Although permitted to do so, we do not require states to share this spectrum with non-state agencies. We do not require states to manage or plan spectrum use by non-state agencies (*e.g.*, local political subdivisions, Federal).

providing states this amount of time to apply for this spectrum allows every state at least one legislative cycle or fiscal year to allocate the funds necessary to plan, prepare, and implement the use of the spectrum. What ever part of this 2.4 megahertz that a state has not applied for by December 31, 2001, will revert to General Use and be administered by the RPCs. As with other geographical-area based licenses, *e.g.*, PCS, no further FCC authorization will be required to construct and operate transmitter sites within the state (unless the site raises specific environmental, aviation safety, "quiet zone," or international issues).

6. Reserve First, we reserve 128 narrowband channels pending the resolution of the *Fourth Notice* in this proceeding.[17] Next, we relocate the remaining 5.4 megahertz of the 700 MHz band (108 wideband channels) between narrowband and wideband segments and reserve this spectrum for future developments in broadband technologies.[18]

7. In sum, as a the result of our actions today, we designate the 24 megahertz of spectrum in the 700 MHz band as follows:

700 MHZ PUBLIC SAFETY BAND—SPECTRUM & CHANNELS

DESIGNATED PURPOSE	AMOUNT OF SPECTRUM	NARROWBAND (6.25 kHZ)	WIDEBAND (50 kHZ)
GENERAL USE	12.5 MHz (52.1 %)	7.7 MHz (1232 channels)[19]	4.8 MHz (96 channels)
INTEROPERABILITY	2.6 MHz (10.8 %)	0.8 MHz (128 channels)	1.8 MHz (36 channels)
STATE LICENSE	2.4 MHz (10.0 %)	2.4 MHz (384 channels)	- 0 -
LOW POWER	0.3 MHz (1.3 %)	0.3 MHz (48 channels)	- 0 -
RESERVE	6.2 MHz (25.8 %)	0.8 MHz (128 channels)	5.4 MHz (108 channels)
T O T A L	24 MHz (100 %)	12 MHz (1920 channels)	12 MHz (240 channels)

8. GNSS Protection Criteria We adopt technical solutions to protect certain global navigation satellite systems (GNSS), particularly the Global Orbiting Navigation Satellite Systems (GLONASS) and Global Positioning System (GPS).[20] These limits are in accordance with international requirements.

9. Interoperability Below 512 MHz We adopt our proposal to designate channels in existing public safety bands for mutual aid purposes (five channels in the 150-174 MHz band and four channel

[17] See note 8, *supra*.

[18] A table setting forth the segments and channels is contained in Appendix G.

[19] In the new composite band plan adopted herein, we redesignate 16 of the original 1248 general use channels for low power.

[20] GLONASS utilizes the Radionavigation-Satellite Service (space-to-Earth) band of 1598–1605 MHz.

pairs in the 450-512 MHz band). We also terminate the *Third Notice* inquiry as to the FCC's future licensing of spectrum in the 138–144 MHz band for interoperability purposes. The inquiry is now moot because Congress reclaimed this spectrum for exclusive federal use in the "National Defense Authorization Act of FY 2000."[21] We also adopt our proposal to designate two channel pairs in the VHF 156-162 MHz band for interoperability communication in thirty-three Economic Areas (EAs), where these channels are allocated for public safety entities.[22]

III. BACKGROUND

10. In 1993, Congress directed the Commission to develop a framework to ensure that public safety communications needs are met through the year 2010.[23] Pursuant to that directive, the Commission issued a report to Congress identifying a need to gather additional information on the present and future communications requirements of public safety agencies.[24] In 1995, the Commission, together with the National Telecommunications and Information Administration (NTIA), established the Public Safety Wireless Advisory Committee (PSWAC), pursuant to the Federal Advisory Committee Act,[25] to provide advice and recommendations regarding the communications needs of public safety agencies through the year 2010. Shortly thereafter, the Commission commenced this rulemaking proceeding to evaluate and plan for present and future public safety communications requirements.[26]

11. On August 14, 1996, the Commission acknowledged that a portion of the spectrum recovered from TV channels 60-69 when digital television (DTV) is fully deployed "could be used to meet public safety needs."[27] In the *DTV Sixth Report and Order*, the Commission stated that it would initiate a separate proceeding to address the issue of allocating TV channels 60-69, and would give serious consideration to allocating 24 megahertz of that spectrum for public safety use.[28] In September 1996, the *PSWAC Final Report* was submitted to the Commission as part of the record in this proceeding. The *PSWAC Final Report* found that the spectrum then allocated to public safety was insufficient to support the current and projected voice and data needs of the public safety community, did not provide adequate capacity for obtaining interoperability, and was inadequate to meet future needs, based on projected population growth and demographic changes. The *PSWAC Final Report* concluded that in order to meet

[21] *See* Pub. L. No. 106-65, § 1062, 113 Stat. 767 (1999).

[22] The channel pairs were formerly allocated in 47 C.F.R. § 80.371 for VHF Public Coast Stations as public correspondence channels and were also shared under 47 C.F.R. § 90.283.

[23] *See* 47 U.S.C. § 309(j)(10)(B)(iv), as added by the Omnibus Budget Reconciliation Act of 1993, Pub. L. No. 103-66, Title VI, § 6002, 107 Stat. 312 (1993).

[24] *1995 FCC Public Safety Report*, 10 FCC Rcd 5207 (1995).

[25] Federal Advisory Committee Act, 5 U.S.C., App. 2 (1988).

[26] The Development of Operational, Technical, and Spectrum Requirements for Meeting Federal, State and Local Public Safety Agency Communication Requirements Through the Year 2010, *Notice of Proposed Rule Making*, 11 FCC Rcd 12,460 (1996).

[27] Advanced Television Systems and Their Impact Upon the Existing Television Broadcast Service, *M*M Docket No. 87-268, *Sixth Further Notice of Proposed Rule Making*, 11 FCC Rcd 10,968, 10,980 (1996) (*DTV Sixth Notice*).

[28] Advanced Television Systems and Their Impact Upon the Existing Television Broadcast Service, MM Docket No. 87-268, *Sixth Report and Order*, 12 FCC Rcd 14,588, 14,626 (1997) (*DTV Sixth Report & Order*).

these needs, 25 megahertz of new public safety spectrum allocations would be needed within five years.[29] The *PSWAC Final Report* further stated that data communication and wireless video needs were also expected to grow rapidly, and additional spectrum was required to support new capabilities and technologies, including high speed data and video.[30]

12. Subsequently, in the 1997 Budget Act, Congress directed the Commission to reallocate 24 megahertz of the spectrum recovered from TV channels 60-69 as a result of DTV implementation for public safety services.[31] Shortly thereafter, the Commission initiated a rulemaking proceeding in ET Docket No. 97-157 which led to the adoption of a *Report and Order* reallocating 24 megahertz of spectrum located in the 700 MHz band for public safety services.[32]

13. This new allocation is the largest ever made for public safety communications and constitutes a significant public benefit derived from the conversion of television broadcasting in the United States from analog technology to state-of-the-art digital technology.[33] In the *Second Notice*, the Commission sought comment on a wide variety of public safety communications issues, including, but not limited to, future public safety spectrum needs, projected operational and technological requirements for interoperability (between and among public safety entities on a local and regional basis), and technical parameters needed to ensure efficient and effective communications.[34]

14. In the *First Report and Order*, we established a band plan and adopted service rules for the 700 MHz band. We designated 12.6 megahertz of the spectrum for general use to be managed by regional planning committees (RPCs). In addition, we designated 2.6 MHz of spectrum in the 700 MHz band for interoperability purposes (the ability of different governmental agencies to communicate across jurisdictions and with each other). We also adopted technical specifications to enhance spectrum efficiency and minimize harmful interference in the 700 MHz band. The *First Report and Order* also designated 8.8 megahertz of 700 MHz band spectrum as reserved subject to the *Third Notice*.[35]

15. In the *Third Notice*, we continued our inquiry into present and future public safety communications needs. We sought comment on a broad range of options to promote the efficient and

[29] *Final Report of the Public Safety Wireless Advisory Committee to the Federal Communications Commission*, September 11, 1996, at 3 (*PSWAC Final Report)*.

[30] *Id.* at 19-20.

[31] *See* Balanced Budget Act of 1997, Pub. L. No. 105–33, § 3004, 111 Stat. 251 (1997) (1997 Budget Act), codified at 47 U.S.C. § 337.

[32] Reallocation of Television Channels 60-69, the 746-806 MHz Band, ET Docket No. 97–157, *Notice of Proposed Rule Making*, 12 FCC Rcd 14,141 (1997); *Reallocation Report and Order*, 12 FCC Rcd 22,953 (1998).

[33] *See DTV Sixth Report and Order*, 12 FCC Rcd at 14,588.

[34] The *Second Notice*, prompted by a Petition for Rulemaking filed by the National Communications System, sought comment on the establishment of Cellular Priority Access Service (CPAS) designed to meet the communications needs of public safety services in emergency and disaster situations. *See* 12 FCC Rcd at 17,779-800. We address CPAS issues by a separate action. *See Second Report and Order*, WT Docket No. 96-86, FCC 00–242 (rel. July 13, 2000).

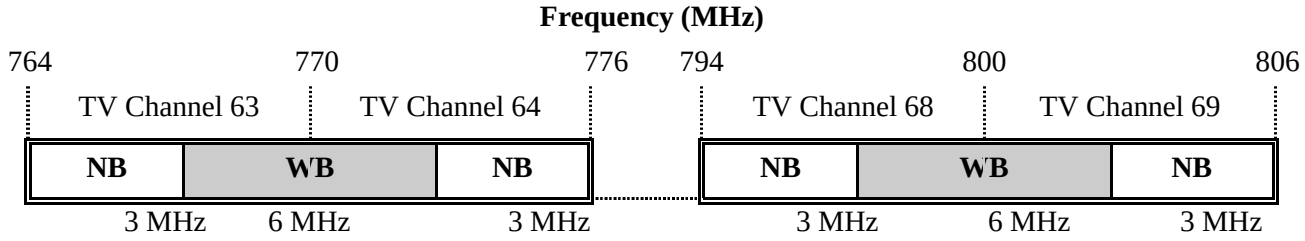
[35] Our decisions today, addressing petitions for reconsideration of the *First Report and Order*, effectively decrease the amount of spectrum in reserve from 8.8 megahertz to 8.6 megahertz. *See, e.g, Third MO&O*, paras. 37–38, *infra*.

effective use of the 700 MHz band spectrum that we reserved in the *First Report and Order*. We also asked how to license the 2.6 megahertz of spectrum in the 700 MHz band that we designated for nationwide interoperability in the *First Report and Order*. Additionally, we discussed protection requirements for 700 MHz band operations in connection with Global Navigation Satellite Systems.[36] We also offered proposals to facilitate use of nationwide interoperability in public safety bands below 512 MHz.

IV. THIRD MEMORANDUM OPINION AND ORDER

A. Band Plan

16. In the *First Report and Order*, we designated the 24 MHz of spectrum in the 700 MHz band to be divided as shown below:[37]



NB = narrowband channels
WB = wideband channels

***First Report and Order* (1998) —700 MHz Public Safety Band Spectrum & Channels**

Designated Purpose	Amount of Spectrum	Narrowband (6.25 kHz)	Wideband (50 kHz)
General Use	12.6 MHz (52.5 %)	7.8 MHz (1248 channels)	4.8 MHz (96 channels)
Nationwide Interoperability	2.6 MHz (10.8 %)	0.8 MHz (128 channels)	1.8 MHz (36 channels)
Reserved	8.8 MHz (36.7 %)	3.4 MHz (544 channels)	5.4 MHz (108 channels)
TOTAL	24 MHz (100 %)	12 MHz (1920 channels)	12 MHz (240 channels)

[36] Global Positioning Service (GPS) is the civilian portion of the United States Global Navigation Satellite System (GNSS), made available for commercial use, which utilizes the Aeronautical Radionavigation-Satellite (space-to-earth) band of 1559-1610 MHz on a primary basis and is maintained by the United States Department of Defense. Our discussion also includes a section on the protection requirements for the Russian Federation Global Orbiting Navigation Satellite System (GLONASS).

[37] *First Report and Order*, 14 FCC Rcd at 166, 167 ¶¶ 24, 25.

17. The band plan designates 764-776 MHz (TV Channels 63 and 64) for base-to-mobile communications and 794-806 MHz (TV Channels 68 and 69) for mobile-to-base communications.[38] The band plan also accommodates all of the traditional operational modes (voice, data, image/HSD, and video) and is flexible enough to allow deployment of future technologies. We divided the band into separate segments for narrowband and wideband communications for both General Use and Nationwide Interoperability. To promote efficient spectrum usage, the band plan incorporates a channelization approach that is based on the smallest practical channel sizes for narrowband and wideband public safety communications).[39] To promote flexibility, we included a "building block" approach that allows licensees to combine narrowband or wideband channels to accommodate different technologies. Specifically, we permit the combination of up to four narrowband 6.25 kHz channels (up to 25 kHz) and up to three wideband 50 kHz channels (up to 150 kHz) to create larger bandwidths when needed to accommodate different technologies, such as 12.5 kHz or 25 kHz voice and data channels, or communications requiring higher data speeds.[40]

1. General Use Channels

18. *Band segments (narrowband and wideband)*. APCO notes that we largely adopted the channel plan proposed by NPSTC (which APCO helped to develop).[41] APCO contends, however, that the adopted plan lacks necessary flexibility to meet the varying needs of each region for narrowband or wideband channels.[42] APCO requests, therefore, that we provide each RPC with additional flexibility to: (1) aggregate narrowband channels to create additional wideband channels and; (2) split wideband channels to produce additional narrowband channels.[43] APCO states that in either case, we should permit RPCs to modify the adopted band segments only as a last resort and that unassigned narrowband channels could not be aggregated unless and until all existing wideband channels were exhausted (and *vice versa* as to splitting unused wideband channels).[44]

19. The adopted band plan reflects the best current evaluation of the relative spectrum requirements for narrowband and wideband operations[45] whereas APCO's suggested rule change would permit each of the fifty-five RPCs to adopt irregular narrowband/wideband segments. We continue to believe that it makes sense to separate narrowband segments from wideband segments to ensure the placement of compatible communications types together in band segments. Ensuring compatibility removes an element of uncertainty as to the potential for adjacent channel interference, leading to less complicated frequency coordination requirements and more efficient use of the spectrum.[46] Nonetheless,

[38] *Id.* at 168, 169 ¶¶ 28, 29.

[39] The minimum channel size (building block) is 6.25 kHz for narrowband, and 50 kHz for wide band channels.

[40] *First Report and Order*, 14 FCC Rcd at 173-75 ¶¶ 38, 41.

[41] APCO Petition at 15, 16.

[42] *Id*.

[43] APCO Petition at 15, 16; *see also* NYSTEC Petition at 5, 6, 9, 10.

[44] APCO Petition at 15, 16. APCO adds that, due to the need to maintain a common nationwide channel plan for interoperability purposes, the interoperability channels should not be subject to such modifications. *Id.; see also* NYSTEC Petition at 9, 10.

[45] Accord APCO Petition at 15.

[46] *See id*., 14 FCC Rcd at 169 ¶ 31, n.76, citing Motorola Comments, Appendix at 4-7, NPSTC Comments Appendix A, and Florida Comments at 2-6.

we appreciate APCO's point that the need for narrowband or wideband channels will vary throughout the nation. We note in this connection that the existing waiver process[47] is available for individual applicants that demonstrate that all other alternatives have been thoroughly exhausted.[48] Moreover, as discussed below in Section A.3. (Location of Reserve Spectrum), we are adopting NPSTC's suggestion to relocate the reserve channels between the narrowband and wideband segments.[49] This action will provide future flexibility to adjust the dividing line between narrowband and wideband segments.

20. *Aggregation of narrowband channels*. Ericsson seeks reconsideration of our decision to limit the maximum aggregation of channels to four channels in the narrowband channel plan. Ericsson contends that limiting aggregation to four 6.25 kHz channel "building blocks" restricts the efficient accommodation of emerging technologies that have operating bandwidths between 25 kHz and 50 kHz. Thus, Ericsson proposes that we modify the narrowband channel plan to permit the aggregation of up to eight 6.25 kHz channels.[50]

21. We do not find this recommendation persuasive. The composite plan that we adopted in the *First Report and Order*, provides a careful balance of general use, interoperability, wideband, and narrowband channels based on all of the band plans submitted in response to the *Second Notice*.[51] We also adopted corresponding rules regarding channel pairing, the segments of the band to be used for narrowband and wideband applications, minimum and maximum channel sizes, and spectrum usage efficiency standards. Ericsson's proposal would allow data applications to use more than the 25 kHz of bandwidth for narrowband channels. We believe this to be unwise because permitting the aggregation of up to eight 6.25 kHz channels, the equivalent of a wide band channel (50 kHz), could prematurely deplete the availability of channels needed for narrowband voice and data operations.[52] Moreover, allowing wideband channels within a narrowband segment[53] creates the same interference potential discussed above.[54]

22. Most importantly, Ericsson's proposal also raises concerns related to spectrum efficiency because it could essentially defeat the efficiency safeguards of the adopted band plan.[55] As noted in the *First Report and Order*, public safety entities are generally insulated from market forces in regard to the

[47] *See, e.g.*, 47 C.F.R. § 1.925 (Waivers). We note as an administrative matter that a rule waiver request is the most appropriate process for determining, *e.g.*, whether all narrowband channels are exhausted in a given geographic area and that a specific proposal to use a portion of a wideband channel is truly a "last resort."

[48] *Accord* NYSTEC Petition at 9, 10 (Commission should allow for some flexibility in the channel plan but only after all other alternatives have been thoroughly exhausted).

[49] NPSTC Petition at 4. We acknowledge that NPSTC's original plan (which APCO helped to develop) called for this approach.

[50] Ericsson Petition at 6.

[51] *See, e.g., First Report and Order*, 14 FCC Rcd at 175, 176 ¶¶ 42–43.

[52] *Id.*, 14 FCC Rcd at 173 ¶ 38.

[53] The adopted band plan reflects the best current evaluation of the relative spectrum requirements for narrowband and wideband operations. *See* para. 18, *supra*.

[54] *See* para. 19, *supra*.

[55] *See, e.g.*, para. 17, *supra*.

acquisition of licenses for radio spectrum and the provision of public safety communications.[56] Instead, each jurisdiction typically provides public safety communications to better protect the safety of life and property — with spectrum utilization based more on budgetary limitations than on considerations of the most efficient and effective technologies.[57] Thus, the technical structure of standard channelization is appropriate to ensure that the 700 MHz public safety band spectrum is used efficiently in the absence of the market forces that discipline other services. Moreover, from a regional and national perspective, the record reflects that not enough spectrum is available to meet the long-term needs of the public safety community.[58] Thus, the adopted band plan incorporates a channelization approach that is based on the smallest practical channel sizes for narrowband and wideband public safety communications along with the "building block" approach to provide significant flexibility. Ericsson's proposal, however, would disturb this careful balance between efficiency and flexibility by allowing voice and data operations within the narrowband segment to use bandwidths of up to 50 kHz (*i.e.*, wideband).

23. Ericsson's proposal would also result in irregular channelization (intra-and inter-regional) whereas, as noted in the *First Report and Order*, standardizing channelization on a national basis provides for reasonably rapid development of a cost-based equipment market for the 700 MHz band. Standardizing channelization on a national basis also removes a major element of uncertainty as to the potential for interference due to irregular, overlapping channels (intra-or inter-region), leading to less complicated frequency coordination requirements and more efficient use of the spectrum.[59] Specifically, allowing nonstandard channels would create difficulties when overlapping channels are assigned to different types of users in nearby service areas. Interference and compatibility difficulties are currently issues in the refarmed bands below 512 MHz, where new channels were established in between existing channels.[60] Similar difficulties would arise in the 700 MHz band, *e.g.*, government and NGO users assigned on overlapping channels, if we allowed each RPC to assign nonstandard, overlapping channels. Moreover, the 700 MHz public safety band is newly allocated so, unlike the refarmed bands, we have an exceptional opportunity to adopt a channelization plan that promotes efficient use, balanced with significant flexibility and a minimum of overlapping channel assignments. We believe the adopted band plan, with some minor modifications adopted today, provides the appropriate balance based on the broad range of commenters. Finally, we note that the existing waiver process is available for truly unique and unusual circumstances.[61]

24. <u>*Set-aside for wideband HSD channels*</u> In his Petition, Powell requests that before allowing the RPCs to begin their planning process, we meet with members of the manufacturing, system integration and public safety communities to discuss a wideband channel plan that would permit development of a national public safety high speed data (HSD) network and still allow the RPCs

[56] *See, e.g., First Report and Order,* 14 FCC Rcd at 172 ¶ 37.

[57] *Id.*

[58] *See, e.g., PSWAC Final Report* at 21. "By the year 2010, as much as an additional 70 MHz may be needed for [voice and data] applications, including image and video requirements." *Id.* (Key Recommendation 2.2.1).

[59] *See id.*, 14 FCC Rcd at 169 ¶ 31, n.76, citing Motorola Comments, Appendix at 4-7, NPSTC Comments Appendix A, and Florida Comments at 2-6.

[60] *See generally* Replacement of Part 90 by Part 88 to Revise the Private Land Mobile Radio Services and Modify the Policies Governing Them, PR Docket No. 92–235, *Report and Order and Further Notice of Proposed Rule Making*, 10 FCC Rcd 10,076 (1995) (*Refarming First R&O*).

[61] *See* 47 C.F.R. § 1.925(b)(3); *see also* note 47, *supra.*

maximum flexibility to implement regional channel plans.[62] Powell states that the wideband plan and channel bandwidths action adopted in the *First Report and Order* will "severely hinder" any effort to establish a nationwide interoperability data network. Powell states that the need for an integrated wireless HSD network cannot be overstated and there is insufficient public safety spectrum, even including this new 24 MHz, to allow law enforcement agencies, much less other public safety users, to implement HSD systems.[63] Powell requests reconsideration of the wideband channel plan where nearly half of the available HSD spectrum is designated for wideband "General Use."[64]

25. We have considered Powell's request and concern regarding the public safety community's needs for HSD systems. As Powell indicates in his Petition,[65] in response to the *Second Notice*, the Commission received several suggestions for wideband channel plans. These proposals were discussed in the *First Report and Order* along with the rationale for our decision, based upon the record at that time, to designate the 12 megahertz of wideband spectrum as follows— 4.8 MHz to General Use, 1.8 MHz for Interoperability, and retain 5.4 MHz in Reserve.[66] We concur with Powell's expectation that HSD will be a highly desired product by the public safety community at large. After consideration of Powell's request, however, we affirm our original wideband general use decision which provided a balance between the wide range of competing wideband needs. Accordingly, we will retain 4.8 MHz for General Use. We believe the planning process of the RPCs will be sufficient to address Powell's concerns. We believe that any modification of the plan at this time could be premature depending upon the technical progress made in the not-too-distant future. Therefore, while we decline to modify our wideband plan at this time, we leave this issue open for further analysis and recommendations by the public safety community, RPCs, and the NCC as the technology progresses. In this connection, we note our decision in today's *Third Report and Order* reserving 5.4 megahertz of spectrum for future needs such as the Law Enforcement HSD network.[67]

2. Interoperability Channels

26. We established narrowband and wideband channels in the *First Report and Order* and set the standard channel bandwidth for narrowband channels at 6.25 kHz. We designated all of these channels as for general use, nationwide interoperability, or reserved subject to the *Third Notice*[68] and, specifically, we designated 2.6 MHz of spectrum for interoperability purposes.[69] This 2.6 MHz of spectrum included 128 narrowband channels for a total of 0.8 MHz of spectrum. We located thirty-two of the 128 channels in each of the four TV channels: two contiguous interoperability channels, skip two channels, two contiguous interoperability channels, skip six channels, two contiguous interoperability channels, skip sixty-six channels. This pattern is repeated five times. After the fifth repeat, eighty-four channels are skipped before arriving at the final two interoperability channels, for a total of thirty-two channels.[70]

[62] Powell Petition at 7.

[63] *Id*. at 5.

[64] *Id* at 6.

[65] *Id*. at 4.

[66] *First Report and Order*, 14 FCC Rcd at 175–177 ¶¶ 42–46 (Amount of Spectrum).

[67] *See Third Report and Order*, para. 68, *infra*.

[68] *See, e.g., id.*

[69] *Id.*

[70] *Id.* at 176–77 ¶¶ 45, 46.

Additionally, we paired the 128 channels (four times thirty-two) to make sixty-four channel pairs. We received requests from APCO and NPSTC to reconsider our decisions regarding the narrowband interoperability channeling plan.

27. *Narrowband interoperability channel size* APCO reiterates its initial proposal for a 12.5 kHz channeling plan based on the Project 25 Phase I (12.5 kHz) standards. APCO again requests that we revise the band plan to change the channelization for the narrowband interoperability channels from 6.25 kHz to 12.5 kHz. It states that a band plan with 12.5 kHz channelization would accommodate a wider range of equipment options and enhance competition and interoperability.[71] APCO further states that operation on 6.25 kHz channels, as opposed to 12.5 kHz, requires linear amplifiers and frequency stability techniques that are years from being widely available in the marketplace.

28. We have reviewed APCO's request and, while making no decision regarding Project 25 Phase I standards at this time, we decline to adopt a 12.5 kHz channeling plan.[72] We find no benefit to adopting a 12.5 kHz channeling plan because the 6.25 kHz channeling plan can accommodate the Project 25 Phase I (12.5 kHz) digital standard for interoperability, as recommended by the NCC,[73] by combining 6.25 kHz channel pairs. Thus, we find no advantage in amending the narrowband interoperability channel plan to 12.5 kHz channel spacing, particularly given that such action could require a return to a 6.25 kHz spacing plan at a later date depending on our decisions related to the interoperability digital standards.[74] We will make those decisions based on the record developed in response to our *Fourth Notice*.[75] However, regardless of the outcome of the *Fourth Notice*, we continue to believe that a 6.25 kHz channeling plan for the 700 MHz band provides the most flexibility for future technologies and a consistency of channel widths between the general use and the interoperability channels. Therefore, we are retaining the 6.25 kHz narrowband channel plan as adopted in the *First Report and Order*.

29. *Location of narrowband interoperability channels* NPSTC asks that we reconsider the narrowband interoperability plan to the extent that we change the spacing between interoperability channels. NPSTC asks that they be spaced 250 kHz apart.[76] NPSTC recommends that the interoperability channels should be in a sequence such as: Channel 19/20, 59/60, 99/100, 139/140, 179/180, 219/220, *etc.* NPSTC requests this reconsideration of the band plan to permit system operation

[71] APCO Petition at 11.

[72] Refer pending in Fourth Notice. . . . .

[73] *See* Public Safety National Coordination Committee Recommendations to the Federal Communications Commission for Technical and Operational Standards for Use of the 764–776 MHz and 794–806 MHz Public Safety Band Pending the Development of Final Rules, dated February 25, 2000 (*NCC Report*) at 21, 22 ¶¶ 68, 69.

