

FCC MAIL SECTION

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

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In the Matter of)	
)	
Improving Public Safety Communications in the 800 MHz Band)	WT Docket 02-55
)	
Consolidating the 800 and 900 MHz Industrial/Land Transportation and Business Pool Channels)	ET Docket No. <u>00-258</u>
)	
Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems)	RM-9498
)	
Petition for Rule Making of the Wireless Information Networks Forum Concerning the Unlicensed Personal Communications Service)	RM-10024
)	
Petition for Rule Making of UT Starcom, Inc., Concerning the Unlicensed Personal Communications Service)	ET Docket No. 95-18
)	
Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for use by the Mobile Satellite Service)	

**REPORT AND ORDER, FIFTH REPORT AND ORDER, FOURTH MEMORANDUM OPINION
AND ORDER, AND ORDER**

Adopted: July 8, 2004

Released: August 6, 2004

By the Commission: **Chairman Powell, Commissioners Abernathy, Copps, and Adelstein** issuing
separate statements.

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I. INTRODUCTION

1. The Homeland Security obligations of the Nation's public safety agencies make it imperative that their communications systems are robust and highly reliable.¹ Accordingly, in this *Report and Order*, we adopt technical and procedural measures designed to address the ongoing and growing problem of interference to public safety communications in the 800 MHz band.² In reaching our decisions herein, we are fulfilling the Commission's obligation to "promote safety of life and property through the use of wire and radio communication."³ We also reiterate our continuing commitment to "ensuring that essential public health and safety personnel have effective communications services available to them in emergency situations."⁴

¹ 47 U.S.C. § 337(f) defines "public safety services" as services:

2. With many of our Nation's first responders using the 800 MHz band for critical public safety communications (e.g., to communicate with their respective dispatchers and each other at the scene of an incident), this band has become a linchpin in their ability to communicate effectively. In recent years, however, public safety systems in this band have encountered increasing amounts of interference from commercial mobile radio service (CMRS) providers. The interference problem in the 800 MHz band is caused by a fundamentally incompatible mix of two types of communications systems: cellular-architecture multi-cell systems—used by ESMR and cellular telephone licensees⁵—and high-site non-cellular systems—used by public safety, private wireless, and some SMR licensees and stems primarily from the operations of Nextel Communications, Inc. (Nextel), an “Enhanced” Specialized Mobile Radio (ESMR) provider in the 800 MHz band,⁶ as well as the operations of cellular telephone providers in the Cellular A and B bands.⁷ Throughout this proceeding, we have sought a solution to the interference problem that achieves the following paramount goals:

- a solution that abates “unacceptable interference” caused by ESMR and cellular systems to

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(A) the sole or principal purpose of which is to protect the safety of life, health, or property;

(B) that are provided

- (i) by State or local government entities; or
- (ii) by nongovernmental organizations that are authorized by a government entity whose primary mission is the provision of such services; and

(C) that are not made commercially available to the public by the provider.

² For purposes of this proceeding, “800 MHz band” refers to spectrum from 806-824/851-869 MHz, which is licensed to public safety, commercial, and private wireless operators pursuant to Part 90 of the Commission's rules.

³ 47 U.S.C. § 151.

⁴ Federal Communications Commission Strategic Plan FY 2003-FY2008, p.5 (2002).

⁵ For the purposes of this proceeding, the term “800 MHz cellular system” will refer to systems which employ a “high-density cellular” architecture. See ¶ 172 *infra* for a definition of “800 MHz cellular systems.”