[74] In the *First Report and Order*, we expected that in the next few years it would be both technically and economically feasible to use 6.25 kHz channels individually for operational modes such as digital voice and data. *See generally Refarming First R&O*, 10 FCC Rcd at 10,099 ¶ 38 (it is reasonable to expect manufacturers to produce 6.25 kHz equipment in the Refarming bands within ten years since 5 kHz systems are currently allowed in the 150–170 MHz band and 5 kHz systems are proliferating in the 220–222 MHz band). We note that the Project 25 Phase II standards have, in fact, been developed and incorporated into an ANSI standard and that these standards are expected eventually to be incorporated into commercially available equipment.

[75] *See Fourth Notice*, note 8 *supra*.

[76] NPSTC Petition at 3.

through a common antenna system where 250 kHz spacing represents the closest efficient use of transmitter combiners.[77]

30. We have considered the NPSTC request to change the spacing between the interoperability channels. We agree with NPSTC that this modification will permit the use of efficient transmitter combiners for common antennas and lower costs for public safety entities. Accordingly, we will relocate the narrowband interoperability channel sets in a more efficient pattern based on 250 kHz separations.[78] NPSTC's suggested pattern, however, would reduce the number of narrowband interoperability channels from 64 to 48 (6.25 kHz) channel pairs. Therefore, we will modify the narrowband interoperability plan giving consideration of 250 kHz separations but maintaining the equivalent number of channels (64 pairs) for narrowband interoperability.

31. *Location of wideband interoperability channels* NPSTC states that the wideband plan generally spaces the wideband interoperability channel groups apart from each other — thereby facilitating common antenna systems. However, two of the 150 kHz wideband interoperability groups in each wideband segment are immediately adjacent to each other.[79] NPSTC recommends changing this channel spacing plan for wideband channels to permit base stations to operate on a common antenna system.[80]

32. The wideband interoperability channel groups were generally spaced between 1200-1350 kHz apart, except for the two adjacent blocks noted by NPSTC.[81] Similar to the narrowband interoperability channels situation, we are also persuaded that modifying the wideband interoperability channeling plan will permit the use of efficient transmitter combiners for common antennas and lower costs for public safety entities using wideband technologies. Upon reconsideration, we amend the wideband interoperability plan to form the two groups of 150 kHz wideband channel groups, in a regular pattern spaced 450 kHz apart, based on efficient wideband combiner technology.

3. Location of Reserve Spectrum

33. NPSTC requests modification of the band plan to place the reserve spectrum between the narrowband and wideband channel segments as originally suggested in both their band plan proposal and Motorola's proposed band plan filed in response to the *Second Notice*.[82] NPSTC states that both plans recommended that we locate the reserve spectrum (channels not initially assigned) between the narrowband and the wideband channel segments so that the dividing line between those band segments could be adjusted to meet local and regional needs.[83] NPSTC notes that we located the reserve spectrum at mid-band locations distributed throughout the narrowband and wideband segments. NPSTC contends

[77] *Id.*

[78] Unlike the previous suggestions discussed above (*see* paras. 19 and 22), a rearrangement of channels continues to preserve the balance of wideband versus narrowband channels.

[79] The adjacent wideband interoperability groups are Channels 58-60, 61-63, 178-180, and 181-183. *See First Report and Order,* Appendix H-6 and H-7.

[80] NPSTC Petition at 3.

[81] *Id.*

[82] NPSTC Petition at 4.

[83] *Id.*

that in some metropolitan areas there will be a greater need for wideband channels than is allocated in our wideband plan.[84]

34. After consideration of NPSTC's request for reconsideration, we conclude that grouping the reserve spectrum into four segments of 1.35 MHz each located between the narrowband and wideband segments offers improved flexibility to accommodate future requirements that are unforeseen at this time. We, therefore, concur with NPSTC's petition and amend the placement of the wideband reserve spectrum.

B. Low Power Narrowband Frequencies for On-scene Communications

35. STI requests that we amend Section 90.531 of our Rules to modify the narrowband general use channel plan to designate twelve 6.25 kHz pairs specifically for nationwide use in a low power, analog modulation, person-to-person communications and personnel accountability reporting (PAR) system for on-scene, firefighting use.[85] STI notes that firefighters, and other public safety personnel working in environmentally hazardous settings, wear protective gear and self–contained breathing apparatus (SCBA) that makes ordinary voice communications extremely difficult, even at close range.[86] To overcome this problem, on-scene/PAR systems such as STI's[87] have SCBA masks with low power radios that provide hands-free, voice activated, firefighter-to-firefighter communication. Furthermore, STI notes that existing personnel alert safety systems (PASS) are ineffective when firefighters do not attach the separate PASS device to their gear and remember to activate it upon entry onto the fireground.[88] By comparison, STI avers that its multifunction system provides for improved communications and personnel alert safety and accountability reporting systems,[89] which STI believes should prevent some firefighter deaths and injuries.[90] STI claims that its on-scene/PAR system could be available for use within one year if we amend Section 90.531 of our Rules to designate (a) twelve channel pairs specifically for this use without going through the RPC process, and (b) Section 90.535 of our Rules to permit the use of only analog modulation in the on-scene/PAR system. STI contends that digital modulation is inferior to analog for use in the on-scene/PAR system for three reasons: (1) the SCBA mask radio would not operate as well with marginal signal strength (as signal strength goes down, digital

[84] *Id*.

[85] STI Petition at ii.

[86] STI Petition at 4.

[87] The on-scene/PAR system in development by STI is known as the MaskCom® Communications System. STI Petition at 2.

[88] STI notes that according to industry literature, an informal survey of nearly 1000 firefighters revealed that more than sixty percent did not activate their PASS devices at every fire, and a substantial number of firefighters similarly may not assure that they are carrying their PASS devices. STI Petition at 4–5 citing *Firefighter Fatalities*, National Fire Protection Association (NFPA) Journal, July/Aug. 1998 at 50, 56.

[89] STI Petition at 6. These personnel system functions include recording time and status on–scene, automatic monitoring of air supply, man-down alarming signals, evacuation signals, and homing signals to locate firefighters trapped or lost in buildings. STI notes that the homing signal feature will assist firefighters in locating downed, trapped or lost comrades in dangerous fires and with reduced risk to the rescuers. *Id.*

[90] STI Petition at 5. STI notes that 94 firefighters lost their lives in 1997, half while operating at the fireground or at other emergencies, and that firefighter injuries at the fireground numbered from 40,000 to more than 60,000 annually during 1988-1997. *Id.* citing *Firefighter Fatalities*, NFPA Journal, July/Aug. 1998 at 49-50.

reception drops altogether whereas analog continues to work with degraded performance); (2) digital equipment is more sensitive to ambient heat; and (3) digital radios tend to weigh more.[91]

36. APCO and AASHTO responded to STI's Petition and both support it. APCO also asks us to set aside a larger amount of spectrum than STI requested to accommodate additional low power public safety operations such as: police surveillance and tactical operations, urban search and rescue, and remote control of robotic devices.[92]

37. We conclude that there is merit to providing for low power public safety communication systems such as the on-scene/PAR system.[93] We are not convinced, however, that we should allocate 700 MHz spectrum exclusively for this one particular public safety low power application as requested by STI. We agree with APCO that there may be other low power applications that could operate in the 700 MHz band.[94] In instances where there is the potential for multiple low power applications, absent a compelling showing, we favor a sharing approach rather than making exclusive assignments for each specific application. In general, we believe low power operations can co-exist on the same frequencies with minimal potential for interference because of the low power restriction.[95] For these reasons, we will allocate twenty-four (6.25 kHz) channel pairs for low power mobile operations only.[96] The maximum effective radiated power (ERP) on these channels is limited to 2 watts.

38. As noted above, we believe that a low power sharing approach is appropriate here. However, to minimize further the potential for interference we are adopting some additional restrictions. We are designating the twenty-four pairs as low power channels nationwide. Further, since we believe most low power operations will operate in-region the vast majority of the time, we will require applicants for eighteen of the pairs (Channels 1-8 and 949-958)[97] to go through the regional planning process. The RPCs will be responsible for determining the most appropriate low power application(s) on these channels and the frequency coordinators will be responsible for providing appropriate interference protection.[98] We have not specified all twenty-four pairs for RPC oversight because we believe there may be public safety organizations who have low power needs and cross regional borders routinely, such as search and rescue organizations. Therefore, we will license the remaining six low power pairs (Channels

[91] STI Petition at 12-14.

[92] APCO Response to Petitions at 10; AASHTO *et al.* Reply at 9.

[93] In general, low power system operations have been beneficial to the private land mobile radio services. *See, e.g.*, Replacement of Part 90 by Part 88 to Revise the Private Land Mobile Radio Services and Modify the Policies Governing Them, PR Docket No. 92–235, *Report and Order and Further Notice of Proposed Rule Making*, 10 FCC Rcd 10,076, 10,110 ¶ 66 (1995) (*Reframing First R&O*).

[94] For example, the police may need low power frequencies in connection with physical surveillance, stakeouts, raids and other such activities.

[95] *See, e.g.*, Amendment of the Commission's Rules Concerning Low Power Radio and Automated Maritime Telecommunications System Operations in the 216-217 MHz Band, WT Docket No. 95-56, *Report and Order*, 11 FCC Rcd 18,517, 18,532 ¶ 34 (1996).

[96] The twenty-four 6.25 kHz channels (twelve 12.5 kHz channels) provides for the six 12.5 kHz low power channels STI says it needs and an additional six 12.5 kHz channels to satisfy other potential low power needs.

[97] Only one side of the pair is listed.

[98] For example, the RPCs would determine whether to allow the channel pairs to be used in a duplex operation or split the pairs to allow separate low power operations on each side of the pair.

9-12 and 959-960) on a nationwide, itinerant basis.[99] These six channels should provide for the communications needs of entities that routinely need to travel to different parts of the country and, because they are nationwide, we are exempting applications for the low power itinerant channels from the frequency coordination requirement. Finally, we clarify that a Commission license will be required for operation on any of the low power channels.

39. STI asks that we permit the use of analog modulation as the primary mode of modulation on its on-scene/PAR system and that the interoperability channel operating requirement not apply. In the *First Report and Order*, we adopted rules requiring all portable and mobile units to be capable of operating on all the narrowband interoperability channels and that when such equipment is operating on the interoperability channels, it be designed to use digital modulation as the primary mode.[100] The purpose of the digital modulation requirement was to make more efficient use of the spectrum. The reason for the interoperability requirement was to ensure that public safety entities could talk to one another. These requirements were cornerstones of the rules governing the public safety 700 MHz band. Thus, we are concerned about the potential negative impact of granting the exemption requested by STI. In this case, however, we believe a limited exemption of these two requirements may be in order but only for equipment that operates only on the designated low power channels. Low power systems by design make efficient use of the spectrum because they increase frequency reuse.[101] Further, low power systems such as the on-scene/PAR system are usually not designed to communicate with public safety entities outside "the system." Finally, granting a limited exemption will provide additional flexibility to design specialized, self-contained communications systems intended to enhance safety. Therefore, we will exempt equipment that is designed to operate only on the 700 MHz low power channels (capable of transmitting only on these designated low power channels) from the requirement of having to be capable of operating on all interoperability channels[102] and the primary digital modulation requirement.[103] For these same reasons, we will also exempt such low power equipment from the trunking requirement.[104] Finally, we caution that 700 MHz band radios without these capabilities are inappropriate for meeting the multitude of daily public safety communication requirements. Nonetheless, so long as these operational limitations/circumstances are understood, we agree that there is merit to providing for low power public safety communication systems.

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[99] *See* § 90.7 for a definition of itinerant operations.

[100] Mobile and portable units can have analog modulation capability, but only as a secondary mode in addition to the primary digital mode. *See First Report and Order*, 14 FCC Rcd at 211 ¶ 128, n.322.

[101] We have exempted low power equipment in the past from certain requirements because of the spectral efficiency attained through frequency reuse. *See, e.g.*, Replacement of Part 90 by Part 88 to Revise the Private Land Mobile Radio Services and Modify the Policies Governing Them, PR Docket No. 92–235, *Memorandum Opinion and Order*, 11 FCC Rcd 17676, 17,686–87 ¶¶ 20–22 (1996).

[102] *See* 47 C.F.R. § 90.547. We are also revising Section 90.547, on our own motion, to more clearly reflect the interoperability channel capability requirement that we adopted in the *First Report and Order*. *See First Report and Order*, 14 FCC Rcd at 213 ¶ 135. "We are adopting [new Section 90.547] to require that all narrowband mobile and portable 700 MHz band public safety radios be capable of operating on all of the narrowband nationwide interoperability channels." *Id.*

[103] *See* 47 C.F.R. § 90.535. Equipment that employs analog modulation as the primary mode of modulation must meet the emission mask and frequency stability requirements associated with PLMR 12.5 kHz channels at 900 MHz. *See* 47 C.F.R. §§ 90.210(d), 90.213.

[104] *See* 47 C.F.R. § 90.537.

V. THIRD REPORT AND ORDER

A. Use and Licensing of the Spectrum Reserved for the *Third Notice*

40. In the *First Report and Order*, we designated 12.6 megahertz of spectrum for general use, to be managed by regional planning committees (RPCs),[105] and 2.6 megahertz of spectrum for interoperability. We reserved the remaining 8.8 megahertz of spectrum "subject to the *Third Notice*."[106] In the *Third MO&O*, we decided to designate 0.3 megahertz of spectrum for low power operations.[107] Of this 0.3 megahertz of spectrum, we allotted 0.2 megahertz from the reserve spectrum and 0.1 megahertz from the general use spectrum. Additionally, 0.8 megahertz (128 narrowband channels) was set-aside pending the resolution of the interoperability guard band issue discussed in the *Fourth Notice* in this proceeding.[108] Consequently the amount of the spectrum currently under consideration "subject to the *Third Notice*" is 7.8 megahertz – 2.4 megahertz for narrowband operations (voice and data) and 5.4 megahertz for wideband technologies (image/HSD and slow motion video).[109]

41. In the *Third Notice*, we sought comment on three alternatives to govern the use and licensing of the reserve spectrum.[110] First, we sought comment on whether we should allow RPCs to administer the reserve spectrum, in addition to administering the 12.6 megahertz, we designated for General Use in the *First Report and Order*.[111] We also invited commenters to suggest modifications or refinements to the RPC process to improve the management of the reserve spectrum.[112]

42. Second, we sought comment on whether we should grant a single license to each state for the entire reserve spectrum and require the states – rather than RPCs – to manage all use of this spectrum by state, local, and Federal public safety providers.[113] We specifically invited states to comment on this

[105] We concluded that the RPC approach has been a reasonably successful method of ensuring that the public safety spectrum in the 800 MHz band was assigned fairly and efficiently and put to its most appropriate and efficient use. Nonetheless, we modified the 700 MHz RPC process after considering comments and experiences with the 800 MHz RPC process. *First Report and Order*, 14 FCC Rcd at 191 ¶ 78.

[106] *First Report and Order*, 14 FCC Rcd at 175-176 ¶ 43.

[107] *See* para. 37, *supra.*

[108] *See* note 8, *supra*.

[109] *See, e.g., First Report and Order*, 14 FCC Rcd at 170, ¶ 33. We noted that this reserve designation may be short term, based on the comments to the *Third Notice. Id.* Alternatively, we asked whether some or all of reserve spectrum should remain in reserve pending future developments. *Third Notice*, 14 FCC Rcd at 228, 233 ¶¶ 169, 181.

[110] *Third Notice*, 14 FCC Rcd at 228-233 ¶¶ 169–181.

[111] *Third Notice*, 14 FCC Rcd at 230 ¶ 173.

[112] *Id.*

[113] We noted that some commenters to the *Second Notice* argued that local politics, inadequate diversity of representation, lack of funding and training, and the inability to coordinate statewide channel assignments have hampered the 800 MHz RPC process. *Third Notice*, 14 FCC Rcd at 230 ¶ 172. We also noted that a number of states have developed statewide systems as a cost-effective way of sharing advanced technologies and that the RPC process may not lend itself as easily to these types of systems as a state-run process might. *Id.* at 230 ¶ 172. On the other hand, we also noted concerns that states administering statewide-shared system might be less responsive to the local needs and requirements of rural areas and more responsive to the needs of major metropolitan areas. *Id.* at 232 ¶ 178.

issue.[114] We requested comments on whether states should have to adhere to the same planning process as the RPCs.[115] Additionally, we asked whether state licensing would facilitate the construction of regional or statewide systems[116] and whether to permit states to use and share the spectrum with local political subdivisions, as well as Federal and other public safety providers. [117] We also sought comment on the appropriate amount of spectrum to assign to states.[118]

43. Finally, we also invited commenters to suggest other flexible licensing approaches to promote the development of a comprehensively planned public-safety communication system in the 700 MHz band as well as alternative uses of the 8.8 Megahertz that would promote innovative ways to serve the public safety community.[119] We specifically asked commenters to address the Commission's legal authority to adopt alternative licensing approaches.[120] We also sought comment on whether to continue reserving all or part of the reserve spectrum for future technological advances.[121]

44. Commenters generally focused on two issues: (1) state planning "versus" regional planning; and (2) whether states should receive some spectrum for their statewide use. As to the first issue, commenters generally favor using the RPC method for administration of the reserve spectrum.[122] APCO and other commenters assert that state administered spectrum would be an unfunded Federal mandate requiring states to establish a "sub-licensing" program.[123] A few commenters claim that a block of spectrum that is state-administered would not effectively, efficiently or responsively meet the radio communication needs of local public safety service providers.[124] While opposing state administered spectrum, APCO and others recommend that we require RPCs to set-aside a portion of the spectrum for statewide systems.[125] California and Florida recommend that RPCs manage the reserve spectrum but they further recommend that we require RPCs to set-aside a portion of the spectrum for statewide and multi-

[114] *Third Notice* 14 FCC Rcd 232 ¶ 178.

[115] *Third Notice*, 14 FCC Rcd 232 ¶ 178.

[116] *Third Notice* 14 FCC Rcd 232-233 ¶ 178, 179. We asked whether regional or statewide systems would provide the economies of scale and scope that would increase incentives for other public safety providers to participate in the regional or statewide system. *Id.* at 231 ¶ 175.

[117] *Id*. at 232-233 ¶ 179. We noted that, should we decide to license individual states, we would need to revise 47 C.F.R. § 90.179 (Shared use of radio stations) to allow each state licensee to authorize appropriate public safety agencies within the state to use the spectrum pursuant to the state licensee's authorization. *Id.* at 234 ¶ 183. We also proposed to amend 47 C.F.R. § 90.1 to reflect that the scope of Part 90 does not govern the licensing of radio systems belonging to and operated by the United States. *See Third Notice*, 14 FCC Rcd at 234 ¶ 183 *citing* 47 U.S.C. § 305(a).

[118] *Third Notice* 14 FCC Rcd 232 ¶ 178.

[119] *Third Notice*, 14 FCC Rcd 233 ¶ 181.

[120] *Id.* at 234, ¶ 184.

[121] *Third Notice*, 14 FCC Rcd 233 ¶ 181.

[122] *See e.g.*, APCO Comments at 3-4; IACP Comments at 7; Cities Comments at 4.

[123] Arizona Reply Comments at 8; APCO Comments at 3.

[124] Cities Comments at 15; UTC Comments at 7.

[125] APCO Comments at 3; California Comments at 2; IACP Comments at 3.

jurisdictional radio systems.[126] Arizona objects to a state planning, instead of regional planning, approach to spectrum management, and it prefers that the RPC manage the spectrum planning, but it has no objection to the licensing of spectrum directly to the state as a blanket license for its internal use.[127]

45. As to the second issue, many commenters support licensing some spectrum directly to the states.[128] Joint Commenters AASHTO, *et al.*, representing various public safety groups,[129] support licensing each state to administer the 8.8 megahertz of reserve spectrum as delineated in the *Third Notice*.[130] Of the comments received by the states, only California opposes giving states a direct license of at least a portion on the reserve spectrum.[131] Florida, New York, Pennsylvania, Virginia, and Arizona, support direct licensing to the state of at least a portion of the reserve spectrum and see no advantage to management of such state spectrum by the RPCs.[132] New York (*i.e.*, NYSTEC) suggests allocating a portion of the reserve spectrum for statewide use.[133] Pennsylvania strongly urges assigning at least some portion of the reserved spectrum directly to the states. Virginia supports state licensing rather than using RPCs, and it supports state administration of the 8.8 megahertz of reserve spectrum.[134]

46. One commenter, FLEWUG, opposes both RPCs and state-based licensing, and contends that neither process is appropriate or sufficient for licensing the reserve spectrum.[135] It suggests that an expanded NCC becomes the controlling authority for administering and licensing the 8.8 megahertz of reserve spectrum.[136] FLEWUG avers that it is premature to make any further determination as to the use of the reserve spectrum and suggests we defer any decision regarding this spectrum at this time.[137] It

[126] California Comments at 2.

[127] Arizona Reply Comments at 8.

[128] *See e.g.*, NPSTC Comments at 6; Los Angeles Comments at 2; UTC Comments at 2; PSWN Comments at 10.

[129] *See* Joint Commenters AASHTO, *et al.* Comments at 1 (the joint commenters are American Association of State Highway and Transportation Officials (AASHTO), Forestry Conservation Communications Association (FCCA), International Association of Fire Chiefs, Inc. (IAFC), International Association of Fish and Wildlife Agencies (IAFWA), International Municipal Signal Association (IMSA), and National Association of State Foresters (NASF)).

[130] Joint Commenters AASHTO, *et al.* Comments at 3-4.

[131] Tennessee DOT and Wisconsin submitted comments in response to the *Third Notice* but neither addressed the licensing of the 8.8 MHz of reserve spectrum.

[132] Florida Comments at 3; Pennsylvania Comments at 5; Reply Comments at 3, Virginia Comments at 1; Arizona Reply Comments at 8 (Arizona does not object to a state license for its internal use).

[133] NYSTEC Comments at 7. (NYSTEC provides technical assistance to New York State in defining and procuring a next-generation, statewide wireless communications system. NYSTEC Comments at 3.)

[134] Virginia Comments at 1.

[135] FLEWUG Comments at 4.

[136] *Id.*

[137] *Id* at 6.

recommends we refer this matter, *i.e.*, the use of the reserve spectrum, to the NCC for further examination.[138]

47. Upon review of the extensive record in this proceeding and based on the Commission's considerable experience in licensing public safety entities, we believe a two-fold approach is best for the 7.8 megahertz of reserve spectrum.[139] We conclude that the 700 MHz plan should be augmented by designating the narrowband segment (2.4 megahertz, or ten percent of the spectrum) as an optional geographic state license, while holding the wideband segment (5.4 megahertz, or twenty-two percent of the spectrum) in reserve for future expansion.[140] We believe this decision complements the current 700 MHz plan, whereby RPCs administer 12.5 megahertz, or fifty-two percent of the spectrum – 7.7 megahertz for narrowband operations (voice and data) and 4.8 megahertz for wideband technologies (image/HSD and slow motion video). This decision responds to the majority view that a certain portion of the spectrum needs to be set-aside for statewide systems, either licensed directly to the states or administered through the RPCs.[141] We further believe, for the public safety radio service where market incentives do not apply, that it is prudent to hold some spectrum in reserve to accommodate future requirements that are unforeseen at this time. This decision is in line with those parties, which filed either Petitions for Reconsideration to the *First Report and Order* or comments to the *Third Notice*, that suggest that our 700 MHz plan either lacks flexibility or needs further study.[142]

1. State License

48. As discussed above, we conclude that each state should have an option to receive a statewide license for up to 2.4 megahertz of 700 MHz band public safety spectrum. The Commission has long encouraged public safety agencies to develop wide-area multi-agency trunked public safety radio systems and the 700 MHz band public safety allocation offers a unique opportunity to facilitate the development of these systems.[143] Under this approach, states will have limitless possibilities to apply their unique expertise and knowledge to best use the radio spectrum to meet the public safety needs of their citizens. Specifically, state licensees will have significant flexibility in terms of the technologies, programs/systems to deploy — so long as the spectrum is used for public safety services as required by Section 337 of the Communications Act.

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[138] *Id.*

[139] As decided in the *First Report and Order* and modified by the *Third MO&O*, the composite band plan provides 7.8 megahertz of reserve spectrum split as follows — 2.4 megahertz for narrowband operations (voice and data) and 5.4 megahertz for wideband technologies (image/HSD and slow motion video).

[140] The 7.8 megahertz of reserve spectrum subject to current consideration is split between narrowband and wideband segments – 2.4 megahertz narrowband and 5.4 megahertz wideband.

[141] Joint Commenters AASHTO, *et al.*, Arizona, Florida, Pennsylvania, Virginia, and NYSTEC supported either all or a portion of the reserve spectrum be designated for direct state licenses. While opposing the state licensing, APCO, IACP, NPSTC, and California recommended that RPCs be required to set-aside a portion of the reserve spectrum for statewide or wide-area systems. *See*, Joint Commenters AASHTO, et al. Comments at 1. Arizona Reply Comments at 8. Florida Comments at 3. Pennsylvania Comments at 5 and Reply Comments at 3. Virginia Comments at 1. NYSTEC Comments at 7. APCO Comments at 6. IACP Comments at 3. NPSTC Comments at 6. California Comments at 2.

[142] APCO Petition at 15, 16. Powell Petition at 5. NPSTC Petition at 4. (discussed above in the *Third MO&O* at paragraphs 17, 23, and 32.) FLEWUG Comments at 6.

[143] *See, e.g.*, *Third Notice*, 14 FCC Rcd at 230-31 ¶¶ 174-75.

49. Licensing up to 2.4 megahertz of the reserve spectrum to each state is consistent with a majority of the commenters — those supporting state licensing for either all or a portion of the spectrum as well as those parties requesting that RPCs set aside spectrum for state-wide use.[144] The PSWAC Transition Subcommittee (TRSC)[145] also reported solid support for state wide and area wide system licensing and operation — so long as such licenses are for state operations and based on state and local governments having joint planning, ownership, and operation of such systems.[146] TRSC described a sampling of these systems then under development by the States of Colorado, Michigan, Louisiana, and Iowa and surrounding states.[147] TRSC emphasized that "[i]t is important not to confuse state licenses for [state agency] operations [with state licenses] for operations with other than state agencies on a shared basis."[148] Specifically, TRSC contrasted the solid support for state wide and area wide system licensing with any block license approach that would create spectrum management roles for states. TRSC averred that the state planning approach would raise complex issues including: (1) whether states want to be spectrum managers; and (2) the extent to which such a role would affect the "balance of power" between the state and local governments within their boundaries.[149] Accordingly, we conclude that states with bold visions for expansive statewide/regional coverage should have the option to receive a direct State License as a new tool for addressing their communication requirements.

50. State License complements the RPC process. The State License approach complements the RPC process by ensuring that each state receives a significant amount of spectrum for statewide use, because the RPC process, by definition, may not focus on the statewide needs of every state.[150] In this regard, we note that several commenters want the FCC to make significant changes to the process to correct alleged deficiencies (in the RPC process adopted in the *First R&O*),[151] or assume oversight of RPCs.[152] California notes that because wide-area systems reduce the availability of not only the channels assigned to the system but also the adjacent channels which might present interference situations, states are at a distinct disadvantage in arguing within the regional planning structure for spectrum.[153] PSWN notes that states, due to their status as the largest users of spectrum, may find it difficult to objectively

[144] APCO Comments at 3-6; APCO Reply Comments at 3; Florida Comments at 3; Pennsylvania Comments at 5; Pennsylvania Reply Comments at 5; Virginia Comments at 1; Joint Commenters AASHTO, *et al.* Comments at 1; NYSTEC Comments at 22-23; Arizona Reply Comments at 8; California Comments at 5-7.

[145] The Transition Subcommittee examined and proposed procedures for public safety agencies to transition to new technologies and new spectrum in an efficient, cost effective manner that does not interfere with their critical operations. *PSWAC Final Report* at 726 (Transition Subcommittee Report § 1.0).

[146] *PSWAC Final Report* at 754 (Transition Subcommittee Report §§ 7.2.12-13). "The Transition Subcommittee supports such planning and priority licensing for shared state or area systems." *Id*. at 754 (§ 7.1.13).

[147] *PSWAC Final Report* at 751-53 (Transition Subcommittee Report at § 7.2.8). TRSC observed that the state is the largest spectrum user in most instances. *Id.* at 755 (Transition Subcommittee Report § 7.2.14). TRSC noted that the system in Iowa, and surrounding states, is Racom's commercial wireless, trunked digital system that offers law enforcement customers "ruthless preemption" over business customers. *Id.*

[148] *Id*. at 754 (§ 7.1.13.).

[149] *Id*. at 755 (§ 7.2.14).

[150] *Third Notice*, 14 FCC Rcd 231 ¶ 176.

[151] PSWN Comments at 7-8; Region 20 Comments at 4; Cities Comments at 10-13.

[152] PSWN Comments at 7-8; API Comments at 7-8.

[153] California Comments at 5.

weigh its spectrum needs against those of local governments, counties and cities.[154] PSWAC noted that while the regional planning for the 800 MHz band has been reasonably successful overall, the process may have frustrated state government's inherent interest in planning public safety communication solutions on a statewide basis by fragmenting the management of the 800 MHz RPC spectrum.[155]

51. Although some commenters favor an approach whereby the RPCs set-aside spectrum for statewide or regional systems, we believe it would be administratively burdensome, complicate coordination, and possibly increase the potential for interference. While favoring the RPC process, California asks us to require RPCs to assign channels for state use only pursuant to a specific channelization pattern.[156] Florida sees no advantages to RPC management of any portion of the spectrum that we might allocate for statewide use.[157] We agree with these views and find that a uniform channel plan facilitates the development of state systems whereas allowing each of the fifty-five RPCs to adopt irregular channel plans would complicate the inter-regional coordination and increase the potential for interference. We disagree with APCO's assertion that RPCs should have the responsibility to designate which frequencies to set-aside in consultation with RPCs from neighboring regions to maximize re-use of the spectrum.[158] Co-channel and adjacent channel assignments need to be judiciously spaced (*i.e.,* frequency re-use) to avoid interference regardless of whether the assignments are used by neighboring states or other public safety entities (*e.g.,* city or county governments). In fact, we believe designating consistent frequencies to states would promote frequency re-use because each state would have a vested interest in designing optimal frequency plans for both parties. It also simplifies border-area coordination to a state-to-state discussion rather than multiple state-to-regional, *i.e.,* numerous counties and other local jurisdictions, discussions. Consequently, we will designate certain spectrum for State Licenses rather than requiring RPCs to set-aside spectrum.

52. State License – 2.4 megahertz of spectrum. We conclude that designating 2.4 megahertz for state licensing is in line with the spectrum needs identified by those commenters who suggested designating specific amounts of spectrum for state use. While the commenters sought amounts ranging from APCO's suggestion of 1.25-2.0 megahertz as the minimum for the RPCs to set-aside[159] to Joint Commenters AASHTO, *et al.* and Virginia's request for all 8.8 megahertz of the reserve spectrum, most commenters sought between 2.5 to 3.75 megahertz of spectrum. NYSTEC suggests *at least* 2.5 megahertz of spectrum should be designated for statewide systems.[160] California requests 2.8 megahertz

[154] PSWN Comments at 10 *citing PSWAC Final Report* at 755 (Transition Subcommittee Report § 7.2.14).

[155] *PSWAC Final Report* at 315.

[156] California Comments at 5. "The State requests that the Commission assign [2]00 [6.25 kHz] channel pairs (2.5 MHz of spectrum) for state use only. The State further requests that these . . . channel[s] be spread across the entire band, grouped in into at least 20 sets of adjacent channels with at least 200 kHz separation between each set." *Id.* California separately noted that the "failure of just one [RPC] to provide appropriate channel assignments can destroy the state's ability to meet its communication need." *Id.* at 4.

[157] Florida Comments at 3.

[158] APCO Comments at 6.

[159] APCO initially suggested requiring RPCs to set aside a *minimum* of 1.25 MHz for state-wide use, but later noted support for a minimum of 2 MHz for state-wide use. APCO Comments at 6. (*Emphasis in original*.) APCO Reply Comments at 3.

[160] NYSTEC Comments at 23.

of spectrum for state systems and another 3.1 for multi-jurisdictional radio systems.[161] Florida requests 3.75 megahertz of spectrum.[162] Arizona has no objection to licensing all 8.8 megahertz of the reserve spectrum to the State, as a blanket license for its internal use.[163] Based on the comments, we believe 2.4 megahertz strikes the right balance between providing states sufficient spectrum to fully explore and implement state-wide public safety systems and providing states with an amount of spectrum that would either lie fallow or be used in an inefficient manner.[164]

53. While we acknowledge that each state has varying communications requirements, our decision to designate 2.4 megahertz of spectrum is consistent with the record before us. Adopting the same amount of spectrum for all states, regardless of size, is reasonable because the needs of smaller states for frequencies to satisfy communications requirements of high-density population areas will be similar to needs of larger states to cover fewer urban centers spaced over expansive geographic areas. Moreover, as discussed above, designating consistent spectrum for state use offers distinct benefits such as improved coordination. Consequently, we will adopt the same 2.4 megahertz of spectrum for all states.[165] As noted above, we are providing states the same 2.4 megahertz of spectrum nationwide to "open the door" for states to consider cooperative arrangements with their neighbors for new, reliable 700 MHz band radio networks to address interstate public safety concerns such as natural disasters, forest fires, search and rescue missions, and highway emergencies or maintenance. Designating the same 2.4 megahertz of spectrum nationwide provides additional opportunity for the development of interoperability capabilities as well as the potential acceleration of the introduction of new equipment designed to take advantage of this spectrum.[166] Designating the same 2.4 megahertz should also improve interstate frequency coordination, thereby decreasing the potential for interference at state borders.

54. State License is a geographical area license. For commercial mobile radio services, the Commission has concluded that licensing based on pre-defined service areas poses significant advantages, over site-based licensing, because of the greater operational flexibility it affords licensees, its inherent

[161] California requests 2.5 MHz (200 pairs of 6.25 kHz channels) for narrowband operations and 0.3 MHz wideband for state systems. California Comments at 6. California also noted that 8.8 MHz of spectrum is too large an amount for state internal use. California Comments at 3.

[162] Florida requests 2.5 MHz (200 pairs of 6.25 kHz channels) for narrowband operations and 1.25 MHz for wideband. Florida Comments at 4.

[163] Arizona Reply Comments at 8. Arizona adds "[i]f the 8.8 megahertz of spectrum is licensed to the State directly for their own use only, then there is no reason for them to share in the general pool of frequencies." *Id.*

[164] We acknowledge that by designating 2.4 megahertz for state use, we are providing states with almost the same amount of spectrum that we allocated for nationwide interoperability. However, we believe this designation reflects the states need of spectrum for daily, routine use over a specific area, usually employing trunked infrastructure, while interoperability is almost exclusively used on a unit-to-unit, mutual aid basis in response to a concentrated, geographically-based incident.

[165] We feel that 2.4 MHz should be more than enough spectrum to ameliorate this potential problem in most states. We note that, in the event that 2.4 MHz proves to be an insufficient amount of bandwidth, states can seek additional spectrum from RPCs or pursue joint ventures with local governments to implement state/regional systems.

[166] We anticipate these developments could provide economies of scale and other benefits to state agencies and other government public safety agencies within the state. These developments also provide opportunities for less affluent localities to take advantage of the latest public safety technology by designing their systems around the use of the state-wide spectrum.

ability to simplify system expansion, and its easing of the administrative burden on the Commission.[167] While APCO states that statewide systems are not incompatible with regional planning and cites that numerous statewide systems have been approved within the 800 MHz band, we believe a geographic license offers some distinct advantages.[168] PSWAC noted that the implementation of wide-area systems by the public safety community has been hindered, in part, by the Commission's site-by-site licensing process for public safety radio.[169] Frequency-by-frequency, site-by-site, planning is a costly and time-consuming process for states that are seeking to assemble spectrum building blocks at the local level and aggregate into a statewide structure.

55. We conclude that a geographical license for states is a logical outgrowth of the RPC process and we believe it would provide a valid approach to the varying communications needs of all sectors of the public safety community – federal, state, and local.[170] Generally, when spectrum is used for private internal services, including public safety, it is not necessary to develop geographic area licensing [to ensure that service is widely available to the general public].[171] However, site-by-site licensing is designed primarily to license dispatch radio systems on a transmitter-by-transmitter basis in local areas [markets] and the Commission has recognized that this licensing process is very cumbersome for radio systems comprised of several hundred sites.[172] It also deprives licensees that need to cover a wide geographic area of flexibility to move transmitter sites throughout a defined service area without obtaining our prior approval.[173]

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[167] *See, e.g.*, Implementation of Sections 3(n) and 332 of the Communications Act, Regulatory Treatment of Mobile Services, Amendment of Part 90 of the Commission's Rules to Facilitate Future Development of SMR Systems in the 800 MHz Frequency Band, Amendment of Parts 2 and 90 of the Commission's Rules to Provide for the Use of 200 Channels Outside the Designated Filing Areas in the 896-901 MHz and 935-940 MHz Band Allotted to the Specialized Mobile Radio Pool, PR Docket Nos. 89-553, 93-144, GN Docket No. 93- 252, *Third Report and Order*, 9 FCC Rcd 7988, 8044 (1994).

[168] APCO Comments at 5. (APCO cites the statewide systems of Minnesota, Ohio, Florida, Colorado, Connecticut, California, and Michigan. *Id.*)

[169] *PSWAC Final Report* at 315. PSWAC also noted a reticence of individual agencies to surrender some autonomy in return for the efficiencies and better coverage of the larger system. *PSWAC Final Report* at 317-318. We note, however, that PSWAC contends that in many instances perceived losses in terms of independence of operation are more than offset by improvements in function and efficiency. *PSWAC Final Report* at 3.

[170] On a related point regarding administration of interoperability spectrum, Florida, Pennsylvania, FLEWUG, and PSWN, indicate that state communication systems are the most appropriate "bridge" between local and Federal government agencies. *See*, Florida Comments at 5, Pennsylvania Reply Comments at 3; FLEWUG Comments at 17-18; and PSWN Comments at 15.

[171] We recently decided that a site-by-site licensing scheme with frequency coordination is the best approach to licensing the 928/952/956 MHz bands (Multiple Address Systems) because we reserved these bands for private internal use. *See* Amendment of the Commission's Rules Regarding Multiple Address Systems, WT Docket No. 97-81, *Report and Order*, FCC 99-415 at ¶ 45 (rel. January 19, 2000).

[172] *See* Amendment of Part 90 of the Commission's Rules to Facilitate the Future Development of SMR Systems in the 800 MHz Frequency Band, PR Docket No. 93-144, Implementation of Sections 3(n) and 322 of the Communications Act – Regulatory Treatment of Mobile Services, GN Docket No. 93-252, Implementation of Section 309(j) of the Communications Act – Competitive Bidding, PP Docket No. 93-253, *Second Report and Order*, 12 FCC Rcd 19,079 (1997).

[173] *Id.*

56. In determining what type of geographic area license is most appropriate for particular wireless services, we have considered such factors as the nature of the service (*e.g.*, technological constraints), the presence of natural markets, cost of build-out, and the range of services that can be offered in the most rapid and efficient manner. This determination has led to the use of a variety of different license areas (*e.g.*, Metropolitan Statistical Areas, Economic Areas). In this case, the geopolitical boundaries of each state form an appropriate and convenient geographical licensing area for public safety radio spectrum. Noting that spectrum propagation does not honor state boundaries, APCO cites the northeast where regions are organized around multi-state metropolitan areas as a drawback to state licensing.[174] We reject this argument, because, as Pennsylvania points out, radio signals do not respect the artificial boundaries of the RPCs.[175] Indeed, the northeast, where RPCs are metropolitan based rather than state-based, have provided some of our most complicated and vexing problems to be solved. Consequently, we conclude that an optional state-based geographic license is desirable and offers some distinct advantages over RPCs for managing spectrum designated for state operations.

57. State License promotes efficient spectrum use and allows economies of scale. Experience with geographic area licensing in the commercial wireless sector demonstrates that geographic area licenses often encourage the rapid development and deployment of innovative service, facilitate interoperability and operational standards while allowing economies of scale that encourage the development of low cost equipment.[176] APCO contends that, although a few large states may well have the capability to administer the reserve spectrum, most state governments are ill-equipped and unwilling to manage radio spectrum, nor are they able to fund such activities in most cases.[177] Pennsylvania disagrees and notes that the states have the technical and policy expertise to construct wide-area systems and to manage the use of spectrum licensed to the state.[178] We concur, and cite the many state systems currently being built or planned as evidence of the expertise and resources being expended by the states.[179] We believe that providing each state with up to 2.4 megahertz of spectrum will give each state greater latitude to implement spectrum saving technologies in public safety communications by allowing states to plan and develop shared, wide-area systems under a substantially streamlined FCC licensing process.[180] We further note that shared, wide-area systems, *i.e.*, large trunked systems, can provide service to many governmental entities in a given geographical area, which provides greater spectrum efficiency than systems incorporating many smaller non-trunked systems or systems trunked on fewer channels.[181]

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[174] APCO Comments at 4.

[175] Pennsylvania Comments at 4.

[176] *See, e.g.*, Amendment of the Commission's Rules to Establish Part 27, the Wireless Communications Service, GN Docket No. 96-228, *Report and Order*, 12 FCC Rcd 10785, 10814 (1997).

[177] APCO Comments at 3.

[178] Pennsylvania Reply Comments at 2.

[179] *E.g.*, California, Delaware, Florida, Louisiana, Michigan, Missouri, Montana, New Hampshire, Pennsylvania, South Carolina, Virginia, and Utah. *See Third Notice*, 14 FCC Rcd at 232 ¶ 178; *see also* text accompanying note 147, *supra.*

[180] One of the goals identified in the *Second Notice* was the promotion of efficient and effective use of the new spectrum, and, one of the keys to efficient spectrum use is accommodating local, state, and regional needs. *Second Notice*, 12 FCC Rcd at 17,711 and 17,715.

[181] *PSWAC Final Report* at 317-318. Shared systems also offer a high level of built-in interoperability. *Id.*

58. We also believe that our decision may give state public safety agencies greater access to cutting-edge technology that will not only allow them to achieve greater efficiencies in the performance of their duties, but also will reduce danger to public safety personnel.[182] As noted in the *Third Notice*, the development of state-wide systems that include state agencies of various sizes may allow states to more easily deploy state-of-the art systems, due to the economics of scale and scope. Pennsylvania further notes that these wide-area, state systems can provide economies of scale and other benefits to state agencies and local public-safety agencies within the state.[183] States deploying such systems decrease the cost that any one agency needs to bear for infrastructure and lowers the per-user cost for the whole system.[184] Thus, a statewide system could serve as the backbone for delivering new technologies in a cost-effective way to localities throughout the state. Rather than bypassing local communications needs, the statewide system is a way to ensure that jurisdictions in the state are not divided into communications "haves" and "have-nots."

59. The State License approach that we are adopting is also in line with PSWAC's recommendations to (1) encourage more sharing and joint use of spectrum resources in light of the considerable success some states and regions are experiencing in pooling spectral resources, and (2) consider block allocations for public safety use and adopt flexible licensing policies that encourage the use of the most spectrally-efficient technology to meet user defined needs.[185]

a. Licensing and Operational Requirements

60. Based on the channel plan and other decisions set forth above, we will allow any state[186] that chooses to take advantage of spectrum that we have designated for state use to file an application for up to 2.4 megahertz of this spectrum no later than December 31, 2001.[187] We believe that providing states this amount of time to apply for this spectrum allows every state at least one legislative cycle or fiscal year to allocate the funds necessary to plan, prepare, and implement the use of the spectrum.[188] What ever part of this 2.4 megahertz that a state has not applied for by December 31, 2001, will revert to General Use and be administered by the relevant RPC (or RPCs in the instances of states that encompass multiple RPCs).

61. Upon receipt and processing of a state's application, we will issue a license directly to the governor of each state, or its designee.[189] The Communications Act imposes no time limit on licenses issued by the Commission, other than those for broadcast services, which are limited to an eight-year

[182] *See, e.g., PSWAC Final Report* at 2.

[183] Pennsylvania Comments at 5, *see also* NYSTEC Comments at 22-23; PSWN Reply Comments at 8.

[184] *Third Notice*, 14 FCC Rcd 231 ¶ 176.

[185] *See PSWAC Final Report* at 2-4, 19 (Key Finding 2.1.7), 22-23 (Key Recommendation 2.2.3).

[186] We are adopting a definition of "state" that includes United States territories and possessions. *See* 47 C.F.R. § 90.7, as amended (Appendix F).

[187] States will use FCC Form 601 for this application.

[188] We also believe that by allowing each state to elect whether to take the designated spectrum, we address Arizona and APCO concerns and avoid imposing an unfunded mandate on those states that do not wish to utilize the spectrum. Similarly, we believe that allowing states to apply for less than the full 2.4 megahertz of spectrum that will also avoid imposing an unfunded mandate and help to ensure the efficient utilization of this spectrum.

[189] *Accord, e.g.,* Florida Comments at 8 (Florida recommends that the Governor's office of each state be responsible and accountable for development and construction of a state use plan); Virginia Comments at 1.

license term.[190] Section 90.149 of our Rules[191] provides for ten–year license terms in the Private Land Mobile Radio Services.[192] In the context of 700 MHz band geographic–area licenses, we are concerned that the continued existence of incumbent broadcasters in the state license spectrum may retard a licensee's development and use of the spectrum.[193] Thus, we are modifying the license term for the state license to accommodate licensees' need for additional time to develop and use this spectrum, in light of its continued use by broadcasters until 2006 at the earliest. Subject to the conditions set forth below, the initial license term for these licenses will be fifteen years.[194] States can subsequently renew these licenses for additional ten-year periods. Renewal will not be automatic, but state licensees will have a renewal expectancy subject to the conditions set forth below.

62. *Conditions of Grant* We believe it is necessary to establish construction and operation requirements to ensure efficient use of the spectrum including the provision of service to rural, remote, and insular areas. We believe setting our initial construction/operation benchmark at five years is consistent with our experience and Rules for public safety/government entities.[195] Because incumbent broadcasters are not required to complete relocation to other portions of the spectrum until December 31, 2006, we will calculate the five–year benchmark using January 1, 2007 as the starting date.[196]

63. Accordingly, each state license will be granted subject to the condition that the state certifies on or before each applicable benchmark date (see below) that it is:

- providing or prepared to provide "substantial service"[197] to one-third of their population or territory[198] by January 1, 2012, *i.e.*, within five years of the date that incumbent broadcasters are required to relocate to other portions of the spectrum;"

[190] *See* 47 C.F.R. § 73.1020(a).

[191] *See* 47 C.F.R. § 90.149(a) (2000).

[192] *See* 1998 Biennial Regulatory Review -- 47 C.F.R. Part 90 - Private Land Mobile Radio Services, WT Docket No. 98-182, Replacement of Part 90 by Part 88 to Revise the Private Land Mobile Radio Services and Modify the Policies Governing Them and Examination of Exclusivity and Frequency Assignment Policies of the Private Land Mobile Services, PR Docket No. 92-235, *Report and Order and Further Notice of Proposed Rulemaking*, FCC 00-235 at ¶¶ 9-10 (rel. July 12, 2000) (*Part 90 Biennial R&O*).

[193] *See* Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission's Rules, WT Docket 99-168, *First Report and Order*, 15 FCC Rcd 476, 504 ¶ 67 (2000) (*Commercial 700 MHz R&O*).

[194] We adopted fourteen year license term for geographic area licensees in the commercial 700 MHz band. *See id.* As discussed immediately below, however, the "substantial service" deadline for state licensees will be January 1, 2017. We envision granting state licenses early in the year 2002, thus necessitating a fifteen year license term.

[195] *See* 47 C.F.R. §§ 90.155(b), 90.629(b).

[196] We may defer this date (and thus extend the deadlines) if the DTV transition period for a relevant market is extended as set forth in 47 U.S.C. § 309(j)(14)(B) (*e.g.*, markets where 15% or more households do not have access to either DTV-equipped receivers or multi-channel video). In addition, given the large geographic licensing areas, each with a number of incumbent broadcasters, we are setting a definite license term, rather than one dependent on the date on which incumbent broadcasters complete their digital television transition. *See Commercial 700 MHz R&O*, 15 FCC Rcd at 504 ¶ 67.

[197] The term "substantial service" – a term more commonly used in a commercial wireless context – is used for convenience herein to refer to the construction and operation of 700 MHz facilities by public safety entities providing "service which is sound, favorable, and substantially above a level of mediocre service which just might

- providing or prepared to provide "substantial service" to two-thirds of their population or territory by January 1, 2017, *i.e.*, within ten years of the date that incumbent broadcasters are required to relocate to other portions of the spectrum.

- We will deem a state "prepared to provide substantial service" if the licensee certifies that radio system has been approved and funded for implementation by the deadline date.

- If a licensee fails to meet any condition of the grant the license is modified automatically to the frequencies and geographic areas where the state certifies that it is providing substantial service.

    - Any recovered spectrum will revert to General Use. [199]

    - We clarify, however, that spectrum licensed to a state under a state license remains unavailable for reassignment to other applicants until the Commission's database reflects the parameters of the modified state license.

64. We conclude that these construction and operation requirements constitute effective safeguards and performance requirements for the efficient use of this spectrum. However, we reserve the right to review these requirements in the future if we determine that a reassessment is warranted to ensure that the radio spectrum is used efficiently.

65. *Conforming Amendment to Section 90.179* Under Section 90.179[200] of our Rules, a licensee may share its system with other entities that are eligible to hold a license for the same spectrum.[201] A station is shared when persons not licensed for the station control it for their own purposes pursuant to the licensee's permission.[202] In the *Third Notice*, we noted that if we decided to license individual states, we would need to revise Section 90.179 to allow state licensees to authorize appropriate public safety agencies within the state and its political subdivisions to use the spectrum for their own purposes pursuant to the state licensee's authorization.

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minimally warrant renewal." *See* Amendment of the Commission's Rules to Establish Part 27, the Wireless Communications Service ("WCS"), GN Docket No. 96-228, *Report and Order*, 12 FCC Rcd 10843-45 ¶¶ 111-115 (*Part 27 Report and Order*).

[198] We allow states to certify that they are providing substantial service to its population because we recognize that state public safety entities have a responsibility to protect the safety of life, health and property. We allow states to certify that they are providing substantial service to its territory because we recognize that state public safety entities have responsibilities statewide — both densely populated areas and lesser populated rural areas.

[199] *Accord* Joint Commenters AASHTO, *et al.* Comments at 3-4 (spectrum should be maintained for a period of five years following the full availability of the spectrum and then default to the RPCs).

[200] 47 C.F.R. § 90.179.

[201] We recently amended 47 C.F.R. § 90.179 to allow on a non-profit, cost-shared basis: (1) Public Safety Pool licensees to share their facilities with Federal Government entities, and (2) Industrial/Business Pool licensees to share their facilities with Public Safety Pool eligibles. *See Part 90 Biennial R&O*, 15 FCC Rcd __¶¶ 19-21 (2000).

[202] 47 C.F.R. § 90.179(a).

66. The state, as licensee, will be responsible for assuring that the authorized facility is used only by persons and for purposes consistent with Section 90.179.[203] For example, if the state, as licensee, shares a land station on a non-profit, cost sharing basis, it must do so pursuant to a written agreement between the state and each participant that is kept as part of the station records.[204] This amendment is necessary to provide state licensees with the same operational flexibility that Section 90.179 now provides all other PLMR licensees. By comparison, we decline to adopt a "State Licensing" approach under which states – rather than regional planning committees (RPCs) – would manage state, local, and Federal use of all or most of the 8.8 megahertz of reserve spectrum.

b. Technical Requirements

67. State applicants and licensee will be subject to the general limits that govern geographic area licenses including antenna structures and air navigation, international coordination, environmental requirements, and quiet zones.[205] In addition, we will mirror our decision in the *Commercial 700 MHz R&O* and adopt a field strength[206] of 40 dBu/m[207] to control harmful interference between state systems in the 746-764 MHz and 776-794 MHz bands. As we stated in that decision, we believe the field strength approach provides established, objective criteria for controlling in-band interference, and gives licensees the ability to construct and operate facilities in boundary areas so long as the limit is met.[208] We further believe that use of the field strength procedure will satisfy the requirement in Section 337(d)(1) that the Commission establish "interference limits at the boundaries of the spectrum block and service area."[209] Similarly to our decision in the *Commercial 700 MHz R&O*, we will permit adjoining states to agree to alternate field strengths at their common border.[210]

2. 700 MHz Band Reserve

68. We are reserving the remaining 5.4 megahertz of wideband spectrum for future (mid–term) needs and future developments in broadband technologies. We recognize that there was opposition to our retaining any of the public safety 700 MHz band as reserve spectrum. We believe, however, that whenever a large amount of spectrum[211] is made available in a new band for public safety, it is good

[203] 47 C.F.R. § 90.179(b). As with current Section 90.179, the shared use of the spectrum licensed to the individual states would be predicated on the authorized user and the state complying with all the provisions of Section 90.179.

[204] *See* 47 C.F.R. § 90.179(d).

[205] *See, e.g., Commercial 700 MHz R&O*, 15 FCC Rcd at 514 ¶ 93. *See also* 47 C.F.R. §§ 27.51, 27.54, 27.56, 27.57, 27.59, 27.61, 27.63; *see also Part 27 Report and Order*, 12 FCC Rcd at 10848-65 ¶¶ 123-161.

[206] The "field strength" approach requires a licensee to limit the field strength of its station transmissions to some prescribed level at the licensee's geographic border.

[207] The predicted 40 dBu/v field strength shall be calculated using Figure 10 of Section 73.699 of this chapter, with a correction factor for antenna height differential of –9 dB. 47 C.F.R. § 73.699, Fig. 10.

[208] *Commercial 700 MHz R&O,* 15 FCC Rcd at 515 ¶ 96-97.