⁶ Specialized Mobile Radio (SMR) systems provide land mobile communications services (other than radiolocation services) in the 800 MHz and 900 MHz band on a commercial basis. See 47 C.F.R. §§ 90.7, 90.601 *et seq.* ESMR is a term coined by Nextel to describe SMR systems, such as Nextel's, that use cellular architecture, *i.e.*, systems that use multiple, interconnected, multi-channel transmit/receive cells and employ frequency reuse to serve a larger number of subscribers than is possible using non-cellular technology. The particular ESMR technology used by Nextel—the Motorola iDEN system—is capable of using cellular architecture in non-contiguous spectrum. A similar, derivative Motorola technology, known as “Harmony,” is also in limited use. Although the term “ESMR” does not appear in the Commission's rules, it has appeared in the Commission's case law. See Request of Fleet Call, Inc. *Memorandum Opinion and Order*, FCC 91-56, 6 FCC Rcd 1533 ¶ 13(1991). More recently, the Wireless Telecommunications Bureau has defined ESMR as an alternative method to provide wireless service that is based on digital TDMA technology and operates with individual base stations. See “Wireless Telecommunications Bureau Seeks Comment on Qualcomm Inc.'s Petition,” *Public Notice*, 15 FCC Rcd 2580, 2619 (WTB 2000).

⁷ Cellular telephone providers are licensed in the Cellular Radiotelephone Service, pursuant to Part 22 of the Commission's rules, and operate cellular architecture systems in the Cellular A and B bands (824-849/864-894 MHz), which lie immediately above the 800 MHz band. See 47 C.F.R. § 22.99. Hereinafter, for brevity's sake, we refer to these systems as “cellular telephone” or “cellular” systems. While cellular telephone systems are similar to ESMR systems, they operate in contiguous spectrum and employ somewhat different technology.

800 MHz public safety systems;⁸

- a solution that is both equitable and imposes minimum disruption to the activities of all 800 MHz band users, including public safety, non-cellular⁹ SMR, and Business, Industrial and Land Transportation (B/ILT) systems;¹⁰
- a solution that results in responsible spectrum management; and
- a solution that provides additional 800 MHz spectrum that can be quickly accessed by public safety agencies and rapidly integrated into their existing systems.

3. Based on the extensive record of this proceeding and the goals we seek to accomplish, we conclude that the most effective solution to the public safety interference problem in the 800 MHz band is a Commission-derived plan, which is comprised of both long-term and short-term components. As the short-term vehicle by which we ensure a more effective response to the ongoing interference problem, we implement technical standards defining unacceptable interference in the 800 MHz band as well as procedures detailing who bears responsibility for abating this interference and what steps responsible parties must take. For the long-term, we reconfigure the 800 MHz band to address the identified root cause of the interference by separating generally incompatible technologies.

4. To achieve this new 800 MHz band plan, we establish a transition mechanism by which (1) there is minimal disruption to the operations of all affected 800 MHz incumbents during the transition period; (2) the associated reconfiguration costs are funded; and (3) the public safety community and, later, critical infrastructure industries (CII),¹¹ obtain access to an average additional 4.5 megahertz of 800 MHz

⁸ "Unacceptable interference" is a term of art adopted for the limited purposes of this proceeding. See ¶¶ 97-107 *supra*. It defines a bright-line test for interference protection that takes into account, among other factors, the strength of the desired signal and the characteristics of the receiver being employed. It is not intended to determine what level of interference is unacceptable for any other purpose or in any other band.

⁹ "Non-cellular" systems are systems that provide service to their mobile users or subscribers from one or a small number of base stations, which are typically "high site" (*i.e.*, located at high elevations, on towers, mountains, hill tops, or tall buildings) multiple, interconnected, multi-channel transmit/receive cells and employ frequency reuse to serve a larger number of subscribers. For the purposes of this proceeding, the term non-cellular will refer to systems which do not employ a "high-density cellular" architecture. See ¶¶ 170-174 *infra*.

¹⁰ Business and Industrial/Land Transportation (B/ILT) licensees are licensed in the Private Land Mobile Radio Service pursuant to Part 90 of the Commission's Rules and utilize their systems for private, internal needs in a variety of commercial applications (e.g., factories, taxis. B/ILT typically use "high-site, high power" systems in the 800 MHz and 900 MHz. See 47 C.F.R. 90.35. See also n. 9 for a description of high site, high power systems.