[209] 47 U.S.C. § 337(d)(1).

[210] *Commercial 700 MHz R&O,* 15 FCC Rcd at 515 ¶ 97.

[211] With 1920 narrowband channels available, we do not think public safety entities will be adversely impacted in the short term if the Commission retains some reserve spectrum.

spectrum management policy to keep some spectrum in reserve for unforeseen needs.[212] In this case, public safety regional plans for the 700 MHz band have not been finalized and, in most cases, not even started. As discussed earlier, some parties asked for further study — NPSTC's Petition for Reconsideration requested locating a "reserve band" between the narrowband and wideband channels to accommodate future needs;[213] Powell's Petition for Reconsideration also requested that we defer the planning of the wideband channels until further discussions could commence on the development of a national HSD network;[214] and FLEWUG requests that all 8.8 megahertz be held in reserve pending further consideration by the NCC.[215] Thus, we conclude that holding some wideband spectrum in reserve is a prudent course of action at this time. Keeping a relatively small reserve (twenty-two percent of the 700 MHz band) gives the Commission flexibility to "fine tune" the band plan in the future with the benefit of experience that can only be gained after radio systems are deployed in this new band.

69. Specifically, in the *Third MO&O*, we regrouped the reserve spectrum into four (2 pair) segments of 1.35 megahertz each that are located between the narrowband and wideband segments.[216] This regrouping offers improved flexibility to accommodate future requirements that are unforeseen at this time because the 5.4 megahertz of reserve spectrum is located between narrowband and wideband segments so we can accommodate future needs for narrowband, wideband or broadband that may be identified through the planning process or by advances in technology without impacting existing plans or licensees. Keeping a reserve that is grouped in two pairs of 1.35 megahertz each also recognizes trends towards broadband technologies. For example, the 108 wideband channels that we are reserving could accommodate needs such as exclusive high speed data,[217] additional interoperability spectrum,[218] or hybrid commercial/private mobile system.[219] Therefore, we will retain 5.4 megahertz of spectrum as a public safety reserve. Once the 700 MHz band planning process is complete, we will review the status of a spectrum reserve. Also, we would welcome any future suggestions the NCC may have regarding this issue.

[212] For example, when deciding on how to allocate the 40 megahertz of 800 MHz PLMR spectrum, the Commission decided to make 30 megahertz available and keep 10 megahertz in reserve for unforeseen needs. *See* An Inquiry Relative to the Future Use of the Frequency Band 806-960 MHz; Amendment of Parts 2, 18, 21, 73, 74, 89, 91, and 93 of the Rules Relative to Operations in the Land Mobile Service Between 806 and 960 MHz, Docket No. 18262, *Second Report and Order*, 46 FCC 2d 752, 759 ¶ 19 (1974). Later, when the Commission made the 10 megahertz of reserve spectrum available, the Commission changed the operating and licensing parameters due to changing needs.

[213] *See* NPSTC Petition at 4; *see also* para. 33, *supra*.

[214] *See* Powell Petition at 5; *see also* para. 24, *supra*.

[215] *See* FLEWUG Comments at 4; *see also* para. 46, *supra*.

[216] *See* paras. 33-34, *supra.*

[217] IACP Comments at 3.

[218] API Comments at 8.

[219] FLEWUG Reply Comments at 8.

B. Protection of the GNSS[220] from Second Harmonic Interference

70. In the *Third Notice*, we proposed technical solutions to protect the GNSS global navigation satellite systems, particularly the GLONASS.[221] We were concerned that second harmonic emissions[222] from public safety mobiles operating in the 794-806 MHz band (TV channels 68 and 69) may cause harmful interference to aeronautical users of GLONASS receivers.[223] To protect this system and to ensure that equipment operating in these bands would not cause radio interference to the GNSS, NTIA advocated applying out-of-band emission limits for GNSS to all spurious emissions, including second harmonic emissions, and being limited to: (1) wideband emissions, -70 dBW/MHz equivalent isotropically radiated power (EIRP); and (2) narrowband emissions, -80 dBW/700 Hz. We proposed to apply the emission limits requested by NTIA only to the second harmonics to the GLONASS band. However, we requested comment concerning the validity of the assumptions that underlie NTIA's requested standard, such as the assumed separation distance of 30 meters between public safety mobile operations and GLONASS receivers.[224] In addition, we sought comment on the impact of these proposed limits on the design of equipment for public safety use in the 700 MHz band.[225] We further noted that NTIA's standard is only necessary to protect GNSS operations in the 1559-1605 MHz band.[226] Therefore, we proposed to apply the traditional FCC standard (*i.e.*, generally 43 + 10 log P) outside the radionavigation satellite service (RNSS) frequency band.[227]

[220] The GNSS has two components, GPS and GLONASS, and provides radionavigation satellite services (RNSS) worldwide. The GPS is in operation and will be the United States component of the GNSS. GPS utilizes the lower portion of the RNSS (space-to-Earth) allocation from 1559-1610 MHz on a primary basis, and is maintained by the United States Department of Defense. GLONASS, the other component of the GNSS, is the Russian Federation Global Orbiting Navigation Satellite System, which will use the 1597-1605 MHz portion of that allocation (*i.e.*, the second harmonic frequencies of TV channels 68 and 69) when the system reaches its final frequency configuration after 2005. We recently addressed the potential of second harmonic emissions in the 776-794 MHz band (TV Channels 65-67) to GPS. *See Commercial 700 MHz R&O*, 15 FCC Rcd at 524 ¶ 116.

[221] *Third Notice*, 14 FCC Rcd at 241 ¶ 196.

[222] Radio transmitters produce energy not only on the desired frequency but also lesser amounts of energy on multiples of the desired frequency, known as harmonics. Although most of the power generated is on the desired frequency, very sensitive receivers can detect the smaller amounts of power generated on the harmonic frequencies.

[223] *Third Notice*, 14 FCC Rcd at 241, ¶ 196.

[224] *Id.* at 243 ¶ 199.

[225] *Id.* at 243, ¶ 199, n.533.

[226] Although some commenters raised similar concerns regarding second harmonic interference from public safety operations in the 772-772.5 MHz band to ground stations (known as Local User Terminals, LUTs) in the 1544-1545 MHz band of the COSPAS-SARSAT satellite system for search and rescue emergency radio beacons of the Global Maritime Distress and Safety System (GMDSS), this matter will not be considered at this time because the affected public safety frequencies are located in the wideband reserve spectrum (Channels 103-108). *See* NTIA Comments at 16-17, and NOAA/USCG Reply Comments at 2.

[227] *Id.* at 243, ¶ 199.

1. Base/mobile Pairing ("Band Flipping")

71. In the *First Report and Order*, we noted that manufacturers could design future public safety equipment to operate in both the 700 MHz and 800 MHz bands.[228] In that context, we decided to designate the higher 794-806 MHz band for mobile-to-base communications, due in part to its proximity to the adjacent 806-824 MHz band that is designated for mobiles and/or portables as well.[229] FLEWUG has requested that we amend the band plan for 794-806 MHz to allow only fixed, base-to-mobile communications.[230] In this way, the possibility of transmitters operating from multiple and unknown locations is reduced and the problem is confined to fixed stations only.[231] FLEWUG also states that its recommendation reduces the impact of the problem with respect to the equipment modifications required to adhere to the emission limit criteria because slight increases in weight or size in base stations would be manageable while similar changes to handheld devices would be much more apparent and potentially a hindrance to public safety operations.[232] FLEWUG argues that the designation of 794-806 MHz for mobile-to-base communications, rather than for base-to-mobile communications, may exacerbate interference with the GNSS band at 1559-1605 MHz.[233]

72. Several commenters oppose FLEWUG's request because they believe that such redesignation of the band plan would do little to avoid interference with GNSS, and that the traditional emission limits (*i.e.*, 43 + log P) should be sufficient.[234] Florida, APCO, Arizona and Motorola oppose FLEWUG's request because the present band plan offers direct interoperability with existing mobile systems in the adjacent 806-824 MHz band.[235] They also assert that FLEWUG's request would effectively eliminate the ability for mobiles and/or portables to engage in "talk-around" communications between the 700 and 800 MHz bands.[236] Arizona disagrees with FLEWUG and NTIA's recommendation to flip the band plan, noting that it would result in 700 MHz base stations only a few kHz from other 700 MHz base station receivers on primary sites.[237] Motorola states that the potential interference relationship between 700 MHz public safety systems and GNSS is actually quite limited because only a small portion of the public safety mobile allocation (*i.e.*, 779.5-802.5 MHz) has direct second harmonic relations with frequencies

[228] *Id.* at 168 ¶ 28.

[229] *Id.*

[230] FLEWUG Comments at 20–21 n.46 *citing* FLEWUG Petition for Reconsideration of *First Report and Order* [WT Docket No. 96–86] at 25 ¶ 41 (FLEWUG Petition); *see also* NTIA Comments at 12. FLEWUG raises band flipping in the context of protecting GNSS from interference both in its Petition and in its Comments to the *Third Notice. Id.* We discussed GNSS issues primarily in the *Third Notice;* thus, we are considering FLEWUG's "band flipping" recommendation, along with all responsive pleadings, in this *Third Report and Order*.

[231] FLEWUG Comments at 20–21 n.46 *citing* FLEWUG Petition at 25 ¶ 41 (FLEWUG Petition); *see also* NTIA Comments at 12.

[232] *Id*.

[233] *Id*.

[234] *See* Florida Opposition to Petition for Reconsideration at 1; APCO Response to Petition for Reconsideration at 11-12; Arizona Comments at 5; Motorola Comments to Petitions for Reconsideration at 3-4.

[235] *Id*.

[236] Motorola Comments to Petitions for Reconsideration at 3.

[237] Arizona Comments at 5.

assigned to GLONASS.[238] It would therefore be unwise to overlook the benefits of allowing mobile transmitters in the 794-806 MHz band.[239]

73. Motorola alleges that reversing the base and mobile allocations would require the establishment of a guard band of at least one megahertz between the upper edge of the 794-806 MHz base band and the lower edge of the existing 806-824 MHz mobile band.[240] Motorola also notes that establishing such a guard band would further reduce the ability of the 700 MHz allocation to meet the immediate needs of public safety. Additionally, Motorola states that reversing the plan would complicate the design of dual-band mobile receivers by requiring manufacturers to further increase receiver bandwidth in order to accommodate talk-around in the 764-776 MHz band, which would further add to the cost of public safety equipment.[241]

74. After considering all the views, we decline to flip the band plan as suggested by FLEWUG and NTIA. Prohibiting use of the mobile transmitters in the 794-806 MHz base station allocation, as proposed by FLEWUG, would affect the ability of public safety users to communicate unit-to-unit in talk-around mode. Unit-to-unit operations are fundamental to public safety operations and critical to interoperability. As noted by Motorola, reversing the base and mobile allocations may also necessitate the establishment of a 1 MHz guard band at the 806 MHz band edge, further reducing the ability of the 700 MHz allocation to meet the immediate needs of public safety. Moreover, the proposed band plan offers direct interoperability with existing mobile systems in the adjacent 806-824 MHz band. Flipping the band plan would result in the location of 700 MHz base stations with a separation of only a few kHz from other 700 MHz base station receivers on primary sites. We believe that the adopted mobile transmit/receive plan is optimal for public safety users because it provides manufacturers the opportunity to easily broaden the bandwidth of mobile radios to provide interoperability between 700 MHz and 800 MHz band radios. By contrast, reversing the plan would complicate the design of dual-band mobile receivers by requiring manufacturers to further increase receiver bandwidth in order to accommodate talk-around in the 764-776 MHz band and would further add to the cost of public safety equipment.

2. Emission Limits

75. We are faced with dual Congressional obligations on this issue. First, we must "protect the integrity of the [GPS] frequency spectrum against interference and disruption."[242] Additionally, we are also charged with making spectrum available for public safety use in the 746-806 MHz band. Mindful of these obligations, we proposed to adopt the emission limits presented by NTIA but sought comment to create a thorough understanding of the need and ramifications of this standard on use of the 700 MHz band for public safety. Specifically, we must balance the needs of competing requirements of the spectrum. We have considered the comments and conclude that the limits proposed by NTIA provide the appropriate balance between these two obligations. Further, we note the similarity between the issues we confront here and those in the *Commercial 700 MHz R&*O and believe that in the interest of consistency, we should follow the lead previously established with regard to the treatment of GNSS/GPS. Regarding these same issues, we expressed our concern about critical safety-of-life applications of GPS, particularly

[238] Motorola Comments to Petitions for Reconsideration at 4.

[239] *Id.*

[240] *Id.*

[241] *Id.*

[242] Defense FY99 Appropriations Conference Report and in the Commercial Space Act of 1998, H.R. 105-746, Defense FY99 Appropriations Conference Report; H.R. 1702 Commercial Space Act of 1998.

those systems that will use GPS for aeronautical radionavigation, and our desire to ensure that adopted rules do not adversely affect these operations.[243] NTIA, which represents the positions of the Federal Government on spectrum management matters, has suggested specific emission limits for equipment operating in this band that it believes will sufficiently protect aeronautical radionavigation operations. We agree with NTIA that the proposed emission limits will "ensure that fixed and mobile equipment will not cause radio frequency interference to the GNSS when those systems are used for precision approach and landing" and we adopt NTIA's recommendations.[244] Outside of the 1559-1610 MHz radionavigation satellite service (RNSS) band, our traditional standard (*i.e*. generally 43 + 10 log P) will apply.[245]

76. Accordingly, using the rules established in the *Commercial 700 MHz R&*O as a guide, we adopt the following limits: for operations in the 764-776 MHz and 794-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to –70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and –80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.[246] For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

77. In making this determination, we note that the issue at hand is not only the protection of GPS and GLONASS from interference but also the future international GNSS.[247] As to the adequacy of our proposed protection scheme, commenters argued that our proposed standards were either too restrictive or too lenient to protect GNSS operations. Some commenters believe that imposition of the NTIA standards would seriously inhibit the use of these channels by public safety entities.[248] They also believe that the concerns of those supporting stricter standards are overstated. Although many of these commenters endorse the establishment of a special committee of technical experts to further study the issue,[249] we believe the record we sought to expand by way of the *Third Notice* has alleviated any need for such a committee. However, we repeat our view that we might consider longer-term solutions at a future date.[250] Conversely, other commenters adamantly argued that the NTIA limits would devastate GLONASS, result

[243] *Commercial 700 MHz R&O*, 15 FCC Rcd at 504 ¶ 67. We recently reaffirmed these conclusions on reconsideration. *See* Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission's Rules, WT Docket 99-168, *Memorandum Opinion and Order and Further Notice of Proposed Rulemaking*, FCC 00-224 at ¶¶ 28-29 (rel. June 30, 2000).

[244] NTIA Comments at 1. AirTouch suggests that our proposed emission limits could be difficult to meet for portable units, but does not suggest that they would be so difficult as to prevent equipment manufacturers from producing mobiles and portables meeting those limits. We have not received any indication from any potential 700 MHz band equipment manufacturers commenting in this proceeding that it will be difficult to suppress wideband out of band emission limits to the –70 dBW/MHz level.

[245] *See* 47 C.F.R. § 90.210.

[246] Although we noted in the *First Report and Order* that the current GPS operating at 1563.42-1587.42 MHz would not be impacted by second harmonic emissions from public safety systems operating in 794-806 MHz band (TV Channels 68-69), we clarify that a portion of the public safety band (794-805 MHz) does impact the upper portion of the band used by the GNSS (1559–1610 MHz).

[247] NTIA Comments at 4-5; FLEWUG Reply Comments at 16.

[248] *See, e.g.* NPSTC Comments at 12; Pennsylvania Reply Comments at 12-13.

[249] NPSTC Comments at 14-15; Pennsylvania Reply Comments at 13; PSWN Reply Comments at 11; IACP Comments at 6-7.

[250] *See Third Notice* 14 FCC Rcd. at 244 ¶ 201.

in harmful interference to the GPS frequency band and end the continuous viability of GPS and GLONASS.[251] Still other commenters, such as FLEWUG, generally view NTIA's proposed emission standards, -70 dBW/MHz for wideband emissions and -80 dBW/700 Hz for narrowband emissions, as the most realistic.[252]

78. The current International Civil Aviation Organization (ICAO) standards define GNSS as containing components of both GPS and GLONASS in its final configuration. Many commenters assert that protection for GLONASS is of minimal importance since GPS is the dominant standard in the United States and because only the public safety wideband channels have a direct, though limited, second harmonic relationship with GLONASS.[253] We do not agree with this view. As a member of ICAO and the International Maritime Organization (IMO), the United States has made international commitments to provide protection from interference to GLONASS in its final configuration. These commitments are, in effect, treaty obligations that we must coordinate into a common policy when confronted with interference issues such as the one before us here. Additionally, even though GLONASS has not yet fully develop to achieve extensive practical use, we direct attention to the fact that the use of the 1559-1610 MHz RNSS band is evolving.[254] We, therefore, are adopting rules that provide for the future development of GNSS systems.

79. With regard to aviation concerns, foreign flights are likely to use combined GPS and GLONASS receivers since GNSS consists of both GPS and GLONASS components. We believe that requiring foreign aircraft to use GPS exclusively creates an undue burden and is inconsistent with the treaty obligations of the United States. NTIA notes that GNSS is an international system affecting aviation and marine entities and the United States has international agreements and treaty obligations involving various components of GNSS.[255] Specifically, we must balance the needs of competing requirements of the spectrum. In this case, we must balance the needs of users of GNSS and future users of the 700 MHz band. Contrary to the contentions of many commenters, we cannot discount the effect that emissions may have on GLONASS simply because it is not the favored system used in this country. Rather, the treaty obligations of the United States leave us with little discretion and we must focus on the

[251] The GPS Commenters suggest the following changes to the proposed 47 C.F.R. § 90.553: To provide adequate protection to GNSS receivers which will utilize the Radionavigation-Satellite Service (space-to-Earth) band, mobile units must meet a minimum second harmonic suppression standard in the frequency range of 1559-1605 MHz of 120 dB (was 90) down from the maximum effective radiated power of the carrier and handheld and portable units must meet a minimum second harmonic suppression standard in the frequency range of 1559-1605 MHz of 110 dB (was 80) down from the maximum effective radiated power of the carrier. This proposed standard would apply only to equipment operating in the frequency range of 779.5-802.5 MHz. GPS Commenters at 17.

[252] *See e.g*. FLEWUG Reply Comments at 15-16.

[253] APCO Comments at 9-10; Motorola Comments at 5; Arizona Reply Comments at 5-6; NPSTC Comments at 14.

[254] The current plan of the Russian Federation will result in its highest GLONASS carrier frequency relocating to 1604.8125 MHz. The French Low SATellite NAVigation (LSATNAV) and the ESA E-NSS-1 satellite navigation systems have been proposed for operating in the 1559.052-1563.144 MHz and 1587.696-1592.788 MHz portions of the 1559-1610 MHz band. It is envisioned that one of these RNSS systems will be included in the second generation of GNSS, referred to as GNSS-2. The U.S. is engaged in discussions with the European Union (EU) regarding their Galileo system, a developing RNSS system that is planned to be compatible and interoperable with GPS. The EU is considering spectrum in both the upper and lower portion of the 1559-1610 MHz band for Galileo. The French Administration and the European Space Agency are developing other RNSS systems that may operate in this band as well.

[255] NTIA Comments at 4-7.

effect to GNSS generally because of its dual components, GPS and GLONASS. We conclude that our proposed emission limits will be sufficient to protect critical GNSS operations, *i.e.*, GPS, GLONASS, and the future components of GNSS.

80. Further, we agree with NTIA that the proposed out of band emission limits will ensure that fixed and mobile equipment will not cause radio frequency interference to the GNSS when those systems are used for precision approach and landing. With regard to the separation criteria of 30 meters, as we noted in the *Third Notice*, the limits proposed by NTIA, including its assumption of a separation distance of 30 meters from the GPS or GLONASS receiver for spurious or harmonic signals are consistent with the levels recommended by the FAA.[256] The field data collection of PSWN and comments of FLEWUG support our conclusion that this assumed separation distance is appropriate for public safety operations.[257]

81. The proposed –70 dBW/MHz wideband emission limit is consistent with the United States' position in the ITU-R study group activities. Our decision in this proceeding is also consistent with the decisions adopted on this matter internationally.[258] Should future actions internationally result in conflicts between the decision we adopt here and international positions, we could then consider those differences as part of a separate, future proceeding, if appropriate. To this end, we would encourage continued industry dialogue so that if a consensus based on future data is reached, we can then entertain modifications. Absent more actual data, our decision is based on the recommendations to date.

C. Interoperability Below 512 MHz

82. In the *Third Notice*, we tentatively concluded that locating interoperability channels in the 700 MHz[259] and 800 MHz[260] bands alone would not provide a comprehensive solution to nationwide interoperability.[261] Citing the *PSWAC Final Report*, we noted that federal, state and local public safety agencies use a total of ten radio bands, that range from 30 MHz to over 800 MHz.[262] To date, the ability to operate in these bands with a single, commercial grade radio is complicated because their individual radio systems operate in different frequency bands. Consequently, communications between public safety agencies is limited. This inability to communicate hinders cooperation and coordination among public safety agencies on a day-to-day basis.[263]

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[256] *Third Notice*, 14 FCC Rcd at 241 ¶ 197.

[257] PSWN Comments at 18; FLEWUG Comments at 20-21.

[258] On a related matter, we note that as a result of WRC-2000 there is a new allocation for the radionavigation satellite service in the 1164-1215 MHz band. As part of the GPS modernization program a new GPS signal (L5) for aviation and civil use will be provided in the 1164-1188 MHz portion of the band. RTCA Working Group 6 is currently in the process of examining the protection limits for GPS receivers using the L5 signal.

[259] In the *First Report and Order*, we designated 2.6 megahertz of the 700 MHz band for nationwide interoperability. *Third Notice*, 14 FCC Rcd at 236 ¶ 188.

[260] Five channel pairs in the 821-824/866-869 MHz band (800 MHz band) are available only for mutual aid purposes. *See* 47 C.F.R. § 90.617(a)(1). *See also Report and Order*, General Docket No. 87-112, 3 FCC Rcd 905.

[261] *Third Notice*, 14 FCC Rcd at 236 ¶ 188. "[M]ost public safety radio systems, especially smaller ones, operate in the VHF and UHF bands below 512 MHz. Locating interoperability channels above 512 MHz will not help these [public safety providers])." *Id.*, ¶ 187.

[262] *PSWAC Final Report* at 3.

[263] *First Notice*, 11 FCC Rcd at 12,469.

83. To address these obstacles, we proposed to establish nationwide interoperability channels below 512 MHz, thereby providing for the development and use of shared interoperability systems and the building of gateways between technically incompatible federal, state, and local public safety systems.[264] Accordingly, we made proposals and invited comment on interoperability channels in (1) the existing 150-174 MHz and 450-512 MHz public safety bands, (2) the 138-144 MHz band, and (3) the VHF maritime band at 156-162 MHz. We also sought comment on requiring every public safety mobile radio to have the capacity to transmit and receive on at least one nationwide interoperability channel in the band in which it is operating. Additionally, we requested comment on whether it is necessary to establish a nationwide interoperability band below 512 MHz.[265]

84. Commenters agreed with our conclusion that separate interoperability channels are needed in the Public Safety Pool below 512 MHz.[266] Specifically, commenters supported our proposal in the *Third Notice* to designate specific VHF and UHF channels for interoperability.[267] Moreover, several comments stated that our *Third Notice* proposals did not adequately address the need for interoperability channels below 512 MHz[268] and some commenters also complained about the relatively severe operational limitations that would apply to some of the specific channels that we set forth in the *Third Notice*.[269] While in the *Third Notice* we sought comment on the need for a separate interoperability band below 512 MHz and several commenters continued to promote this solution, no other spectrum identified is readily available.[270] We believe the Rules adopted today represent a practical step toward a comprehensive solution to the issue of interoperability below 512 MHz. As described in detail below, we adopt specific channels within the existing public safety bands (150-174 MHz and 450-512 MHz) resulting from the *Refarming* proceeding for nationwide interoperability. We also designate the three VHF channel pairs set-aside for public safety in the VHF maritime band (156-162 MHz), which are located generally in the Midwest region of the country, for interoperability use. For convenience, the following table sets forth the specific channels below 512 MHz that we are designating exclusively for interoperability purposes.

[264] *PSWAC Final Report* at 3*; First Notice*, 11 FCC Rcd at 12,472.

[265] *Third Notice*, 14 FCC Rcd at 237-38 ¶ 191.

[266] *See e.g.*, FLEWUG Comments at 18-19; Florida Comments at 7-8; Motorola Comments at 8; APCO Comments at 7.

[267] *See e.g.*, IACP Comments at 4; Florida Comments at 6; Cities Comments at 17; NYSTEC Comments at 12-13.

[268] APCO Comments at 7-8; FLEWUG Comments at 19 citing *PSWAC Final Report* at 21; PSWN Comments at 16-17; PSWN Reply Comments at 10; NYSTEC Comments at 13; State of California Comments at 8.

[269] Motorola Comments at 8-9; NPSTC Comments at 8.

[270] *First Report*, 14 FCC Rcd at 238-239 ¶193 citing *PSWAC Final Report* at 52.

Table of Public Safety Interoperability Channels Below 512 MHz[271]

CHANNEL (MHz)	LABEL	NOTES
151.1375 base/mobile	VTAC 1	not available in PR/VI
154.4525 base/mobile	VTAC 2	not available in PR/VI
155.7525 base/mobile	VCALL	
158.7375 base/mobile	VTAC 3	
159.4725 base/mobile	VTAC 4	
157.250 mobile 161.850 base/mobile	RTAC 1 RTAC 1a	VPC Ch. 25 (25 kHz pair) Available in all 33 EAs
157.225 mobile 161.825 base/mobile	RTAC 2 RTAC 2a	VPC Ch. 84 (25 kHz pair) Available in 22 EAs
157.275 mobile 161.875 base/mobile	RTAC 3 RTAC 3a	VPC Ch. 85 (25 kHz pair) Available in 11 EAs
453.2125 base/mobile 458.2125 mobile	UCALLa UCALL	
453.4625 base/mobile 458.4625 mobile	UTAC 1a UTAC 1	
453.7125 base/mobile 458.7125 mobile	UTAC 2a UTAC 2	
453.8625 base/mobile 458.8625 mobile	UTAC 3a UTAC 3	

1. Interoperability Channels in the 150-174 & 450-512 MHz (Existing Public Safety Bands).

85. In the *Third Notice*, we proposed to designate ten channels in the existing public safety bands below 512 MHz for nationwide interoperability. Several commenters supported this proposal, but voiced concerns about adjacent channel assignments and bandwidth problems.[272] NPSTC and Arizona noted that other VHF and UHF spectrum could be reallocated nationwide, including the wideband paired channels in the 150-160 and 450-460 MHz bands (Improved Mobile Telephone Service which is now obsolete due to cellular and PCS).[273] APCO, Motorola and others note that the specific UHF channels identified in *the Third Notice* are 6.25 kHz wide channels which is inconsistent with the PSWAC recommendation of 12.5 kHz for interoperability channels.[274]

86. Upon review of the comments, we adopt five VHF channels (five frequencies) and four UHF channel pairs (eight frequencies) for interoperability purposes — one calling channel and four tactical channels in the existing VHF public safety band at 150-174 MHz, and one calling and three tactical

[271] We note that NTIA has designated certain federally allocated radio frequencies for interoperability use under a plan it developed in cooperation with IRAC and FLEWUG. *See* National Telecommunications and Information Administration (NTIA), U.S. Department of Commerce, *Manual of Regulations and Procedures for Federal Radio Frequency Management* (January 2000 Edition) § 4.3.16.