¹¹ For purposes of this *Report and Order*, we define as CII licensees those entities, outside of the scope of the "public safety service" definition of 47 U.S.C. § 337(f), *see* n. 1 *supra*, but which operate "public safety" radio services within the scope of Section 309(j)(2) of the Act. 47 U.S.C. § 309(j)(2) defines "public safety radio services" as including private internal radio services used by State and local governments and non-government entities, and including emergency road services provided by not-for profit organizations, that: (i) are used to protect the safety of life, health, or property; and (ii) are not made commercially available to the public.

Examples of CII licensees include 800 MHz systems that provide private internal radio services used by utilities, railroads, metropolitan transit systems, pipelines, private ambulances, volunteer fire departments, and not-for-profit organizations that offer emergency road services, such as the American Automobile Association (AAA).

We recognize that the section 309(j)(2) definition is more encompassing than that proposed by Nextel in the "White Paper." See Promoting Public Safety Communications, Realigning the 800 MHz Land Mobile Radio (continued....)

band spectrum. We believe that the totality of these measures will both eliminate unacceptable interference currently encountered by 800 MHz public safety and CII systems¹² and reflect sound spectrum management principles. Our plan incorporates essential elements of a proposal developed by Nextel, the major public safety organizations, and various private wireless organizations (the so-called "Consensus Parties").¹³

5. In recognition of the public interest benefit derived from robust and reliable public safety

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Band to Rectify Commercial Mobile Radio - Public Safety Interference and Allocate Additional Spectrum to Meet Critical Public Safety Needs, Nextel Communications, Inc., submitted by Robert S. Foosaner, Nextel Communications, Inc., to Thomas J. Sugrue, Chief, Wireless Telecommunications Bureau, FCC (cover letter dated Nov. 12, 2001) (White Paper) at 46. In this regard, we observe that in the White Paper, Nextel cites a study undertaken by the Department of Commerce, National Telecommunications and Information Administration, which requested comment on a broader definition of CII, including pipelines and railroads. See White Paper at n. 60; Request for Comment on Energy, Water and Railroad Service Providers' Spectrum Use Study, 66 Fed Reg. 18447 (2001). Section 309(j)(2) also is broader than the definition proposed by the Critical Infrastructure Communications Council (CICC), which is composed of the following organizations: The American Gas Association, the American Petroleum Institute, the American Public Power Association, the American Water Works Association, the Association of American Railroads, the Edison Electric Institute, the Interstate Natural Gas Association of America, the National Association of Water Companies, the National Rural Electric Cooperative Association, and the United Telecom Council (UTC). See UTC Comments at n. 2. We nonetheless believe that this expanded definition is appropriate in this context because it recognizes that the very nature of the services provided by the included entities involves potential hazard to life and property and that CII entities often work hand in hand with public safety officials at the scene of an incident. Indeed, reliable CII radio communications have long proven essential in speeding recovery from natural or man-made disasters. Our decision to define CII is confined to this proceeding and does not represent a Commission decision that CII entities are public safety entities.

¹² Although we focus on the benefits to public safety and CII, we do not intend to imply that other 800 MHz radio systems will not be beneficiaries of the actions we take today. Except where specifically stated otherwise, the interference protections we afford today inure to the benefit of all 800 MHz non-cellular licensees. "Non-cellular 800 MHz licensees," as used herein, refers to public safety, CII, B/ILT and non-cellular SMR licensees.