[272] NPSTC Comments at 7-8; IACP Comments at 4; Arizona; Motorola Comments at 7.

[273] NPSTC Comments at 10 *citing* Letter comments from DOD to PSWAC, dated July 29, 1996, and incorporated as Appendix K to the Spectrum requirements Report, *PSWAC Final Report* Appendix D at 119 (725); Arizona Reply Comments at 8.

[274] *See e.g.*, APCO Comments at 8, Motorola Comments at 7, NYSTEC Comments at 13.

channel pairs in the existing UHF public safety band at 450-512 MHz.[275] Although some commenters indicated that we should look elsewhere (*e.g.*, Part 22, Improved Mobile Telephone Service) for interoperability channels, the record before us is insufficient to justify reallocating spectrum already allocated to other services. Moreover, we believe that designating channels in the existing public safety bands for interoperability is a practical and necessary step in addressing the lack of interoperability considering that a substantial number of federal, state, and local public safety agencies operate in these bands. While we acknowledge the difficulties associated with adjacent channel operations, which are discussed below, the advent of 12.5 kHz "offset" channels resulting from the *Refarming* proceeding presents a significant opportunity to designate channels for nationwide interoperability purposes that we should not overlook. We realize our decisions may adversely impact existing licensees, however we believe that the benefits of providing for interoperability in these bands outweigh any adverse impact. We believe our action facilitates additional interoperability capability with minimal impact to existing licensees. Moreover, we received no comments opposing our proposal to designate interoperability channels in the public safety bands below 512 MHz.

87. As an initial matter, we adopt the five VHF channels 151.1375, 154.4525, 155.7525, 158.7375, and 159.4725 MHz as set forth in the *Third Notice*. These channels were recommended by the frequency coordinators and generally supported by commenters.[276] Nevertheless, their use as interoperability channels presents serious operational challenges. As noted by several commenters, VHF channels are spaced 7.5 kHz apart but operations are permitted up to 12.5 kHz, and this overlap increases the potential for adjacent channel interference. Generally, this adjacent channel interference is minimized through prudent sharing of these channels during frequency coordination, *e.g.*, attempting to keep adjacent-channel VHF transmitters separated by ten miles. However, such coordination is not possible on nationwide interoperability channels, which by definition cannot be restricted geographically or operationally. Thus, adjacent channel interference will be a serious operational challenge for VHF interoperability channels. Nonetheless, the need for additional interoperability capability in the VHF band outweighs these operational challenges – some VHF interoperability capability is better than no VHF interoperability capability. Since this is a characteristic of the VHF band and no alternate channels were suggested in comments, we conclude that these channels represent a viable choice based on industry views.

88. For the UHF band, we adopt four channel pairs for interoperability purposes: 453/458.2125, 453/458.4625, 453/458.7125, and 453/458.8625 MHz. In the *Third Notice*, we proposed two UHF channel pairs (four frequencies) and sought comments on another channel pair for nationwide interoperability purposes.[277] Although several commenters supported designating UHF channels for interoperability, they also noted that the specific channels identified in the *Third Notice* for interoperability are 6.25 kHz wide channels which would be inconsistent with the PSWAC recommendation of 12.5 kHz for interoperability channels.[278] We agree.[279] Relying on our experience with the five channel pairs designated at 800 MHz for interoperability, we believe four channel pairs are

[275] Frequencies in the 450-512 MHz band are paired channels, necessitating adoption of an even number of channels (four or six) rather than five.

[276] While noting limitations, several commenters supported the designation of five VHF channels for interoperability. None suggest alternative channels. *See e.g.*, APCO Comments at 8, IACP Comments at 4, Florida Comments at 6, Cities Comments at 17, FLEWUG Comments at 19.

[277] *Third Notice*, 14 FCC Rcd at 237-38 ¶191.

[278] NPSTC Comments at 7-8; IACP Comments at 4; Arizona; Motorola Comments at 7.

[279] *See NCC Report* at 21, 22 ¶¶ 68, 69.

an appropriate number to facilitate interoperability in the UHF band.[280] Based on a search of our database the channels we adopt today represent the least encumbered 12.5 kHz UHF channels.[281] Currently, there is a freeze on the licensing of new high power stations on the 12.5 kHz "offset" channels in the 450–470 MHz band[282] but the freeze on the filing of these applications in the 450-460 MHz band is to be lifted on January 29, 2001.[283]

89. Because our decision affects not only those licensed on the interoperability frequencies but also those on nearby channels operating with 12.5 kHz or 25 kHz equipment, we will provide a transition period through January 1, 2005 for implementation.[284] Current licensees may continue to operate on these interoperability channels indefinitely; however, after January 1, 2005, existing users that continue to operate on these channels will do so on a secondary basis to interoperability uses.[285] Prior to January 1, 2005, interoperability use will be permitted only on a secondary basis to existing users; that is, interoperability transmissions can be made only when the channel is clear and on a non-interference basis. This transition period, we believe, will provide existing licensees with sufficient time and notice to become aware of any potential effects on their particular operations by future interoperability use. It also provides any critical public safety operations with ample time to identify their options and determine the best course of action. We also note that some public safety operations may be such that they could be suspended during emergency situations. Specifically, an existing licensee could assign noncritical traffic to the interoperability channel and instruct its employees to use other VHF channels whenever the

[280] Based on our experience with the five channel pairs designated at 800 MHz for interoperability, four represents the appropriate number of interoperability channels in the UHF band where channels also are paired. Given that one pair is reserved as a calling channel, fewer than four channel pairs would provide too few tactical channels and greater than four would have even a greater impact to existing licensees.

[281] These "least licensed" channels are 12.5 kHz "offset" channels chosen from the PX coordinator pool (former local government radio service) because the PX pool has the largest number of channels pairs (75 pairs) and applications can be coordinated by all four coordinators. By comparison, the PP coordinator pool (former police radio service) has 41 pairs, the PM coordinator pool (former emergency medical radio service) has 24 pairs, the PF coordinator pool (former fire radio service) has 6 pairs, the PS coordinator pool (former special emergency radio service) has 1 pair, and PP/PF/PM jointly share 4 pairs. Choosing channels in the PX coordinator pool also should minimize the impact to the majority of existing police, fire, and emergency medical licenses which were located in their respective pools. Each "offset" channel that we select for interoperability has a potential impact on between 32-78 incumbent (primary), co-channel licensees. As a factual matter, between 2376-2506 adjacent channel licensees are also impacted. We selected channels that are spaced 250 kHz apart since no "offset" channel appears to be significantly better than another simply by numbers counted, because the 250 kHz separation between channels presents a technically sound solution (*e.g.*, permits antenna combining and minimizes intermodulation interference) for these four channels. *See* paras. 29, 30, *supra*.

[282] *See* Replacement of Part 90 by Part 88 to Revise the Private Land Mobile Radio Services and Modify the Policies Governing Them, PR Docket No. 92–235, *Second Memorandum Opinion and Order*, 14 FCC Rcd 8642, 8660 ¶ 33 (1999) citing Freeze on the Filing of High Power Applications for 12.5 kHz Offset Channels in the 450-470 MHz Band, *Public Notice*, 10 FCC Rcd 9995 (1995).

[283] *See* Freeze on the Filing of High Power Applications for 12.5 kHz Offset Channels in the 450-460 MHz Band to be Lifted January 29, 2001, *Public Notice*, DA 00-1360 (June 29, 2000). *See also* Wireless Telecommunications Bureau Accepts LMCC Low Power Plan for Part 90 450-470 MHz Band, *Public Notice*, DA 00-1359 (June 29, 2000).

[284] The January 1, 2005, date corresponds to the required date by which the new equipment in the VHF and UHF bands must meet the new 6.25 kHz standards. *See* 47 C.F.R. § 90.203 (j); s*ee* also *Refarming First R&O*, 10 FCC Rcd at 10,099 ¶ 38.

[285] Secondary operations may not cause interference to primary interoperability use.

interoperability channel is needed for interoperability communication. Or, an existing licensee may anticipate that it would be a part of any interoperability event within its jurisdiction (licensed area), in which case it would use the interoperability channel only for interoperability communication for the duration of the interoperability event or need. We believe the adoption of interoperability channels in these critical public safety bands – where the majority of public safety radio systems operate today – will make significant interoperability improvements.

90. Under our Rules, an entity must have a license to operate a base or control station on these interoperability channels.[286] Mobile operation, however, is permitted on these channels without an individual license (*i.e.*, a blanket licensing approach).[287] Public safety licensees who are eligible to hold a Part 90 license, or who are otherwise licensed under Part 90 of our Rules, can operate mobile units on these interoperability channels without an individual license. Additionally, as suggested in comments, we also will require, as of January 1, 2005, every newly certified public safety mobile radio unit to have the capacity to transmit and receive on at least one nationwide interoperability channel (*i.e.*, the calling channel) in the band in which it is operating.[288] For licensing and administration of these interoperability channels, we will rely on the four public safety frequency coordinators.[289] We envision that the four coordinators would jointly develop an interoperability plan regarding the management and nationwide use of these interoperability channels. This plan could be developed in concert with the group(s) tasked with administering the interoperability channels in the 700 MHz band. Additionally, we would expect the frequency coordinators to work with existing licensees experiencing harmful interference to critical public safety operations to find suitable replacement channels.[290] Finally, until general interoperability provisions can be made with Canada and Mexico, interoperability operations within the Canadian and Mexican border areas will need to be coordinated on an individual basis with these countries in the usual manner.

2. Interoperability Channels in the 138-144 MHz Band (NTIA/DOD Reallocation)

91. We also noted in the *Third Notice* that NTIA identified three megahertz of 138-144 MHz band to reallocate and auction as new telecommunications services by 2008 as required by the Balanced Budget Act of 1997.[291] In response to the suggestion of the *PSWAC Final Report*, we sought comment on

[286] As with the 800 MHz National Public Safety Planning Advisory Council (NPSPAC) mutual aid channels, base and control stations must be licensed individually. *See 800 MHz Band Report and Order*, 3 FCC Rcd at 909 ¶¶ 30, 33-34; *see generally* 47 C.F.R. §§ 90.16, 90.20, 90.603, 90.617, 90.619(a)(2).

[287] *See 800 MHz Band Report and Order*, 3 FCC Rcd at 909 ¶¶ 30, 33-34; *see generally* 47 C.F.R. §§ 90.16, 90.20, 90.603, 90.617, 90.619(a)(2).

[288] FLEWUG Comments at 19; NYSTEC Comments at 14.

[289] With an exception not relevant here, there are currently four frequency coordinators certified to coordinate frequencies for public safety applicants; Association of Public–Safety Communications Officials–International (APCO), International Association of Fire Chiefs, Inc. (IAFC)/International Municipal Signal Association (IMSA), Forestry Conservation Communications Association (FCCA), and American Association of State Highway and Transportation Officials (AASHTO). *See, e.g.*, Replacement of Part 90 by Part 88 to Revise the Private Land Mobile Radio Services and Modify the Policies Governing Them, PR Docket No. 92–235, *Second Report and Order*, 12 FCC Rcd 14307 (1997) at App. D (List of Frequency Coordinators Below 512 MHz).

[290] We additionally note that the existing licensee could migrate to frequencies in the 700 or 800 MHz bands, or be offered alternative channels in the VHF/UHF bands as other licensees relocate to these higher bands.

[291] *Third Notice*, 14 FCC Rcd at 238-239 ¶ 193, citing *PSWAC Final Report* at 52.

the feasibility of using the 138-144 MHz band currently used by the U.S. Department of Defense and the Federal Emergency Management Agency as a separate interoperability band.[292] However, in the "National Defense Authorization Act of FY 2000," Congress reclaimed this spectrum for exclusive federal use, thus rendering the issue moot.[293]

3. Interoperability in 156-162 MHz Band (VHF Maritime Band)

92. In the *Maritime Third Report and Order*,[294] we designated exclusively for public safety users two 25 kHz channel pairs (either Channels 25 and 84, or Channels 25 and 85) in the VHF 156-162 MHz maritime band in each of the thirty-three inland VHF Public Coast areas (VPCs).[295] We set aside Channel 25 (157.250/161.850 MHz) for public safety in each of these areas. However, because of incumbent licensees (whose operations were grandfathered and continue to be protected), no other single channel was available in all thirty-three areas.[296] Therefore, we set aside Channel 84 (157.225/161.825 MHz) in twenty-two of the areas and Channel 85 (157.275/161.875 MHz) in the other eleven areas.[297] We then stated in the *Maritime Third Report and Order* that the ultimate use for these reserved frequencies, and the procedures for licensing this spectrum, would be decided as part of the public safety proceeding.[298]

93. In the *Third Notice*, we proposed to designate these channels for interoperability operations in each of the thirty-three VPCs.[299] We also proposed to require public safety licensees to use these channels in accordance with the rules, standards and procedures formerly found in section 90.283 of our rules and be subject to coordination of these stations with Canada and Mexico in the same manner as public coast stations.[300] Commenters support the proposal, but note that while the reallocation will provide significant relief to some areas of the country, it will provide only limited relief to the basic interoperability needs facing public safety radio systems.[301] They further state that the proposal has extreme geographic restrictions and does not meet one of the primary requirements for interoperability spectrum described in

[292] *Third Notice*, 14 FCC Rcd at 239 ¶ 193. *See also Petition of the National Public Safety Telecommunications Council for Further Rulemaking to Allocate Spectrum in the 138-144 MHz Band for Public Safety (*April 9, 1998*).*

[293] *See* Pub. L. No. 106-65, § 1062, 113 Stat. 767 (1999).

[294] *See* Amendment of the Commission's Rules Concerning Maritime Communications, *Third Report and Order and Memorandum Opinion and Order*, PR Docket No. 92-257, 13 FCC Rcd 19853, 19853, 19895-19900 (Appendix C, D and E) (1998) (*Maritime Third Report and Order*).

[295] A VPC constitutes a separate licensing area and is an inland Economic Area, no part of which is within one hundred miles of a major waterway. *See Maritime Third Report and Order* at 19862 ¶ 15.

[296] *Maritime Third Report and Order*, 13 FCC Rcd at 19863-64 ¶ 18.

[297] *Maritime Third Report and Order*, 13 FCC Rcd at 19899 Appendix E. We note that the Maritime Communications proceeding, PR Docket No. 92-257, remains pending and that there may be additional opportunities to facilitate public safety use of maritime channels to meet interoperability or other needs.

[298] *Maritime Third Report and Order*, 13 FCC Rcd at 19868-69 ¶ 31.

[299] *Third Notice*, 14 FCC Rcd at 240 ¶ 194.

[300] *Id.*

[301] APCO Comments at 9; NPSTC Comments at 9-10; IAPC Comments at 5.

the PSWAC Report. NPSTC therefore believes these individual areas may benefit more by licensing these channels for operational rather than interoperability use.[302]

94. We adopt the proposal to designate these frequencies for interoperability in the thirty-three inland EAs.[303] We agree that this action is not a comprehensive, nationwide solution to the interoperability needs facing the public safety community,[304] it nonetheless helps to alleviate some of the need for interoperability capabilities. The channel pairs (channels 25, 84, and 85) will consist of 25 kHz channel pairs and will be available exclusively for assignment to public safety entities but only in the thirty-three EAs listed in our Rules. We are designating these channels as primarily for interoperability purposes, which means that interoperability communication has primary status over noninteroperability communication, which is permissible when the channels are not needed for interoperability use.

95. Applicants will apply for channel pairs (depending on which permissible EA is involved) in accordance with all relevant technical provisions under Part 90 of our Rules. We also sought comments on the appropriate power limit for these channels.[305] One of our concerns is that VHF public safety channels are usually allowed to have maximum effective radiated power of 500 watts under Part 90 of our Rules. Pursuant to former Section 90.283 of our Rules, however, the public coast channels as well as those that shared these channels under Part 90 were limited to a transmitter power of 50 watts.[306] No comments addressed this point. Ideally, we would prefer to allow the public safety stations to use the same facilities and standards that we adopted for the 700 MHz band and other Part 90 land mobile systems. The public coast stations, which utilize these channels, however, are limited to a transmitter output of 50 watts.[307] Consequently, we will limit the public safety users to a transmitter output power of 50 watts. This limitation will ensure proper protection to grandfathered stations as well as public coast stations in adjoining regions.

VI. PROCEDURAL MATTERS

96. To better understand the nature of the Y2K problem and the potential risks it posed to public safety communications networks, we sought comment in the *Third Notice* on how best to ascertain the extent, reach, and effectiveness of Y2K compliance initiatives undertaken by public safety entities. We requested information on at least three possible means to accomplish this goal and made no specific proposals. Nine comments and three reply comments addressing Y2K matters were filed in response to the *Third Notice*. In October 1999, in conjunction with the Network Reliability and Interoperability Council ("NRIC"), the Commission and NRIC released its Y2K Communications Sector Report Supplements for Broadcast, Cable, Satellite, and Emergency Communications. We incorporated the information provided in response to our request for information in the *Third Notice* into this supplement. Accordingly, we are incorporating the supplement into the record of WT Docket No. 96-86 and including a summary of the Y2K comments filed in response to the *Third Notice* as Appendix E.

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[302] NPSTC Comments at 9-10 citing *PSWAC Final Report*, Appendix C – Interoperability Subcommittee Report, Section 12.3.11.4, page 152 (426) and Section 12.3.11.5, page 153 (427); *see also* IACP Comments at 5.

[303] A map of the inland VPCs is attached as Appendix H.

[304] APCO Comments at 9; IACP Comments at 5; NPSTC Comments at 9-10.

[305] *See* 47 C.F.R. § 90.205.

[306] *See* former 47 C.F.R. § 90.283(c) (1997) (limiting transmitter power of Part 90 users sharing VHF public coast spectrum to 50 watts), (removed by the *Maritime Third Report and Order* at Appendix F).

[307] 47 C.F.R. § 80.215(c)(1).

97. *Ex Parte Presentations*. The captioned proceeding is a permit-but-disclose notice and comment rule making proceeding. *Ex parte* presentations are permitted, provided they are disclosed as provided in Commission Rules.[308]

98. *Paperwork Reduction Analysis.* This *Third Report and Order* contains modified information collections, respectively. As part of its continuing effort to reduce paperwork burdens, the Commission invites the general public and the Office of Management and Budget (OMB) to take this opportunity to comment on revision to the information collections contained in the *Third Report and Order.* As required by the Paperwork Reduction Act of 1995, Pub. L. No. 104-13, public comments on the information collections contained in the *Third Report and Order* are due thirty days after publication of the summary of the *Third Report and Order* in the Federal Register.

99. Comments on the modified information collections contained in the *Third Report and Order* should address: (a) whether the collection of information is necessary for the proper performance of the functions of the Commission, including whether the information shall have practical utility; (b) the accuracy of the Commission's burden estimates; (c) ways to enhance the quality, utility, and clarity of the information collected; and (d) ways to minimize the burden of the collection of information on the respondents, including the use of automated collection techniques or other forms of information technology. These comments should be submitted to Judy Boley, Federal Communications Commission, Room 1-C804, 445 12th Street, S.W., Washington, D.C. 20554, or via the Internet to jboley@fcc.gov. Furthermore, a copy of any such comments should be submitted to Virginia Huth, OMB Desk Officer, 10236 NEOB, 725 17th Street, N.W., Washington, D.C. 20503.

Final Regulatory Flexibility Act Analysis

100. As required by the Regulatory Flexibility Act, s*ee* 5 U.S.C. § 604, the Commission has prepared a Third Supplemental Final Regulatory Flexibility Analysis of the possible impact of the rule changes contained in the *Third Memorandum Opinion and Order* on small entities. The Third Supplemental Final Regulatory Flexibility Analysis is set forth in Appendix A. As required by the Regulatory Flexibility Act, s*ee* 5 U.S.C. § 604, the Commission has prepared a Final Regulatory Flexibility Analysis of the possible impact of the rule changes contained in the *Third Report and Order* on small entities. The Final Regulatory Flexibility Analysis is set forth in Appendix B. The Commission's Consumer Information Bureau, Reference Information Center, will send a copy of this *Third MO&O and Third Report and Order*, including the Third Supplemental Final Regulatory Flexibility Analysis and the Final Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration.

VII. ORDERING CLAUSES

101. Authority for issuance of this *Third Memorandum Opinion and Order and Third Report and Order* is contained in Sections 4(i), 302, 303(f) and (r), 332, and 337 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 302, 303(f) and (r), 332, 337.

102. Accordingly, IT IS ORDERED pursuant to 4(i), 302, 303(f) and (r), 332, and 337 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 302, 303(f) and (r), 332, 337 that Part 90 of the Commission's Rules, 47 C.F.R. Part 90, IS AMENDED as set forth in Appendix F, effective thirty days after publication of this *Third Memorandum Opinion and Order* and *Third Report and Order* in the Federal Register.

[308] *See generally* 47 C.F.R. §§ 1.1202, 1.1203, 1.1206.

103. IT IS FURTHER ORDERED that the Commission's Consumer Information Bureau, Reference Information Center, SHALL SEND a copy of this *Third Memorandum Opinion and Order and Third Report and Order*, including the Supplemental Final and Final Regulatory Flexibility Analyses, to the Chief Counsel for Advocacy of the Small Business Administration. For further information, contact Peter J. Daronco, Wireless Telecommunications Bureau, Public Safety and Private Wireless Division, Policy and Rules Branch at (202) 418-0680.

FEDERAL COMMUNICATIONS COMMISSION

Magalie Roman Salas
Secretary

APPENDIX A

THIRD SUPPLEMENTAL FINAL REGULATORY FLEXIBILITY ANALYSIS (*Third Memorandum Opinion and Order)*

As required by the Regulatory Flexibility Act ("RFA"),[1] an Initial Regulatory Flexibility Analysis ("IRFA") was incorporated in Appendix A of the *Second Notice of Proposed Rulemaking* ("*Second Notice*") issued in this proceeding.[2] The Commission sought written public comments on the proposals in the *Second Notice*, including comments on the IRFA. No comments were filed in direct response to the IRFA. Subsequently, a Final Regulatory Flexibility Analysis ("FRFA") was incorporated in Appendix A of the *First Report and Order* issued in this proceeding.[3] A Supplemental Final Regulatory Flexibility Analysis ("First SFRFA") was incorporated in Appendix A of the *Memorandum Opinion and Order on Reconsideration* ("*First MO&O*") issued in this proceeding.[4] A Second Supplemental Final Regulatory Flexibility Analysis ("Second SFRFA") was incorporated in Appendix A of the *Second Memorandum Opinion and Order* ("*Second MO&O*") issued in this proceeding.[5] The Third Supplemental Final Regulatory Flexibility Analysis ("Third SFRFA") contained in this *Third Memorandum Opinion and Order* ("*Third MO&O*") supplements the information contained in the FRFA, First SFRFA, and Second SFRFA and is limited to matters raised on reconsideration or clarification with regard to the *First Report and Order* and addressed in this *Third MO&O*. This Third SFRFA conforms to the RFA.[6]

I. Need for, and Objectives of, the *Third MO&O*

1. In this *Third MO&O*, we address the multiple Petitions for Reconsideration and/or Clarification filed in connection with the *First Report and Order* in this docket that established a band plan and adopted service rules in the newly-reallocated public safety spectrum at 764-776 MHz and 794-806 MHz ("the 700 MHz band"). This *Third MO&O* presents our decisions in response to those various portions of the petitions that address the:

a. band plan for the 700 MHz band, and
b. low power narrowband devices for on-scene communication.

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[1] *See* 5 U.S.C. § 603. The RFA, *see* 5 U.S.C. § 601 *et. seq*., 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).

[2] *See* Development of Operational, Technical and Spectrum Requirements For Meeting Federal, State and Local Public Safety Agency Communications Requirements Through the Year 2010, WT Docket No. 96-86, *Second Notice of Proposed Rulemaking*, 12 FCC Rcd. 17706, 17809 (1997).

[3] *See* Development of Operational, Technical and Spectrum Requirements For Meeting Federal, State and Local Public Safety Agency Communications Requirements Through the Year 2010, WT Docket No. 96-86, *First Report and Order and Third Notice of Proposed Rulemaking*, 14 FCC Rcd. 152, 249 (1998) ("*First Report and Order*").

[4] *See* Development of Operational, Technical and Spectrum Requirements For Meeting Federal, State and Local Public Safety Agency Communications Requirements Through the Year 2010, WT Docket No. 96-86, *Memorandum Opinion and Order on Reconsideration*, 14 FCC Rcd. 8059, 8070 (1999) ("*First MO&O*").

[5] *See* Development of Operational, Technical and Spectrum Requirements For Meeting Federal, State and Local Public Safety Agency Communications Requirements Through the Year 2010, WT Docket No. 96-86, *Second Memorandum Opinion and Order*, FCC 00-264 (rel. August 1, 2000) ("*Second MO&O*").

[6] *See* 5 U.S.C. § 604.

2. In the *Third MO&O*, we revise the band plan adopted in the *First Report and Order* to reposition the location of the narrowband and wideband channel groups for the general use, interoperability, and reserve spectrum. We also modify the adopted narrowband general use channel plan by designating forty-eight narrowband channels for low power use for on-scene communication. These clarifications are needed in order to promote efficient spectrum usage and flexibility.

II. Summary of Significant Issues Raised by Public Comments in Response to the FRFA.

3. No comments were filed in direct response to the FRFA.

III. Description and Estimate of Numbers of Small Entities Affected by Rule Amendment

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.[7] The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction."[8] In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act.[9] 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").[10] A small organization is generally "any not-for-profit enterprise which is independently owned and operated and is not dominant in its field."[11] Nationwide, as of 1992, there were approximately 275,801 small organizations.[12] "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."[13] As of 1992, there were approximately 85,006 such jurisdictions in the United States.[14] This number includes 38,978 counties, cities, and towns; of these, 37,566, or ninety-six percent, have populations of fewer than 50,000.[15] 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.

[7] 5 U.S.C. § 603(b)(3).

[8] *See* 5 U.S.C. § 601(6).

[9] 5 U.S.C. § 601(3) (incorporating by reference the definition of "small business concern" in 15 U.S.C. § 632). Pursuant to the RFA, 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." 5 U.S.C. § 601(3).

[10] Small Business Act, 15 U.S.C. § 632 (1996).

[11] 5 U.S.C. § 601(4).

[12] 1992 Economic Census, U.S. Bureau of the Census, Table 6 (special tabulation of data under contract to Office of Advocacy of the SBA).

[13] 5 U.S.C. § 601(5).

[14] U.S. Dept. of Commerce, Bureau of the Census, "1992 Census of Governments."

[15] *Id.*

5. *Public Safety Radio Pool Licensees.* As a general matter, Public Safety Radio Pool licensees include police, fire, local government, forestry conservation, highway maintenance, and emergency medical services.[16] Spectrum in the 700 MHz band for public safety services is governed by 47 U.S.C. § 337; there are approximately 127,540 licensees within these services. Non-Federal governmental entities as well as private businesses are licensees for these services. All governmental entities with populations of less than 50,000 fall within the definition of a small entity.[17] The rule changes adopted in this *Third MO&O* could affect public safety entities who wished to utilize frequencies in the low power pool for uses such as on-scene firefighting communications and various other short-range communications systems which would be developed for 700 MHz band equipment.

6. *Radio and Television Equipment Manufacturers*. We anticipate that at least six radio equipment manufacturers will be affected by our decisions in this proceeding. According to the SBA's regulations, a radio and television broadcasting and communications equipment manufacturer must have 750 or fewer employees in order to qualify as a small business concern.[18] Census Bureau data indicate that there are 858 U.S. firms that manufacture radio and television broadcasting and communications equipment, and that 778 of these firms have fewer than 750 employees and would therefore be classified as small entities.[19]

7. *Television Stations*. This proceeding will affect full service TV station licensees (Channels 60-69), TV translator facilities, and low power TV ("LPTV") stations. The SBA defines a TV broadcasting station that has no more than $10.5 million in annual receipts as a small business.[20] TV broadcasting stations consist of establishments primarily engaged in broadcasting visual programs by TV to the public, except cable and other pay TV services.[21] Included in this industry are commercial,

[16] *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 who 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.

[17] 5 U.S.C. § 601(5), *see supra* ¶ 4.

[18] 13 C.F.R. § 121.201, Standard Industrial Code (SIC) 3663.

[19] U.S. Dept. of Commerce, *1992 Census of Transportation, Communications and Utilities* (issued May 1995), SIC 3663.

[20] 13 C.F.R. § 121.201, SIC 4833 (1996).

[21] Economics and Statistics Administration, Bureau of Census, U.S. Department of Commerce, 1992 Census of Transportation, Communications and Utilities, Establishment and Firm Size, Series UC92-S-1, Appendix A-9 (1995) (ESA 1992 Census).

religious, educational, and other TV stations.[22] Also included are establishments primarily engaged in TV broadcasting and which produce taped TV program materials.[23] Separate establishments primarily engaged in producing taped TV program materials are classified under another SIC number.[24] There were 1,509 TV stations operating in the Nation in 1992.[25] That number has remained fairly constant as indicated by the approximately 1,551 operating TV broadcasting stations in the Nation as of February 28, 1997.[26] For 1992[27] the number of TV stations that produced less than $10.0 million in revenue was 1,155 establishments, or approximately 77 percent of the 1,509 establishments.[28] There are currently 95 full service analog TV stations, either operating or with approved construction permits on channels 60-69.[29]

8. In the *DTV Proceeding*, we adopted a Digital Television ("DTV") Table which provides only 15 allotments for digital television stations on channels 60-69 in the continental United States.[30] There are seven DTV allotments in channels 60-69 outside the continental United States.[31] Thus, the rules will affect approximately 117 TV stations; approximately 90 of those stations may be considered small businesses.[32] These estimates may overstate the number of small entities since the revenue figures on which they are based do not include or aggregate revenues from non-TV affiliated companies. We recognize that the rules may also impact minority-owned and women-owned stations, some of which may be small entities. In 1995, minorities owned and controlled 37 (3.0 percent) of 1,221 commercial TV

[22] *See* Executive Office of the President, Office of Management and Budget, Standard Industrial Classification Manual (1987), at 283, which describes TV Broadcasting Station (SIC 4833) as:

> Establishments primarily engaged in broadcasting visual programs by television to the public, except cable and other pay television services. Included in this industry are commercial, religious, educational and other television stations. Also included here are establishments primarily engaged in television broadcasting and which produce taped television program materials.

[23] ESA 1992 Census at Appendix A-9.

[24] ESA 1992 Census at Appendix A-9; SIC 7812 (Motion Picture and Video Tape Production); SIC 7922 (Theatrical Producers and Miscellaneous Theatrical Services (producers of live radio and TV programs)).

[25] *Allocation Report and Order*, 12 FCC Rcd at 22953 (1998), at Appendix C; ESA 1992 Census at Appendix A-9.

[26] *Allocation Report and Order*, 12 FCC Rcd 22953 (1998) at Appendix C.

[27] A census for communications establishments is performed every five years ending with a "2" or "7." *See* ESA 1992 Census at III.

[28] The amount of $10 million was used to estimate the number of small business establishments because the relevant Census categories stopped at $9,999,999 and began at $10,000,000. No category for $10.5 million existed. Thus, the number is as accurate as is possible to calculate with the available information.

[29] *See Allocation Notice*, 12 FCC Rcd at 14142.

[30] *See DTV Proceeding*, 12 FCC Rcd 14588.

[31] *See Allocation Notice* 12 FCC Rcd 14142, n.5.

[32] We use the 77 percent figure of TV stations operating at less than $10 million for 1992 and apply it to the 117 TV stations to arrive at 90 stations categorized as small businesses.

stations in the United States.[33] According to the U.S. Bureau of the Census, in 1987 women owned and controlled 27 (1.9 percent) of 1,342 commercial and non-commercial TV stations in the United States.[34]

9. There are currently 4,977 TV translator stations and 1,952 LPTV stations.[35] Approximately 1,309 low power TV and TV translator stations are on channels 60-69[36] which could be affected by policies in this proceeding. The Commission does not collect financial information on any broadcast facility and the Department of Commerce does not collect financial information on these broadcast facilities. We will assume for present purposes, however, that most of these broadcast facilities, including LPTV stations, could be classified as small businesses. As indicated earlier, approximately 77 percent of TV stations are designated under this analysis as potentially small businesses.

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

10. The only compliance requirement that is newly imposed by this Third MO&O is that we now require applicants for channels which where once reserved and are now available for low power licensing to go through the regional planning committee (RPC) process, including frequency coordination. RPCs will be responsible for determining the most appropriate low power application(s) on these channels and the frequency coordinators will be responsible for providing appropriate interference protection.

V. Steps Taken To Minimize Significant Economic Impact on Small Entities, and Significant Alternatives Considered

11. 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.[37]

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[33] *Minority Commercial Broadcast Ownership in the United States*, U.S. Dep't of Commerce, National Telecommunications and Information Administration, The Minority Telecommunications Development Program ("MTDP") (Apr. 1996). MTDP considers minority ownership as ownership of more than 50 percent of a broadcast corporation's stock, voting control in a broadcast partnership, or ownership of a broadcasting property as an individual proprietor. The minority groups included in this report are Black, Hispanic, Asian, and Native American.

[34] *See* Comments of American Women in Radio and TV, Inc. in MM Docket No. 94-149 and MM Docket No. 91-140 at 4 n.4 (filed May 17, 1995) (citing 1987 Economic Censuses, *Women-Owned Business*, WB87-1, U.S. Dep't of Commerce, Bureau of the Census, August 1990 (based on 1987 Census)). After the 1987 Census report, the Census Bureau did not provide data by particular communications services (four-digit SIC Code), but rather by the general two-digit SIC Code for communications (#48). Consequently, since 1987, the Census Bureau has not updated data on ownership of broadcast facilities by women, nor does the Commission collect such data. However, we sought comment on whether the Annual Ownership Report Form 323 should be amended to include information on the gender and race of broadcast license owners. Policies and Rules Regarding Minority and Female Ownership of Mass Media Facilities, *Notice of Proposed Rule Making*, 10 FCC Rcd 2788, 2797 (1995).

[35] *See Allocation Report and Order*, 12 FCC Rcd 22986 at Appendix C.

[36] *See Allocation Notice* at 12 FCC Rcd 14142, n.3.

[37] *See* 5 U.S.C. § 603.

12. *Channel plans* We appropriately decided to modify the narrowband and wideband interoperability channeling plans to permit the use of efficient transmitter combiners for common antennas. This revision lowers costs for public safety entities. Thus, these rule changes will benefit all public safety entities, including small entities. On the other hand, denying these petitions was not a viable alternative because maintaining the channel plan adopted in the *First Report and Order* would have increased costs for public safety entities, including small entities, by precluding the use of combiners. Additionally, our decision grouping the reserve spectrum into four segments of 1.35 MHz each located between the narrowband and wideband segments offers improved flexibility to accommodate future requirements that are unforeseen at this time. These rule changes will have future benefits for all public safety entities, including small entities.

13. *Low Power Channels* Our decision allocating channels nationwide for low power mobile operations offers improved flexibility for the public safety community to meet specialized, on-scene communication requirements. Thus, these rule changes will benefit all public safety entities, including small entities. Moreover, designating the twenty-four pairs as low power channels nationwide will lower costs for equipment manufacturers and public safety users, including small entities, as will our decision to exempt these low power devices from the interoperability capability, digital modulation, and trunking requirements.[38] The regional planning and frequency coordination process that we apply to the "regional" channels and the licensing process that we apply to all of these channels are necessary to minimize interference. We minimized burdens by exempting the nationwide, itinerant channels from regional planning and frequency coordination. This exemption benefits all public safety entities including small entities, resulting in reduced costs and improved operational flexibility to meet on-scene communication requirements. We also note that about half of the new low power channels were previously general use channels and thus already subject to regional planning, frequency coordination, and licensing under the *First Report and Order*. Other alternatives were not changing the rule and/or requiring regional planning and frequency coordination for all of the low power channels. Our decision reflects a balance between the need to minimize interference and the need for operational flexibility.[39]

14. By establishing this low power designation, we ease the economic burden, of funding communications systems in the new 700 MHz band, on public safety agencies, including small entities, that forego purchasing more expensive high power equipment when less expensive low-power equipment meets their short distance communications needs. We also ease the burden on equipment manufacturers, including small entities, because this low power designation provides flexibility to produce high-power equipment, low-power equipment, or both. Moreover, exempting this low power equipment from the interoperability capability requirement will quicken the type certification process for manufacturers of this low power equipment.

Report to Congress: The Commission will send a copy of the *Third Report and Order*, including this Final Regulatory Flexibility Analysis, in a report to be sent to Congress pursuant to SBREFA.[40] A copy of the *Third Report and Order* including the Final Regulatory Flexibility Analysis

[38] In the *Third MO&O*, we amend our Rules to exempt mobiles and portables that operate exclusively on these low power frequencies from the digital modulation requirement of Section 90.535, the trunking requirement of Section 90.537, and the interoperability channel capability requirement of Section 90.547 of our Rules. In addition, we are revising Section 90.547 to more clearly reflect the interoperability channel capability requirement that we adopted in the *First Report and Order*.

[39] *See Third Report and Order*, para. 38, *supra*.

[40] *See* 5 U.S.C. § 801(a)(1)(A).

(or summaries thereof) will also be published in the Federal Register.[41] In addition, the Commission will send a copy of the *Third Report and Order*, including the Final Regulatory Flexibility Analysis to the Chief Counsel for Advocacy of the SBA.

[41] *See 5* U.S.C. § 604(b).

APPENDIX B

FINAL REGULATORY FLEXIBILITY ANALYSIS
(*Third Report and Order*)

As required by the Regulatory Flexibility Act (RFA),[1] Initial Regulatory Flexibility Analysis (collectively referred to as "IRFAs") were incorporated in the *Notice of Proposed Rule Making* ("*Public Safety Notice*"), the *Second Notice of Proposed Rule Making* ("*Second Notice*") and the *Third Notice of Proposed Rulemaking* (*Third Notice*) in Docket 96-86.[2] The Commission sought written public comments on the proposals in the *Public Safety Notice*, *Second Notice*, and *Third Notice*, including comments on the IRFAs. No comments on the IRFAs were received. This Final Regulatory Flexibility Analysis ("FRFA") conforms to the RFA.[3]

I. Need for, and Objectives of, the *Third Report and Order*

1. In the *Third Report and Order* portion of this combined item, we address technical, designation and licensing issues for the spectrum that we reserved in the *First Report and Order* to be "subject to the *Third Notice.*"[4] In addition, we adopt technical criteria for 700 MHz band operations to protect satellite-based global navigation systems ("GNSS") from harmful interference and establish measures to promote interoperability on public safety channels below 512 MHz. These are crucial developmental steps towards the flexible regulatory framework needed to meet vital current and future public safety communications needs.

II. Summary of Significant Issues Raised by Public Comments in Response to the IRFAs.

2. Based on the comments submitted generally by small entities, the Commission found that the rules we proposed to adopt in this proceeding may have a significant impact on a substantial number of small businesses. Therefore, the IRFAs solicited comments on alternatives to our proposed rules that would minimize the impact on small entities consistent with the objectives of this proceeding. No comments were submitted directly in response to the IRFAs; however, as described in Section V, we have taken into account all general comments received which addressed the impact on small entities.

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[1] *See* 5 U.S.C. § 603. The RFA, *see* 5 U.S.C. § 601 *et. seq*., 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).

[2] The Development of Operational, Technical and Spectrum Requirements For Meeting Federal, State and Local Public Safety Agency Communication Requirements Through the Year 2010, WT Docket 96-86, *Notice of Proposed Rule Making*, 11 FCC Rcd 12,460 (1996) (*Public Safety Notice*); The Development of Operational, Technical and Spectrum Requirements For Meeting Federal, State and Local Public Safety Agency Communication Requirements Through the Year 2010 and Establishment of Rules and Requirements For Priority Access Service, WT Docket 96-86, *Second Notice of Proposed Rule Making*, 12 FCC Rcd 17,706 (1997) (*Second Notice*), The Development of Operational, Technical and Spectrum Requirements For Meeting Federal, State and Local Public Safety Agency Communication Requirements Through the Year 2010 and Establishment of Rules and Requirements For Priority Access Service, WT Docket 96-86, *First Report and Order and Third Notice of Proposed Rulemaking*, 14 FCC Rcd. 152 (1998) (*First Report and Order* or *Third Notice*, as applicable).

[3] *See* 5 U.S.C. § 604.

[4] *See First Report and Order*, 14 FCC Rcd. at 175-176 ¶ 43.

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

3. The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction."[5] In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act.[6] A small business concern is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the SBA.[7] A small organization is generally "any not-for-profit enterprise which is independently owned and operated and is not dominant in its field."[8] Nationwide, as of 1992, there were approximately 275,801 small organizations.[9] "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."[10] As of 1992, there were approximately 85,006 such jurisdictions in the United States.[11] This number includes 38,978 counties, cities, and towns; of these, 37,566, or ninety-six percent, have populations of fewer than 50,000.[12] 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.

4. *Public Safety Radio Pool Licensees.* As a general matter, Public Safety Radio Pool licensees include police, fire, local government, forestry conservation, highway maintenance, and emergency medical services.[13] Spectrum in the 700 MHz band for public safety services is governed by 47 U.S.C.

[5] *See* 5 U.S.C. § 601(6).

[6] 5 U.S.C. § 601(3) (incorporating by reference the definition of "small business concern" in 15 U.S.C. § 632). Pursuant to the RFA, 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." 5 U.S.C. § 601(3).

[7] Small Business Act, 15 U.S.C. § 632 (1996).

[8] 5 U.S.C. § 601(4).

[9] 1992 Economic Census, U.S. Bureau of the Census, Table 6 (special tabulation of data under contract to Office of Advocacy of the SBA).

[10] 5 U.S.C. § 601(5).

[11] U.S. Dept. of Commerce, Bureau of the Census, "1992 Census of Governments."

[12] *Id.*

[13] *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 who 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

§ 337; there are approximately 127,540 licensees within these services. Non-Federal governmental entities as well as private businesses are licensees for these services. All governmental entities with populations of less than 50,000 fall within the definition of a small entity.[14] The rule changes adopted in this *Third MO&O* could affect public safety entities who wished to utilize frequencies in the low power pool for uses such as on-scene firefighting communications and various other short-range communications systems which would be developed for 700 MHz band equipment.

5. *Radio and Television Equipment Manufacturers*. We anticipate that at least six radio equipment manufacturers will be affected by our decisions in this proceeding. According to the SBA's regulations, a radio and television broadcasting and communications equipment manufacturer must have 750 or fewer employees in order to qualify as a small business concern.[15] Census Bureau data indicate that there are 858 U.S. firms that manufacture radio and television broadcasting and communications equipment, and that 778 of these firms have fewer than 750 employees and would therefore be classified as small entities.[16]

6. *Television Stations*. This proceeding will affect full service TV station licensees (Channels 60-69), TV translator facilities, and low power TV (LPTV) stations. The SBA defines a TV broadcasting station that has no more than $10.5 million in annual receipts as a small business.[17] TV broadcasting stations consist of establishments primarily engaged in broadcasting visual programs by TV to the public, except cable and other pay TV services.[18] Included in this industry are commercial, religious, educational, and other TV stations.[19] Also included are establishments primarily engaged in TV broadcasting and which produce taped TV program materials.[20] Separate establishments primarily engaged in producing taped TV program materials are classified under another SIC number.[21]

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relief organizations, school buses, beach patrols, establishments in isolated areas, communications standby facilities, and emergency repair of public communications facilities.

[14] 5 U.S.C. § 601(5), *see supra* para. 3.

[15] 13 C.F.R. § 121.201, Standard Industrial Code (SIC) 3663.

[16] U.S. Dept. of Commerce, *1992 Census of Transportation, Communications and Utilities* (issued May 1995), SIC 3663.

[17] 13 C.F.R. § 121.201, SIC 4833 (1996).

[18] Economics and Statistics Administration, Bureau of Census, U.S. Department of Commerce, 1992 Census of Transportation, Communications and Utilities, Establishment and Firm Size, Series UC92-S-1, Appendix A-9 (1995) (ESA 1992 Census).

[19] *See* Executive Office of the President, Office of Management and Budget, Standard Industrial Classification Manual (1987), at 283, which describes TV Broadcasting Station (SIC 4833) as:

> Establishments primarily engaged in broadcasting visual programs by television to the public, except cable and other pay television services. Included in this industry are commercial, religious, educational and other television stations. Also included here are establishments primarily engaged in television broadcasting and which produce taped television program materials.

[20] ESA 1992 Census at Appendix A-9.

[21] ESA 1992 Census at Appendix A-9; SIC 7812 (Motion Picture and Video Tape Production); SIC 7922 (Theatrical Producers and Miscellaneous Theatrical Services (producers of live radio and TV programs)).

7. There were 1,509 TV stations operating in the Nation in 1992.[22] That number has remained fairly constant as indicated by the approximately 1,551 operating TV broadcasting stations in the Nation as of February 28, 1997.[23] For 1992[24] the number of TV stations that produced less than $10.0 million in revenue was 1,155 establishments, or approximately 77 percent of the 1,509 establishments.[25] There are currently 95 full service analog TV stations, either operating or with approved construction permits on channels 60-69.[26] In the *DTV Proceeding*, we adopted a Digital Television ("DTV") Table which provides only 15 allotments for DTV stations on channels 60-69 in the continental United States.[27] There are seven DTV allotments in channels 60-69 outside the continental United States.[28] Thus, the rules will affect approximately 117 TV stations; approximately 90 of those stations may be considered small businesses.[29] These estimates may overstate the number of small entities since the revenue figures on which they are based do not include or aggregate revenues from non-TV affiliated companies. We recognize that the rules may also impact minority-owned and women-owned stations, some of which may be small entities. In 1995, minorities owned and controlled 37 (3.0 percent) of 1,221 commercial TV stations in the United States.[30] According to the U.S. Bureau of the Census, in 1987 women owned and controlled 27 (1.9 percent) of 1,342 commercial and non-commercial TV stations in the United States.[31]

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[22] *Allocation Report and Order*, 12 FCC Rcd at 22953 (1998), at Appendix C; ESA 1992 Census at Appendix A-9.

[23] *Allocation Report and Order*, 12 FCC Rcd 22953 (1998) at Appendix C.

[24] A census for communications establishments is performed every five years ending with a "2" or "7." *See* ESA 1992 Census at III.

[25] The amount of $10 million was used to estimate the number of small business establishments because the relevant Census categories stopped at $9,999,999 and began at $10,000,000. No category for $10.5 million existed. Thus, the number is as accurate as is possible to calculate with the available information.

[26] *See Allocation Notice*, 12 FCC Rcd at 14142.

[27] *See DTV Proceeding*, 12 FCC Rcd 14588.

[28] *See Allocation Notice* 12 FCC Rcd 14142, n.5.

[29] We use the 77 percent figure of TV stations operating at less than $10 million for 1992 and apply it to the 117 TV stations to arrive at 90 stations categorized as small businesses.

[30] *Minority Commercial Broadcast Ownership in the United States*, U.S. Dep't of Commerce, National Telecommunications and Information Administration, The Minority Telecommunications Development Program ("MTDP") (Apr. 1996). MTDP considers minority ownership as ownership of more than 50 percent of a broadcast corporation's stock, voting control in a broadcast partnership, or ownership of a broadcasting property as an individual proprietor. The minority groups included in this report are Black, Hispanic, Asian, and Native American.

[31] *See* Comments of American Women in Radio and TV, Inc. in MM Docket No. 94-149 and MM Docket No. 91-140 at 4 n.4 (filed May 17, 1995) (citing 1987 Economic Censuses, *Women-Owned Business*, WB87-1, U.S. Dep't of Commerce, Bureau of the Census, August 1990 (based on 1987 Census)). After the 1987 Census report, the Census Bureau did not provide data by particular communications services (four-digit SIC Code), but rather by the general two-digit SIC Code for communications (#48). Consequently, since 1987, the Census Bureau has not updated data on ownership of broadcast facilities by women, nor does the Commission collect such data. However, we sought comment on whether the Annual Ownership Report Form 323 should be amended to include information on the gender and race of broadcast license owners. Policies and Rules Regarding Minority and Female Ownership of Mass Media Facilities, *Notice of Proposed Rule Making*, 10 FCC Rcd 2788, 2797 (1995).

8. There are currently 4,977 TV translator stations and 1,952 LPTV stations.[32] Approximately 1,309 low power TV and TV translator stations are on channels 60-69[33] which could be affected by policies +in this proceeding. The Commission does not collect financial information of any broadcast facility and the Department of Commerce does not collect financial information on these broadcast facilities. We will assume for present purposes, however, that most of these broadcast facilities, including LPTV stations, could be classified as small businesses. As indicated earlier, approximately 77 percent of TV stations are designated under this analysis as potentially small businesses. Given this, LPTV and TV translator stations would not likely have revenues that exceed the SBA maximum to be designated as small businesses.

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

9. This *Third Report and Order* adopts some rules that will entail additional compliance requirements. These three additional requirements may have an effect on small entities. First, we adopt additional technical criteria for 700 MHz band operations. These new requirements are enacted in order to protect satellite-based global navigation systems from harmful interference.[34] Although this requirement may result in increases in manufacturing costs, including for small manufacturing entities, and may result in higher equipment costs, including for small entities, this modification is essential due to safety concerns related to GNSS operations. Second, we establish measures to promote interoperability on public safety channels below 512 MHz. After January 1, 2005, applications for equipment certification will only be granted for mobile and portable transmitters operating on public safety frequencies in the 150-174 MHz and/or 450-470 MHz bands that are capable of operating on at least one nationwide public safety interoperability channel designated in the band(s) in which the equipment operates. Although this requirement may result in increases in manufacturing costs, including for small manufacturing entities, and may result in higher equipment costs, including for small entities, this modification is essential to improve interoperability capabilities in existing public safety bands for public safety entities, including small entities, that operate in these bands. Lastly, we also require applicants for interoperability channels designated in the 156-162 MHz band (in thirty-three inland VHF public coast areas (VPC)) to complete the frequency coordination process. This process requires applicants to pay fees to frequency coordinators. These fees are generally based on the number of sites, frequencies, and complexity of the coordination process. The adoption of these rules is crucial in order to minimize the potential for interference among the varied users of these channels.

V. 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.[35]

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[32] *See Allocation Report and Order*, 12 FCC Rcd 22986 at Appendix C.

[33] *See Allocation Notice* at 12 FCC Rcd 14142, n.3.

[34] *See Third Report and Order*, para. 78-81 , *supra.*

[35] *See* 5 U.S.C. § 603.

11. *State License* We designate 2.4 MHz of the 700 MHz band for licensing directly to each state. The rules we adopt will preclude all non-state entities from being licensed for the designated state license frequencies. Most commenters agreed that licensing states for this amount of spectrum (for state agency use) is reasonable.[36] We also include provisions to ensure that this spectrum will become available for "general use" if a given state either (1) declines to apply for a state license or (2) fails to provide or be prepared to provide "substantial service" by certain benchmark dates. Additionally, we amend Section 90.179 to allow states to share the use of the 2.4 MHz of spectrum with local and other public safety entities, which removes an impediment to small entities accessing this spectrum under sharing agreements with states. We considered a variety of alternative approaches for the use and licensing of the reserve spectrum. We declined to adopt an alternative "State Licensing" approach under which states – rather than regional planning committees – would manage state, local, and Federal use of all or most of the 8.8 MHz of spectrum reserved subject to the *Third Notice.* While there were no comments specifically responding to the IRFAs, we considered numerous comments that raised the concern that licensing states for the entire amount would designate the spectrum in a manner deleterious to small entities. Accordingly, we designated an appropriate amount of spectrum for state use instead of designating all of the reserve spectrum to manage. We also believe our decision to allocate the same 2.4 MHz nationwide will benefit small entities because they will not face the possibility of interference on a variety of frequencies from their parent state as well as from adjoining states.

12. *GNSS Protection Criteria* The technical solutions we adopt to protect certain global navigation satellite systems ("GNSS") will impact all manufacturers of equipment that operates in the 700 MHz public safety band. This includes even small manufacturing entities. However, as discussed in the *Third Report and Order*,[37] these limits are necessary to protect GNSS operations, including Global Orbiting Navigation Satellite Systems and Global Positioning System in accordance with international requirements. Moreover, Congress directed the Commission to "protect the integrity of the [GPS] frequency spectrum against interference and disruption."[38] Nevertheless, we have attempted to minimize, to the extent possible, the effect of these additional technical requirements.

13. *Interoperability below 512 MHz* We establish measures to promote interoperability on public safety channels below 512 MHz by designating specific channels in each band for nationwide interoperability purposes We did this because the record demonstrated the need for improved interoperability capabilities below 512 MHz. This designation requires that existing licensees on these channels operate on a secondary basis to interoperability communication. In order to minimize the impact of these rules, we "grandfathered" these licensees on a secondary basis only to interoperability communication rather than ordering them to vacate the channels or use them exclusively for interoperability purposes. We also provide these licensees a transition period, until January 1, 2005. We selected the "least licensed channels" in each band to minimize the economic impact arising from the need to designate interoperability channels in these existing public safety bands.[39] Additionally, after January 1, 2005, applications for equipment certification will only be granted for mobile and portable transmitters operating on public safety frequencies in these bands that are capable of operating on at least one nationwide public safety interoperability channel designated in the band(s) in which the equipment operates. We provide a similar transition period for equipment manufacturers in order to minimize the

[36] *See Third Report and Order*, paras. 48-58, *supra*.