¹³ The proponents of this proposal have referred to themselves as the "Consensus Parties" and we use that term for reference purposes in this *Report and Order*. The Consensus Parties' members are the Association of Public Safety Communications Officials-International (APCO), International Association of Chiefs of Police (IACP), International Association of Fire Chiefs, Inc. (IAFC), International Municipal Signal Association (IMSA), Major Cities Chiefs Association (MCCA), Major County Sheriffs' Association (MCSA), National Sheriffs' Association (NSA), Aeronautical Radio, Inc. (ARINC), American Mobile Telecommunications Association (AMTA), American Petroleum Institute (API), Association of American Railroads (AAR), Forest Industries Telecommunications (FIT), Industrial Telecommunications Association (ITA), PCIA - The Wireless Infrastructure Association (PCIA), Taxicab, Limousine and Paratransit Association (TLPA), National Stone, Sand and Gravel Association (NSSGA), and Nextel. See Letter, dated October 29, 2002, from Robert M. Gurs, Esq., Counsel for APCO to Marlene H. Dortch, Secretary, Federal Communications Commission. See n. 172 *infra*. However, while the Consensus Parties represent a broad coalition of commercial and public safety entities, we recognize that their position does not reflect a consensus of all of the various parties to this proceeding, including some public safety entities that object to the Consensus Parties' proposal or elements thereof. See, e.g., Letter, dated March 24, 2004, from Chuck Canterbury, National President, Fraternal Order of Police (FOP) to George W. Bush, President, United States of America; Letter, dated March 25, 2004 from Art Gordon, National Executive Vice President, Federal Law Enforcement Officers Association to George W. Bush, President, United States of America. With regard to the Fraternal Order of Police letter, we observe that on July 1, 2004, the FOP indicated that their concerns over the Consensus Plan have been addressed and that they now support the Consensus Plan. See Letter dated July 1, 2004, from Chuck Canterbury, National President, Fraternal Order of Police, to Michael K. Powell, Chairman, Federal Communications Commission.

communications coupled with the spectrum rights Nextel will surrender as well as financial commitments that Nextel will incur in connection with band reconfiguration, upon acceptance of Nextel of the conditions and obligations that we place on it in this R&O, we will modify certain Nextel licenses to provide it with rights to operate on ten megahertz of spectrum in the 1.9 GHz band, conditioned on fulfillment of the obligations we place on it in this *Report and Order*.¹⁴ As a necessary predicate for the license modifications, we also take action by this Order in ET Docket No. 00-258 and ET Docket No. 95-18 to redesignate the spectrum for the provision of licensed Fixed and Mobile services to be used for Advanced Wireless Services (AWS).¹⁵ To ensure that by these actions Nextel, other licensees and the public are treated equitably, and that Nextel does not realize any windfall gain, we confer these 1.9 GHz spectrum rights on a "value for value" basis. Under this approach, we credit Nextel for (1) the net value of spectrum rights that Nextel is relinquishing to public safety, CII, and other 800 MHz band licensees; (2) the actual cost of 800 MHz band reconfiguration (including both Nextel's costs to support relocation by other licensees and Nextel's own relocation costs); and (3) costs incurred by Nextel to clear the 1.9 GHz band, less any reimbursed expenses. If these combined offsets ultimately total less than the value determined by this *Report and Order* for the 1.9 GHz spectrum rights, we require Nextel to make a payment to the U.S. Treasury at the conclusion of the transition process equal to the difference.¹⁶

6. In complying with the obligations we place upon it in this *Report and Order*, we recognize that Nextel may have to shift some of its operations from the 800 MHz band to 900 MHz band frequencies in order to provide the "green space" necessary to effect reconfiguration of the 800 MHz band. Moreover, in some areas, Nextel may have to share spectrum in the 817-824 MHz/862-869 MHz segment of the reconfigured band with other ESMR licensees.¹⁷ To the extent that such sharing may reduce the amount of 800 MHz spectrum available to Nextel, we believe we should provide the regulatory flexibility necessary for Nextel to make up the shortfall by using 900 MHz band channels. We therefore amend our rules to allow 900 MHz band licensees to initiate CMRS operations on their currently authorized spectrum or to assign their authorizations to others for CMRS use.¹⁸

7. The totality of the actions we take today are based on unique and compelling public interest considerations in the record before us regarding the serious and continuing public safety interference problems in the 800 MHz band. These considerations require that we take the most effective actions, in the short-term and long-term, to promote robust and reliable public safety communications in the 800 MHz band to ensure the safety of life and property. While we are mindful of our statutory obligations under Section 309(j) of the Act regarding the use of competitive bidding procedures for the assignment of spectrum, we nonetheless believe the license modifications we approve today are consistent with Section

¹⁴ We make these modifications under the authority granted us by Sections 4, 301, 303 and 316 of the Act, 47 U.S.C. §§ 316, 303, 301, and 154(i). We set forth a detailed description of our legal authority in ¶¶ 62-87 *infra*.