[37] *See Third Report and Order*, paras. 75-81, *supra*.

[38] Defense FY99 Appropriations Conference Report and in the Commercial Space Act of 1998, H.R. 105-746, Defense FY99 Appropriations Conference Report; H.R. 1702 Commercial Space Act of 1998.

[39] *See id.*, para. 88, note 281.

impact of these rules. This transition period will allow small manufacturing entities, in particular, an opportunity to plan for this new requirement. The alternative of not adopting this interoperability capability requirement was not acceptable because of the need to improve public safety interoperability below 512 MHz. Lastly, we also require applicants for interoperability channels designated in the 156-162 MHz band (in thirty-three inland VHF public coast areas (VPC)) to complete the frequency coordination and licensing process. We briefly considered the alternative of not requiring frequency coordination for these channels. This was unacceptable because of the potential for interference among the varied users of these channels.

14. As discussed in the *Third Report and Order*, we note that one reason for establishing measures to promote interoperability below 512 MHz is to assist public safety entities, including small entities, that cannot afford to or do not want to purchase equipment in the new 700 MHz public safety band, wherein 2.6 megahertz of spectrum is designated for nationwide interoperability.[40] We also attempted to minimize burdens on public safety entities, including small entities, by not requiring that existing public safety licensees apply-for and be licensed to operate mobile and portable transmitters on the nationwide interoperability channels in the existing public safety bands below 470 MHz.

Report to Congress: The Commission will send a copy of the *Third Memorandum Opinion and Order*, including the Third Supplemental Final Regulatory Flexibility Analysis, in a report to be sent to Congress pursuant to SBREFA.[41] A copy of the *Third Memorandum Opinion and Order* including the Third Supplemental Final Regulatory Flexibility Analysis (or summaries thereof) will also be published in the Federal Register.[42] In addition, the Commission will send a copy of the *Third Memorandum Opinion and Order*, including this Final Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the SBA.

[40] *See Third Report and Order*, paras. 82-90, *supra*.

[41] *See* 5 U.S.C. § 801(a)(1)(A).

[42] *See 5* U.S.C. § 604(b).

APPENDIX C

LIST OF PARTIES
(*Third Memorandum Opinion and Order)*

The following is a list of parties filing petitions and responsive pleadings in response to the *First Report and Order* in The Development of Operational, Technical and Spectrum Requirements for Meeting Federal, State and Local Public Safety Agency Communication Requirements Through the Year 2010, WT Docket No. 96-86, *First Report and Order and Third Notice of Proposed Rule Making,* 14 FCC Rcd 152, 164–228 (1998).

Petitions for Reconsideration and/or Clarification were filed by:

1. American Association of State Highway and Transportation Officials,
   Forestry Conservation Communications Association,
   International Association of Fire Chiefs, Inc.,
   International Association of Fish and Wildlife Agencies,
   International Municipal Signal Association, and
   National Association of State Foresters ("AASHTO")
2. American National Standards Institute ("ANSI")
3. Association of Public-Safety Communications Officials-International, Inc. ("APCO")
4. Dataradio Group of Companies ("Dataradio")
5. Ericsson, Inc. ("Ericsson")
6. Federal Law Enforcement Wireless Users Group ("FLEWUG")
7. King Communications U.S.A. Inc. ("King")
8. Motorola, Inc. ("Motorola")
9. National Public Safety Telecommunications Council ("NPSTC")
10. New York State Technology Enterprise Corporation ("NYSTEC")
11. Commonwealth of Pennsylvania ("Pennsylvania")
12. John Powell ("Powell")
13. Project 25 Steering Committee ("Project 25")
14. Safety Tech Industries ("STI")
15. State of California ("California")
16. State of Florida ("Florida")
17. Telecommunications Industry Association ("TIA")

Oppositions and Replies to Petitions for Reconsideration were filed by:

1. AASHTO
2. APCO
3. API
4. California
5. Dataradio
6. Ericsson
7. Florida
8. Minnesota Department of Transportation (Minnesota DOT)
9. Motorola
10. Pennsylvania
11. STI
12. UTC, The Telecommunications Association ("UTC")

APPENDIX C (cont'd)

Comments/Reply Comments on *First Report and Order* Issues were filed by:

1. APCO Canada ("APCO Canada")
2. Daniels Electronics Ltd. ("Daniels")
3. Simoco International Limited ("Simoco")
4. Union Pacific Railroad Company ("UPRR")
5. DuPage Public Safety Communications ("DuPage")
6. Illinois Chapter of APCO ("Illinois APCO")
7. Northwest Central Dispatch System ("NWCDS")
8. City of Chicago OEC ("Chicago")
9. State of Nebraska ("Nebraska")
10. Elk Grove Village Fire Department ("Elk Grove")

APPENDIX D

LIST OF COMMENTERS
(*Third Report and Order*)

The following is a list of parties filing comments and reply comments in response to the *Third Notice of Proposed Rule Making* in The Development of Operational, Technical and Spectrum Requirements for Meeting Federal, State and Local Public Safety Agency Communication Requirements Through the Year 2010, WT Docket No. 96-86, *First Report and Order and Third Notice of Proposed Rule Making*, 14 FCC Rcd 152, 228–246 (1998).

Comments

Air Travelers Association, American Airlines, The General Aviation Manufacturers Association, Outreach, Stanford University (The GPS Research Program), the U.S. GPS Industry Council, and United Airlines (collectively, "GPS Commenters")
American Association of State Highway and Transportation Officials ("AASHTO"), Forestry Conservation Communications Association ("FCCA"), International Association of Fire Chiefs, Inc. ("IAFC"), International Association of Fish and Wildlife Agencies ("IAFWA"), International Municipal Signal Association ("IMSA"), and National Association of State Foresters ("NASF") (collectively, "Joint Commenters AASHTO, *et al*.")
American Petroleum Institute (API)
Association of Public safety Communications Officials International, Inc. (APCO)
Vanu G. Bose (Bose)
State of California (California)
Federal Law Enforcement Wireless Users Group (FLEWUG)
State of Florida (Florida)
International Association of Chiefs of Police (IACP)
County of Los Angeles (Los Angeles)
Motorola, Inc. (Motorola)
National League of Cities and the City and County of San Francisco (collectively, “Cities”)
National Public Safety Telecommunications Council (NPSTC)
National Telecommunications and Information Administration (NTIA)
New York State Technology Enterprise Corporation (NYSTEC)
Executive Office of the President, Office of Management and Budget (OMB)
Commonwealth of Pennsylvania (Pennsylvania)
Public Safety Wireless Network Program (PSWN)
Region–20 800 MHz Public Safety Review Committee Legislative/Regulatory Affairs Committee (Region 20)
State of Tennessee, Department of Transportation (Tennessee DOT)
Dr. Michael C. Trahos, D.O., NCE, CET (Trahos)
UTC, The Telecommunications Association (UTC)
Commonwealth of Virginia, Department of Information Technology (Virginia Dept. of Info Technology) (Late or *Ex Parte*)
State of Wisconsin (Wisconsin)

Reply Comments

Airtouch Communications, Inc., Iridium LLC, Iridium U.S., L.P.,
L/Q Licensee, Inc., Globalstar, L.P.
Air Travelers Association, American Airlines, The General Aviation Manufacturers Association,
Outreach, Stanford University (The GPS Research Program), the U.S. GPS Industry Council, and
United Airlines (collectively, "GPS Commenters")
American Petroleum Institute (API)
State of Arizona (Arizona)
Association of Public safety Communications Officials International, Inc. (APCO)
State of California (California)
Federal Law Enforcement Wireless Users Group (FLEWUG)
Motorola, Inc. (Motorola)
National Oceanic and Atmospheric Administration and U.S. Coast Guard(NOAA/USCG)
National Telecommunications and Information Administration (NTIA)
Commonwealth of Pennsylvania (Pennsylvania)
Public Safety Wireless Network Program (PSWN)
Region VI Northern California NPSCPAC Review and Revision Committee (Region 6)
Dr. Michael C. Trahos, D.O., NCE, CET (Trahos)
UTC, The Telecommunications Association (UTC)

APPENDIX E

SUMMARY OF Y2K COMMENTS TO *THIRD NOTICE*

1. APCO states that some of the procedures we presented are unlikely to be effective and could add unnecessary burdens on public safety communications personnel. APCO argues that: (1) RPCs are not the appropriate vehicle to gather this information because most 800 MHz RPC members will also be part of the 700 MHz RPC process and will soon be engrossed in that activity, leaving little or no time for additional responsibilities; (2) RPCs do not have the funding to undertake such substantial information gathering and reporting activities; (3) 800 MHz RPCs will only reach a small percentage of public safety agencies, as the majority of state and local governments are not licensed in the 800 MHz band and; (4) local government personnel involved in Y2K compliance will be in information technology departments generally separate from agencies with radio communications responsibility.[1] FLEWUG agrees with APCO, stating that trying to collect information through the existing 800 MHz RPCs will only yield information on systems operating at 800 MHz, and a more comprehensive approach is needed. FLEWUG adds that 800 MHz RPCs could operate in–region as a forum for identifying problems and solutions.[2]

2. California states that unlike our oversight on how common carriers provide service to their customers, we have no responsibility in law, regulation, or tradition on how public safety communications systems are operated. The Y2K problem is not an issue of how the radio spectrum is utilized, but rather is an issue of how public safety systems will be impacted operationally by software failures of the equipment it uses.[3] California indicates that most of the equipment potentially affected is not radio equipment for which we might claim some peripheral responsibility, but rather is associated equipment such as dispatch consoles, computer-aided dispatch systems, logging recorders, and other devices for which we have claimed no historical interest.[4]

3. FLEWUG states that it supports the need for additional information regarding Y2K preparedness of public safety radio systems and encourages us to pursue such a course of action. FLEWUG indicates that it perceives Y2K as having both a computer software and firmware problem and a security problem. Accordingly, FLEWUG states that contingency plans and other security measures should be put in place to minimize risks posed by the Y2K problem to public safety radio systems. FLEWUG thus urges the implementation of sufficient safeguards to ensure system-specific information is not revealed if we choose to collect information regarding the Y2K problem. FLEWUG also believes frequency coordinators provide convenient collection points for information, and collecting information through the frequency coordinators instead of from the licensees directly might be more efficient. FLEWUG asserts that if frequency coordinators collect such information, we should ensure they do not try to charge additional fees to their public safety customers or raise fees for coordination services because the public safety community should not realize fee increases due to Y2K data collection efforts. FLEWUG contends that another option would be for the Commission to survey all public safety agencies, with the survey structured to yield statistically significant results to ascertain both the current state of Y2K readiness and the progress and range of compliance initiatives.[5] The information sought likely could

[1] APCO Comments at 10-12.

[2] FLEWUG Comments at 21 and Reply Comments at 17.

[3] California Comments at 9.

[4] *Id*.

[5] FLEWUG Comments at 23.

be collected via, e.g., a short two-page survey, but any survey must be completed quickly and with a sufficient response rate from the community, given the imminent nature of the year 2000 problem.[6]

4. Florida states that within its state government, the effort to address the Y2K problem has been ongoing for several years. Florida expresses doubt that the RPCs or frequency coordinators will be able to provide any substantial information on Y2K compliance among public safety agencies.[7]

5. IACP states that Y2K efforts are primarily a local, state, and federal public safety agency issue and that our primary function should only be to alert these agencies to potential Y2K communications related problems. IACP also does not believe it is appropriate to burden either the RPCs or the Public Safety coordinators with Y2K responsibilities because neither is funded or expertly staffed to provide this service. IACP believes that our most effective action would be a directive to each licensee detailing the Y2K problem in simple, understandable terms and providing a list of resources for the licensee to use.[8] PSWN agrees with IACP that it is not appropriate to burden either the RPCs or the public safety coordinators with Y2K responsibilities.[9]

6. NPSTC states that Y2K will impact many computer aided dispatch systems and that trunked radio systems also may be affected. Additionally, NPSTC believes that the Global Position System ("GPS") equipment used in automatic vehicle location and other high technology systems also may experience date/time problems. NPSTC also states that it is difficult to visualize how this serious problem can be addressed within the scope of this proceeding, particularly considering the time element involved. NPSTC contends that direct notices from the Commission to every licensee would carry more weight and reach more Public Safety agencies than any other means. NPSTC further states that the Commission's notices should contain specific information regarding recognition of the problem, how it might affect Public Safety equipment and systems, and Internet web sites where further information may be obtained.[10] Joint Comments were filed by NPSTC members; AASHTO, FCCA, IAFC, IAFWA, IMSA and NASF ("Joint Commenters") to "supplement" NPSTC's comments. As for our suggestion that frequency coordinators could provide Y2K notification, NPSTC observes that the coordinators generally are in contact with public safety agencies only during the time of the coordination process. The Joint Commenters add that while there might be an organizational element regarding the appropriateness of the frequency coordinators serving as a conduit for Y2K information, *i.e.*, the coordinators generally deal with communications system management personnel. However, in many organizations, Y2K issues are administered by a management information department, which might be part of a different branch within the public safety service or even a different branch of the broader governmental entity than those responsible for communications services.[11]

7. Cities state that San Francisco's departments are currently engaged in efforts to seek Y2K compliance from vendors. The Cities recommend that we obtain detailed information on Y2K compliance efforts directly from individual licensees.[12] The Cities also suggest that we assist licensees by

[6] *Id.*

[7] Florida Comments at 7-8.

[8] Comments of IACP at 6.

[9] PSWN Reply Comments at 11.

[10] NPSTC Comments at 10-12.

[11] Joint Commenters Comments at 4.

[12] The Cities Comments at 18.

requiring equipment manufacturers to provide more comprehensive information regarding their efforts to resolve potential Y2K problems with their products. To assist local governments and licensees in obtaining uniform results, The Cities state that we should also formulate criteria for testing procedures and set standards for defining "Year 2000 compliance" as it relates to telecommunications technologies.[13] Opposition to this suggestion was expressed by Motorola.[14]

8. PSWN states that there are likely to be a number of public safety radio systems with Y2K problems because the average age of public safety systems is approximately ten years. Thus, PSWN states that it is advisable for us to attempt to ascertain the extent of the problem and degree of readiness. PSWN adds that the data collection approaches we suggested would be overly burdensome (especially on frequency coordinators and RPCs) and would establish a precedent for coupling other issues with spectrum management. PSWN suggests that we issue a short, two page, statistical survey, perhaps using cover letters or other introductory materials from organizations and associations well known and regarded by the community to improve the likelihood of a sufficient response.[15]

9. Motorola views the Y2K problem as an important business issue that can affect all parts of its business as well as its suppliers and customers. Accordingly, it has engaged all Motorola business units to identify and address Y2K issues.[16] From a practical perspective, Motorola states that it is unlikely that we can, beginning in the middle of the first quarter of 1999, propose, hear comments on, and develop regulation which will address the Y2K problem with sufficient speed to have any actual effect before the year 2000 arrives. Motorola avers that market forces are appropriately encouraging manufacturers to address the Y2K readiness of their equipment, and that we are taking the appropriate route by fostering an awareness of the Y2K issue and by promoting dialog between manufacturers and users of equipment. Motorola urges us to continue in this role and to eschew suggestions of regulation in this area.[17]

[13] *Id*.

[14] Motorola Reply Comments at 12.

[15] PSWN Comments at 19-20.

[16] Motorola Reply Comments at 12.

[17] *Id*. at 12-13.

APPENDIX F

FINAL RULES

Third Memorandum Opinion and Order
and
Third Report and Order

Part 90 of Title 47 of the Code of Federal Regulations is amended as follows:

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 90.1 is amended by revising paragraph (b), to read as follows:

§ 90.1 Basis and purpose.

* * * * *

(b) *Purpose*. This part states the conditions under which radio communications systems may be licensed and used in the Public Safety, Industrial/Business Radio Pool, and Radiolocation Radio Services. These rules do not govern the licensing of radio systems belonging to and operated by the United States.

* * * * *

3. Section 90.7 is amended by adding definitions for Interoperability and State to read as follows:

§ 90.7 Definitions

* * * * *

Interoperability. An essential communication link within public safety and public service wireless communications systems which permits units from two or more different entities to interact with one another and to exchange information according to a prescribed method in order to achieve predictable results.

* * * * *

State. Any of the 50 United States, the District of Columbia, the Commonwealth of Puerto Rico, the Commonwealth of the Northern Mariana Islands, the U.S. Virgin Islands, American Samoa, and Guam.

* * * * *

4. Section 90.20 is amended by revising the numbers in the "Limitations" column for 53 of the existing entries in the table in paragraph (c)(3), and by adding new paragraphs (d)(80), (81), (82), and (83), and by adding a new paragraph (g) to read as follows:

§ 90.20 Public Safety Pool.

* * * * *

(c) * * *

(3) * * *

PUBLIC SAFETY POOL FREQUENCY TABLE

Frequency or band	Class of station(s)	Limitations	Coordinator
* * * * *	* * * * *	* * * * *	* * * * *
151.130	…..do……	28, 81.	PH
151.1375	…..do……	27, 28, 80.	PH
151.145	…..do……	28, 81.	PO
* * * * *	* * * * *	* * * * *	* * * * *
154.445	…..do……	28, 81.	PF
154.4525	…..do……	27, 28, 80.	PF
* * * * *	* * * * *	* * * * *	* * * * *
155.745	…..do……	81.	PX
155.7525	…..do……	27, 80, 83.	PX
155.760	…..do……	81.	PX
* * * * *	* * * * *	* * * * *	* * * * *
158.730	…..do……	81.	PP
158.7375	…..do……	27, 80.	PP
158.745	Base or mobile	81.	PX
* * * * *	* * * * *	* * * * *	* * * * *
159.465	…..do……	81.	PO
159.4725	…..do……	27, 80.	PO
* * * * *	* * * * *	* * * * *	* * * * *
453.200	…..do……	81.	PX
453.20625	…..do……	44, 82.	PX
453.2125	…..do……	27, 80, 83.	PX
453.21875	…..do……	44, 82.	PX
453.225	…..do……	81.	PX
* * * * *	* * * * *	* * * * *	* * * * *
453.450	…..do……	81.	PX
453.45625	…..do……	44, 82.	PX
453.4625	…..do……	27, 80.	PX
453.46875	…..do……	44, 82.	PX
453.475	…..do……	81.	PX
* * * * *	* * * * *	* * * * *	* * * * *
453.700	…..do……	81.	PX
453.70625	…..do……	44, 82.	PX
453.7125	…..do……	27, 80.	PX
453.71875	…..do……	44, 82.	PX
453.725	…..do……	81.	PX
* * * * *	* * * * *	* * * * *	* * * * *
453.850	…..do……	81.	PX
453.85625	…..do……	44, 82.	PX
453.8625	…..do……	27, 80.	PX
453.86875	…..do……	44, 82.	PX

453.875	…..do……	81.	PX
* * * * *	* * * * *	* * * * *	* * * * *
458.200	…..do……	81.	PX
458.20625	…..do……	44, 82.	PX
458.2125	…..do……	27, 80, 83.	PX
458.21875	…..do……	44, 82.	PX
458.225	…..do……	81.	PX
* * * * *	* * * * *	* * * * *	* * * * *
458.450	…..do……	81.	PX
458.45625	…..do……	44, 82.	PX
458.4625	…..do……	27, 80.	PX
458.46875	…..do……	44, 82.	PX
458.475	…..do……	81.	PX
* * * * *	* * * * *	* * * * *	* * * * *
458.700	…..do……	81.	PX
458.70625	…..do……	44, 82.	PX
458.7125	…..do……	27, 80.	PX
458.71875	…..do……	44, 82.	PX
458.725	…..do……	81.	PX
* * * * *	* * * * *	* * * * *	* * * * *
458.850	…..do……	81.	PX
458.85625	…..do……	44, 82.	PX
458.8625	…..do……	27, 80.	PX
458.86875	…..do……	44, 82.	PX
458.875	…..do……	81.	PX
* * * * *	* * * * *	* * * * *	* * * * *

(d) * * *

(80) After **[effective date]** this frequency is available primarily for public safety interoperability only communications. Stations licensed prior to **[effective date]** may continue to use this frequency on a co–primary basis until January 1, 2005. After January 1, 2005, all operations will be secondary to co–channel interoperability communications.

(81) After [**effective date**] new stations will only be licensed with an authorized bandwidth not to exceed 11.25 kHz. Licensees authorized prior to **[effective date]** may continue to use bandwidths wider than 11.25 kHz on a co–primary basis until January 1, 2005. After January 1, 2005, all stations operating with an authorized bandwidth greater than 11.25 kHz will be secondary to adjacent channel interoperability operations.

(82) This frequency is reserved for assignment only in support of, and on a secondary basis to, nationwide interoperability use.

(83) This interoperability frequency is dedicated for the express purpose of nationwide interoperability calling.

* * * * *

(g) *Former p*ublic correspondence *working channels in the maritime VHF (156-162 MHz) band allocated for public safety use in 33 inland Economic Areas.*

(1) We define service areas in the marine VHF (156-162 MHz) band by forty–two geographic areas called VHF Public Coast Service Areas (VPCSAs). See § 80.371(c)(1)(ii) of this chapter (Public correspondence frequencies). VPCSAs are based on, and composed of one or more of, the U.S. Department of Commerce's 172 Economic Areas (EAs). See 60 Fed Reg. 13114 (Mar. 10, 1995). You may inspect and copy maps of the EAs and VPCSAs at the FCC Reference Center, Room CY A-257, 445 12th St., S.W., Washington, DC 20554. These maps and data are also available on the FCC website at www.fcc.gov/oet/info/maps/areas/. We number public correspondence channels in the maritime VHF (156-162 MHz) band as channels 24 to 28 and channels 84 to 88. Each channel number represents a channel pair. See § 80.371(c) of this chapter.

(2) We allocated two contiguous 25 kHz public correspondence channels in the maritime VHF (156-162 MHz) band for public safety use in 33 VPCSAs that are not near major waterways. These 33 VPCSAs are located in an inland region stretching from the western Great Plains to eastern California and Oregon. Each of these 33 inland VPCSAs corresponds to a single EA. Channel pairs 25, 84, and 85 are paired 25 kHz bandwidth channels as set forth in Table A below. In each of the 33 inland VPCSAs/EAs listed in Table B below, two of these three channel pairs are allocated for public safety use by entities eligible for licensing under paragraph (a) of this section.

Table A - List of Channel Numbers and Corresponding Center Frequencies, and Certified Coordinators

Channel Number	Mobile Station Transmit Center Frequency in MHz	Base Station Transmit Center Frequency in MHz	Coordinator
25	157.250	161.850	PX
84	157.225	161.825	PX
85	157.275	161.875	PX

Table B - List of Channels Allocated for Public Safety Use in 33 Inland VPCSAs/EAs

VHF Public Coast Service Area	Name	Economic Area	Public Safety Channel Pairs
10	Grand Forks	110	25, 84
11	Minot	111	25, 84
12	Bismarck	112	25, 84
13	Aberdeen	114	25, 84
14	Rapid City	115	25, 84
15	North Platte	121	25, 84
16	Western Oklahoma	126	25, 85
17	Abilene	128	25, 85
18	San Angelo	129	25, 85

19	Odessa-Midland	135	25, 85
20	Hobbs	136	25, 85
21	Lubbock	137	25, 85
22	Amarillo	138	25, 85
23	Santa Fe	139	25, 84
24	Pueblo	140	25, 84
25	Denver-Boulder-Greeley	141	25, 84
26	Scottsbluff	142	25, 84
27	Casper	143	25, 84
28	Billings	144	25, 84
29	Great Falls	145	25, 84
30	Missoula	146	25, 84
31	Idaho Falls	148	25, 85
32	Twin Falls	149	25, 85
33	Boise City	150	25, 84
34	Reno	151	25, 84
35	Salt Lake City-Ogden	152	25, 85
36	Las Vegas	153	25, 84
37	Flagstaff	154	25, 84
38	Farmington	155	25, 84
39	Albuquerque	156	25, 84
40	El Paso	157	25, 85
41	Phoenix-Mesa	158	25, 84
42	Tucson	159	25, 84

(3) The channels pairs set forth in Table B above are designated primarily for the purpose of interoperability communication.

(4) Channel pairs 25, 84, and 85 as listed in Table B above were formerly allocated and assigned (under § 80.371(c) (1997) of this chapter) as public correspondence working channels in the maritime VHF 156-162 MHz band; these channels were also shared (under former § 90.283 (1997) of this chapter) with private land radio mobile stations including grandfathered public safety licensees). Thus, there are grandfathered licensees nationwide (maritime and private land mobile radio stations, including by rule waiver) operating on these channels both inside and outside of the 33 EAs listed in Table B above.

(5) All applicants and licensees under this paragraph must comply with the relevant technical

sections under this part unless otherwise stated in this paragraph (g) using the following standards and procedures:

(i) Provide evidence of frequency coordination in accordance with § 90.175. Public safety coordinators except the Special Emergency Coordinator are certified to coordinate applications for the channels pairs set forth in Table B above (*i.e.*, letter symbol PX under paragraph (c)(2) of this section).

(ii) Station power, as measured at the output terminals of the transmitter, must not exceed 50 Watts for base stations and 20 Watts for mobile stations, except in accordance with the provisions of paragraph (vi). Antenna height (HAAT) must not exceed 122 meters (400 feet) for base stations and 4.5 meters (15 feet) for mobile stations, except in accordance with paragraph (vi). Such base and mobile channels shall not be operated on board aircraft in flight.

(iii) Frequency protection must be provided to other stations in accordance with the following guidelines for each channel and for each area and adjacent area:

(A) Protect coast stations licensed prior to July 6, 1998, by the required separations shown in Table C below.

(B) Protect stations described in paragraph(g)(4), by frequency coordination in accordance with § 90.175 of this part.

(C) Protect public safety stations granted under this paragraph (g), by frequency coordination in accordance with § 90.175 of this part.

(D) *Where the Public Safety designated channel is not a Public Safety designated channel in an adjacent EA:* Applicants shall engineer base stations such that the maximum signal strength at the boundary of the adjacent EA does not exceed 5 dBμV/m.

(iv) The following table, along with the antenna height (HAAT) and power (ERP), must be used to determine the minimum separation required between proposed base stations and co-channel public coast stations licensed prior to July 6, 1998 under Part 80 of this chapter. Applicants whose exact ERP or HAAT are not reflected in the table must use the next highest figure shown.

Table C - Required Separation in Kilometers (Miles) of Base Station From Public Coast Stations

Base Station Characteristics

HAAT	ERP (watts)				
Meters (feet)	400	300	200	100	50
15 (50)	138 (86)	135 (84)	129 (80)	129 (80)	116 (72)
30 (100)	154 (96)	151 (94)	145 (90)	137 (85)	130 (81)
61 (200)	166 (103)	167 (104)	161 (100)	153 (95)	145 (90)
122 (400)	187 (116)	177 (110)	183 (114)	169 (105)	159 (99)

(v) In the event of interference, the Commission may require, without a hearing, licensees of base stations authorized under this section that are located within 241 kilometers (150 miles) of a co-channel public coast, I/LT, or grandfathered public safety station licensed prior to July 6, 1998, or an international border, to reduce power, decrease antenna height, and/or install directional antennas.

Mobile stations must be operated only within radio range of their associated base station.

(vi) Applicants seeking to be licensed for stations exceeding the power/antenna height limits of the table in paragraph (iv) must request a waiver of that paragraph and must submit with their application an interference analysis, based upon an appropriate, generally-accepted terrain-based propagation model, that shows that co-channel protected entities, described in paragraph (iii), would receive the same or greater interference protection than the relevant criteria outlined in paragraph (iii).

5. Section 90.35 is amended by revising the numbers in the "Limitations" column for the existing entry [frequency 159.480] in the table in paragraph (b)(3), and by adding a new paragraph (c)(82) to read as follows:

§ 90.35 Industrial/Business Pool.

* * * * *

(b) * * *

(3) * * *

INDUSTRY/BUSINESS POOL FREQUENCY TABLE

Frequency or band	Class of station(s)	Limitations	Coordinator
* * * * *	* * * * *	* * * * *	* * * * *
159.480	…..do……	8, 82.	IP
* * * * *	* * * * *	* * * * *	* * * * *

(c) * * *

(82) After [**effective date**] new stations will only be licensed with an authorized bandwidth not to exceed 11.25 kHz. Licensees authorized prior to **[effective date]** may continue to use bandwidths wider than 11.25 kHz on a co–primary basis until January 1, 2005. After January 1, 2005, all stations operating with an authorized bandwidth greater than 11.25 kHz will be secondary to adjacent channel public safety interoperability operations. (*See* § 90.20(c)(3)).

* * * * *

6. Section 90.175(i) amended by adding paragraphs 15 and 16 to read as follows:

§ 90.175 Frequency coordination requirements.

* * * * *

(i) * * *

(15) Applications for a state license under § 90.529.

(16) Applications for narrowband low power channels listed for itinerant use in § 90.531(b)(4).

* * * * *

7. Section 90.179 is amended by revising paragraph (g) to read as follows:

§ 90.179 Shared use of radio stations.

* * * * *

(g) Notwithstanding paragraph (a) of this section, licensees authorized to operate radio systems on Public Safety Pool frequencies designated in § 90.20 may share their facilities with Federal Government entities on a non-profit, cost-shared basis. Such a sharing arrangement is subject to the provisions of paragraphs (b), (d), and (e) of this section. State governments authorized to operate radio systems under § 90.529 may share the use of their systems (for public safety services not made commercially available to the public) with any entity that would be eligible for licensing under § 90.523 and Federal government entities.

* * * * *

8. Section 90.203 is amended by revising paragraph (j) to read as follows:

§ 90.203 Certification Required

* * * * *

(j) * * *

(1) Applications for certification received on or after January 1, 2005, for mobile and portable transmitters designed to transmit voice on public safety frequencies in the in the 150-174 MHz band will be granted only if the mobile/portable equipment is capable of operating on the nationwide public safety interoperability calling channel in the 150-174 MHz band. (See § 90.20(c), (d) of this part.) Applications for certification received on or after January 1, 2005, for mobile and portable transmitters designed to transmit voice on public safety frequencies in the in the 450-470 MHz band will be granted only if the mobile/portable equipment is capable of operating on the nationwide public safety interoperability calling channel in the 450-470 MHz band. (See § 90.20(c), (d) of this part.)

9. Section 90.529 is added to read as follows:

§ 90.529 State License

(a) Narrowband channels designated as state channels in § 90.531 are licensed to each state (as defined in § 90.7) as follows:

(1) Each state that chooses to take advantage of the spectrum designated as state channels must file an application for up to 2.4 megahertz of this spectrum no later than December 31, 2001. For purposes of this section, the elected chief executive (Governor) of each state, or his or her designee, shall be deemed the person authorized to apply for the State License.

(2) What ever part of this 2.4 megahertz that a state has not applied for by December 31, 2001, will revert to General Use and be administered by the relevant RPC (or RPCs in the instances of states that encompass multiple RPCs).

(b) Each state license will be granted subject to the condition that the state certifies on or before each applicable benchmark date (see below) that it is:

(1) providing or prepared to provide "substantial service" to one-third of their population or territory by January 1, 2012, *i.e.*, within five years of the date that incumbent broadcasters are required to relocate to other portions of the spectrum;

(2) providing or prepared to provide "substantial service" to two-thirds of their population or territory by January 1, 2017, *i.e.*, within ten years of the date that incumbent broadcasters are required to relocate to other portions of the spectrum.

(c) The Commission will deem a state "prepared to provide substantial service" if the licensee certifies that a radio system has been approved and funded for implementation by the deadline date. "Substantial service" refers to the construction and operation of 700 MHz facilities by public safety entities providing service which is sound, favorable , and substantially above a level of mediocre service which just might minimally warrant renewal.

(d) If a state licensee fails to meet any condition of the grant the state license is modified automatically to the frequencies and geographic areas where the state certifies that it is providing substantial service.

(e) Any recovered state license spectrum will revert to General Use. However, spectrum licensed to a state under a state license remains unavailable for reassignment to other applicants until the Commission's database reflects the parameters of the modified state license.

10. Section 90.531 is amended by revising paragraphs (b) and (c) to read as follows:

§ 90.531 Band plan.

(b) *Narrowband segments.* There are four band segments that are designated for use with narrowband emissions. Each of these narrowband segments is divided into 480 channels having a channel size of 6.25 kHz as follows:

Frequency Range	Channel Numbers
764 - 767 MHz	1 - 480
773 - 776 MHz	481 - 960
794 - 797 MHz	961 - 1440
803 - 806 MHz	1441 - 1920

(1) *Narrowband interoperability channels.* The following narrowband channels are designated for nationwide interoperability licensing and use: 23, 24, 39, 40, 63, 64, 79, 80, 103, 104, 119, 120,143, 144, 159, 160, 183, 184, 199, 200, 223, 224, 239, 240, 263, 264, 279, 280, 303, 304, 319, 320, 641, 642, 657, 658, 681, 682, 697, 698, 721, 722, 737, 738, 761, 762, 777, 778, 801, 802, 817, 818, 841, 842, 857, 858, 881, 882, 897, 898, 921, 922, 937, 938, 983, 984, 999, 1000, 1023, 1024, 1039, 1040, 1063, 1064, 1079, 1080, 1103, 1104, 1119, 1120, 1143, 1144, 1159, 1160, 1183, 1184, 1199, 1200, 1223, 1224, 1239, 1240, 1263, 1264, 1279, 1280, 1601, 1602, 1617, 1618, 1641, 1642, 1657, 1658, 1681, 1682, 1697, 1698, 1721, 1722, 1737, 1738, 1761, 1762, 1777, 1778, 1801, 1802, 1817, 1818, 1841, 1842, 1857, 1858, 1881, 1882, 1897, 1898.

(2) *Narrowband reserve channels.* The following narrowband channels are undesignated and reserved pending further Commission action in WT Docket No. 96-86 (*proceeding pending*): 21, 22, 37, 38, 61, 62, 77, 78, 101, 102, 117, 118, 141, 142, 157, 158, 181, 182, 197, 198, 221, 222, 237, 238, 261, 262, 277, 278, 301, 302, 317, 318, 643, 644, 659, 660, 683, 684, 699, 700, 723, 724, 739, 740, 763, 764, 779, 780, 803, 804, 819, 820, 843, 844, 859, 860, 883, 884, 899, 900, 923, 924, 939, 940, 981, 982, 997, 998, 1021, 1022, 1037, 1038, 1061, 1062, 1077, 1078, 1101, 1102, 1117, 1118, 1141, 1142, 1157, 1158, 1181, 1182, 1197, 1198, 1221, 1222, 1237, 1238, 1261, 1262, 1277, 1278, 1603, 1604, 1619, 1620, 1643, 1644, 1659, 1660, 1683, 1684, 1699, 1700, 1723, 1724, 1739, 1740, 1763, 1764, 1779,1780, 1803, 1804, 1819,1820, 1843, 1844, 1859, 1860, 1883, 1884, 1899, 1900.

(3) *Narrowband low power channels subject to regional planning*. The following narrowband channels are designated for low power use for on-scene incident response purposes using mobiles and portables subject to Commission-approved regional planning committee regional plans. Transmitter power must not exceed 2 watts (ERP): Channels 1-8 paired with Channels 961-968, and Channels 949-958 paired with Channels 1909-1918.

(4) *Narrowband low power itinerant channels*. The following narrowband channels are designated for low power use for on-scene incident response purposes using mobiles and portables. These channels are licensed nationwide for itinerant operation. Transmitter power must not exceed 2 watts (ERP): Channels 9-12 paired with Channels 969–972 and Channels 959-960 paired with Channels 1919-1920.

(5) *Narrowband state channel.* The following narrowband channels are designated for direct licensing to each state (including U.S. territories, districts, and possessions): 25-36, 65-76, 105-116, 145-156, 185-196, 225-236, 265-276, 305-316, 645-656, 685-696, 725-736, 765-776, 805-816, 845-856, 885-896, 925-936, 985-996, 1025-1036, 10651076, 1105-1116, 1145-1156, 1185-1196, 1225-1236, 1265-1276, 1605-1616, 1645-1656, 1685-1696, 1725-1736, 1765-1776, 1805-1816, 1845-1856, 1885-1896.

(6) *Narrowband general use channels*. All narrowband channels established in paragraph (b), other than those listed in paragraphs (b)(1), (b)(2), (b)(4) and (b)(5) are designated for assignment to public safety eligibles subject to Commission-approved regional planning committee regional plans.

(c) Wideband segments. There are two band segments that are designated for use with wideband emissions. Each of these wideband segments is divided into 120 channels having a channel size of 50 kHz as follows:

Frequency Range	Channel Numbers
767 - 773 MHz	1 - 120
797 - 803 MHz	121 - 240

(1) *Wideband interoperability channels*. The following wideband channels are designated for nationwide interoperability licensing and use: 28-30, 37-39, 46-48, 73-75, 83-84, 91-93, 148-150, 157-159, 166-168, 193-195, 202-204, 211-213.

(2) W*ideband reserve channels.* The following wideband channels are reserved: 1-27, 94-120, 121-147, 214-240.

(3) *Wideband general use channels*. All wideband channels established in paragraph (c), except for those listed in paragraphs (c)(1) and (c)(2), are designated for assignment to public safety eligibles subject to Commission-approved regional planning committee regional plans.

* * * * *

11. Section 90.535 is amended by revising paragraph (a), to read as follows:

§ 90.535 Modulation and spectrum usage efficiency requirements.

Transmitters designed to operate in the 764–776 MHz and 794–806 MHz frequency bands must meet the following modulation standards:

(a) All transmitters in the 764–776 MHz and 794–806 MHz frequency bands must use digital modulation. Mobile and portable transmitters may have analog modulation capability only as a secondary mode in addition to its primary digital mode. Mobile and portable transmitters that only operate on the low power channels designated in Sections 90.531(b)(3), 90.531(b)(4), are exempt from this digital modulation requirement.

* * * * *

12. Section 90.537 is revised to read as follows:

§ 90.537 Trunking requirement.

All systems using six or more narrowband channels in the 764-776 MHz and 794-806 MHz frequency bands must be trunked systems. Nationwide interoperability channels listed in Section 90.531(b)(1), and the narrowband low power channels listed in Sections 90.531(b)(3), 90.531(4), are not counted as narrowband channels for the purposes of this trunking requirement.

13. Section 90.541 is amended by adding paragraph (d) to read as follows:

§ 90.541 Transmitting power limits

* * * * *

(d) Transmitters operating on the narrowband low power channels listed in Sections 90.531(b)(3), 90.531(b)(4), must not exceed 2 watts (ERP).

14. Section 90.543 is revised to add paragraphs (e) and (f) to read as follows:

§ 90.543 Emission limitations

* * * * *

(e) For operations in the 764 to 776 MHz and 794 to 806 MHz bands, all emissions including harmonics in the band 1559-1610 MHz shall be limited to –70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and –80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna

that is representative of the type that will be used with the equipment in normal operation.

(f) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section.

15. Section 90.547 is revised to read as follows:

§ 90.547 Interoperability channel capability requirement.

Mobile and portable transmitters operating in the 764–776 MHz and 794–806 MHz frequency bands must be capable of operating on all of the designated nationwide narrowband interoperability channels pursuant to standards adopted by the Public Safety National Coordination Committee and approved by the Commission. Mobile and portable transmitters that only operate on the low power channels designated in Sections 90.531(b)(3), 90.531(b)(4), are exempt from this interoperability channel capability requirement.

APPENDIX G

700 MHz PUBLIC SAFETY BAND — SEGMENTATION & CHANNELIZATION TABLES

- Base Channels (former TV Channels 63 and 64)
- Mobile Channels (former TV Channels 68 and 69)

700 MHz BAND PLAN per *Third MO&O and Third R&O* in WT Dkt. 96-86 (TV Ch. 63/64)

480 NARROWBAND BASE CHANNELS - SEGMENT 1 (6.25 kHz each, aggregate to 25 kHz)

764 MHz

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	
161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	
241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	
321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	
401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	

25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	
105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	
185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	
265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	
345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	
425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	

49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	
129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	
209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	
289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	
369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	
449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	

73	74	75	76	77	78	79	80																	
153	154	155	156	157	158	159	160																	
233	234	235	236	237	238	239	240																	
313	314	315	316	317	318	319	320																	
393	394	395	396	397	398	399	400																	
473	474	475	476	477	478	479	480																	

767 MHz

120 WIDEBAND BASE CHANNELS - SEGMENT 1 (50 kHz each, aggregate to 150 kHz)

767 MHz

1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18
19	20	21	22	23	24	25	26	27
28	29	30	31	32	33	34	35	36
37	38	39	40	41	42	43	44	45
46	47	48	49	50	51	52	53	54
55	56	57	58	59	60	61	62	63
64	65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	80	81
82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99
100	101	102	103	104	105	106	107	108
109	110	111	112	113	114	115	116	117
118	119	120						

773 MHz

GENERAL USE
INTEROPERABILITY
RESERVE
STATE LICENSE
LOW POWER

480 NARROWBAND BASE CHANNELS - SEGMENT 2 (6.25 kHz each, aggregate to 25 kHz)

773 MHz

481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	
561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	
641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	
721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	
801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	
881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	

505	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528
585	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608
665	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688
745	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768
824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848
904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928

529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553
609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633
689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713
769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793
849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873
929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953

553	554	554	555	556	557	557	558	558	559	559	560													
633	634	634	635	636	637	637	638	638	639	639	640													
713	714	794	715	795	716	797	717	798	718	799	719													
793	794	794	795	796	797	797	798	798	799	799	800													
873	874	874	875	876	877	877	878	878	879	879	880													
953	954	954	955	956	957	957	958	958	959	959	960													

776 MHz

NARROWBAND CHANNELS:
Two may be combined provided that the lower channel number is odd (e.g., 1, 3, 5)
Four may be combined provided that the lower channel number is 1 + 4n, n = 0 to 479 (e.g., 1, 5,...1917)
Narrowband channels must maintain a data throughput efficiency of not less than 4.8 kbps for each 6.25 kHz of bandwidth.

WIDEBAND CHANNELS:
Two may be combined provided that the lower channel number is 1 + 3n or 2 + 3n, n = 0 to 79 (e.g., 1, 2, 4, 5,...238, 239)
Three may be combined provided that the lower channel number is 1 + 3n, n = 0 to 79 (e.g., 1, 4,...238)
Wideband channels must maintain a data throughput efficiency of not less than 384 kbps for each 150 kHz of bandwidth.

Channel numbers for combined channels are designated by the lowest and highest channel numbers separated by a hyphen, e.g., "1-2" and 1-3".

700 MHz BAND PLAN per *Third MO&O and Third R&O* in WT Dkt. 96-86 (TV Ch. 68/69)

480 NARROWBAND MOBILE CHANNELS - SEGMENT 3 (6.25 kHz each, aggregate to 25 kHz)

794 MHz

961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980
1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060
1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140
1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220
1281	1282	1283	1284	1285	1286	1287	1288	1289	1290	1291	1292	1293	1294	1295	1296	1297	1298	1299	1300
1361	1362	1363	1364	1365	1366	1367	1368	1369	1370	1371	1372	1373	1374	1375	1376	1377	1378	1379	1380

981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000
1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080
1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160
1221	1222	1223	1224	1225	1226	1227	1228	1229	1230	1231	1232	1233	1234	1235	1236	1237	1238	1239	1240
1301	1302	1303	1304	1305	1306	1307	1308	1309	1310	1311	1312	1313	1314	1315	1316	1317	1318	1319	1320
1381	1382	1383	1384	1385	1386	1387	1388	1389	1390	1391	1392	1393	1394	1395	1396	1397	1398	1399	1400

1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020
1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100
1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180
1241	1242	1243	1244	1245	1246	1247	1248	1249	1250	1251	1252	1253	1254	1255	1256	1257	1258	1259	1260
1321	1322	1323	1324	1325	1326	1327	1328	1329	1330	1331	1332	1333	1334	1335	1336	1337	1338	1339	1340
1401	1402	1403	1404	1405	1406	1407	1408	1409	1410	1411	1412	1413	1414	1415	1416	1417	1418	1419	1420

1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040
1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120
1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200
1261	1262	1263	1264	1265	1266	1267	1268	1269	1270	1271	1272	1273	1274	1275	1276	1277	1278	1279	1280
1341	1342	1343	1344	1345	1346	1347	1348	1349	1350	1351	1352	1353	1354	1355	1356	1357	1358	1359	1360
1421	1422	1423	1424	1425	1426	1427	1428	1429	1430	1431	1432	1433	1434	1435	1436	1437	1438	1439	1440

797 MHz

120 WIDEBAND MOBILE CHANNELS - SEGMENT 2 (50 kHz each, aggregate to 150 kHz)

797 MHz

121	122	123	124	125	126	127	128	129
130	131	132	133	134	135	136	137	138
139	140	141	142	143	144	145	146	147
148	149	150	151	152	153	154	155	156
157	158	159	160	161	162	163	164	165
166	167	168	169	170	171	172	173	174
175	176	177	178	179	180	181	182	183
184	185	186	187	188	189	190	191	192
193	194	195	196	197	198	199	200	201
202	203	204	205	206	207	208	209	210
211	212	213	214	215	216	217	218	219
220	221	222	223	224	225	226	227	228
229	230	231	232	233	234	235	236	237
238	239	240						

803 MHz

GENERAL USE
INTEROPERABILITY
RESERVE
STATE LICENSE
LOW POWER

480 NARROWBAND MOBILE CHANNELS - SEGMENT 4 (6.25 kHz each, aggregate to 25 kHz)

803 MHz

1441	1442	1443	1444	1445	1446	1447	1448	1449	1450	1451	1452	1453	1454	1455	1456	1457	1458	1459	1460
1521	1522	1523	1524	1525	1526	1527	1528	1529	1530	1531	1532	1533	1534	1535	1536	1537	1538	1539	1540
1601	1602	1603	1604	1605	1606	1607	1608	1609	1610	1611	1612	1613	1614	1615	1616	1617	1618	1619	1620
1681	1682	1683	1684	1685	1686	1687	1688	1689	1690	1691	1692	1693	1694	1695	1696	1697	1698	1699	1700
1761	1762	1763	1764	1765	1766	1767	1768	1769	1770	1771	1772	1773	1774	1775	1776	1777	1778	1779	1780
1841	1842	1843	1844	1845	1846	1847	1848	1849	1850	1851	1852	1853	1854	1855	1856	1857	1858	1859	1860

1461	1462	1463	1464	1465	1466	1467	1468	1469	1470	1471	1472	1473	1474	1475	1476	1477	1478	1479	1480
1541	1542	1543	1544	1545	1546	1547	1548	1549	1550	1551	1552	1553	1554	1555	1556	1557	1558	1559	1560
1621	1622	1623	1624	1625	1626	1627	1628	1629	1630	1631	1632	1633	1634	1635	1636	1637	1638	1639	1640
1701	1702	1703	1704	1705	1706	1707	1708	1709	1710	1711	1712	1713	1714	1715	1716	1717	1718	1719	1720
1781	1782	1783	1784	1785	1786	1787	1788	1789	1790	1791	1792	1793	1794	1795	1796	1797	1798	1799	1800
1861	1862	1863	1864	1865	1866	1867	1868	1869	1870	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880

1481	1482	1483	1484	1485	1486	1487	1488	1489	1490	1491	1492	1493	1494	1495	1496	1497	1498	1499	1500
1561	1562	1563	1564	1565	1566	1567	1568	1569	1570	1571	1572	1573	1574	1575	1576	1577	1578	1579	1580
1641	1642	1643	1644	1645	1646	1647	1648	1649	1650	1651	1652	1653	1654	1655	1656	1657	1658	1659	1660
1721	1722	1723	1724	1725	1726	1727	1728	1729	1730	1731	1732	1733	1734	1735	1736	1737	1738	1739	1740
1801	1802	1803	1804	1805	1806	1807	1808	1809	1810	1811	1812	1813	1814	1815	1816	1817	1818	1819	1820
1881	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900

1501	1502	1503	1504	1505	1506	1507	1508	1509	1510	1511	1512	1513	1514	1515	1516	1517	1518	1519	1520
1581	1582	1583	1584	1585	1586	1587	1588	1589	1590	1591	1592	1593	1594	1595	1596	1597	1598	1599	1600
1661	1662	1663	1664	1665	1666	1667	1668	1669	1670	1671	1672	1673	1674	1675	1676	1677	1678	1679	1680
1741	1742	1743	1744	1745	1746	1747	1748	1749	1750	1751	1752	1753	1754	1755	1756	1757	1758	1759	1760
1821	1822	1823	1824	1825	1826	1827	1828	1829	1830	1831	1832	1833	1834	1835	1836	1837	1838	1839	1840
1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920

806 MHz

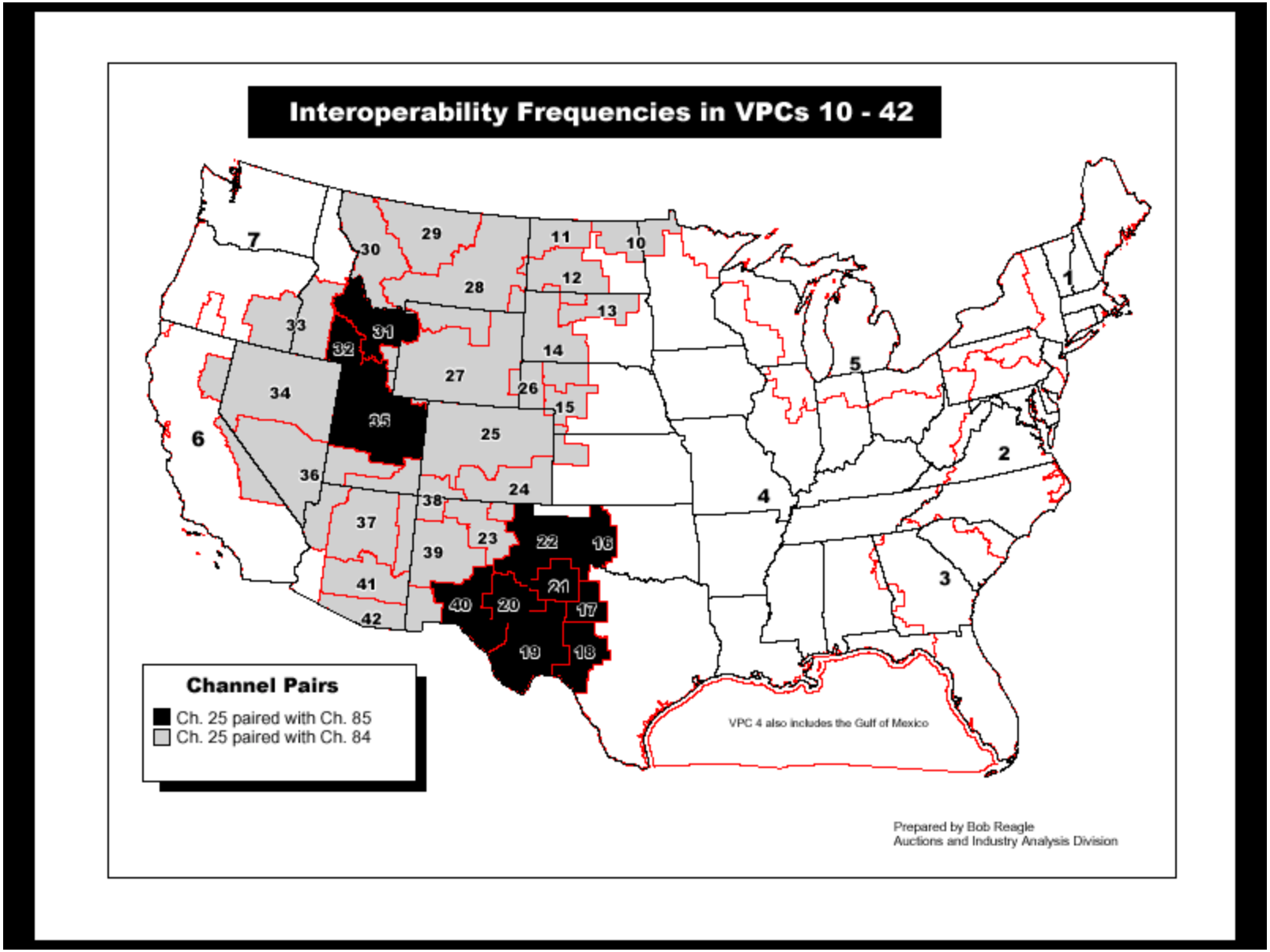
NARROWBAND CHANNELS:
Two may be combined provided that the lower channel number is odd (e.g., 1, 3, 5)
Four may be combined provided that the lower channel number is 1 + 4n, n = 0 to 479 (e.g., 1, 5,... 1917)
Narrowband channels must maintain a data throughput efficiency of not less than 4.8 kbps for each 6.25 kHz of bandwidth.

WIDEBAND CHANNELS:
Two may be combined provided that the lower channel number is 1 + 3n or 2 + 3n, n = 0 to 79 (e.g., 1, 2, 4, 5,... 238, 239)
Three may be combined provided that the lower channel number is 1 + 3n, n = 0 to 79 (e.g., 1, 4,... 238)
Wideband channels must maintain a data throughput efficiency of not less than 384 kbps for each 150 kHz of bandwidth.

Channel numbers for combined channels are designated by the lowest and highest channel numbers separated by a hyphen, e.g., "1-2" and 1-3".

APPENDIX H

INTEROPERABILITY FREQUENCIES IN THE INLAND VPCS (NOS. 10-42)


Interoperability Frequencies in VPCs 10 - 42
Channel Pairs
Ch. 25 paired with Ch. 85
Ch. 25 paired with Ch. 84
VPC 4 also includes the Gulf of Mexico
Prepared by Bob Reagle
Auctions and Industry Analysis Division