¹⁵ See ¶¶ 223-276 *infra*. AWS is the collective term we use for new and innovative fixed and mobile terrestrial wireless applications using bandwidth that is sufficient for the provision of a variety of applications, including those using voice and data (such as Internet browsing, message services, and full-motion video) content. Although AWS is commonly associated with so-called third generation (3G) applications and has been predicted to build on the successes of such current-generation commercial wireless services as cellular and Broadband PCS, the services ultimately provided by AWS licensees are only limited by the fixed and mobile designation of the spectrum we allocate for AWS and the service rules we ultimately adopt for the bands.

¹⁶ See ¶¶ 210-212 *infra*.

¹⁷ See ¶¶ 159-163 *infra*.

¹⁸ See 47 C.F.R. § 90.621(f) in Appendix C *infra*.

309(j) of the Act and our other spectrum management obligations. This action does not signal any change in the Commission's policy of using competitive bidding as a licensing tool in other contexts, consistent with statutory requirements.

II. EXECUTIVE SUMMARY

8. In this *Report and Order*, we adopt a two-prong solution to the public safety interference problem in the 800 MHz band, with each prong having several components. First, to more adequately respond to individual interference events immediately, we establish an objective standard for defining "unacceptable interference" to 800 MHz non-cellular systems, establish rules and procedures for the expeditious implementation and enforcement of this standard, and endorse a variety of technical solutions and mechanisms, defined as "Enhanced Best Practices," to address interference abatement in the short-term. Second, to provide a better spectrum environment for public safety in the long-term, we adopt a plan for reconfiguration of the 800 MHz band and provide for a thirty-six-month transition by incumbent licensees from their current frequency assignments to new frequency assignments in the band.

9. Based on the extensive and comprehensive record of the proceeding, we are convinced that neither band reconfiguration alone, nor application of "technical fixes" on a case-by-case basis would adequately address the interference to 800 MHz public safety communications systems. Thus, we have adopted a Commission-derived solution which, in addition to decisions we have reached independently, incorporates both recommendations made by the proponents of case-by-case "technical fixes" and the proponents of band reconfiguration. In reaching this solution, we were aided by technical and economic studies, research data and legal analyses contained in the record.¹⁹ We believe that the approach we adopt is technically and legally sound, logistically achievable, and representative of the collective expertise of all of the various interests which have addressed this significant issue.

10. In the first prong of this *Report and Order*, we take a number of steps to provide for immediate abatement of interference to 800 MHz band public safety and other non-cellular systems:

- We adopt a new, objective definition of "unacceptable interference," for purposes of this proceeding only, to determine when public safety and other non-cellular 800 MHz band licensees are entitled to interference protection.²⁰
- We assign strict responsibility for eliminating unacceptable interference to the ESMR or cellular telephone operator(s) implicated in the interference occurrence, and assign joint responsibility to all involved commercial operators if unacceptable interference results from a combination of signals from multiple systems.²¹
- We require ESMR and cellular telephone licensees, on request, to notify public safety and CII licensees prior to activating new or modified cells, and require public safety and CII

¹⁹ A detailed overview of the record is set forth in ¶ 61 *infra*. For citation purposes, we refer to comments received to the *Notice of Proposed Rulemaking* in this proceeding using the following format: [Party Name] Comments/Reply Comments at [Page or Paragraph Number]. We refer to comments received in response to the Consensus Parties Reply Comments using the following format: Comments of [Party Name] to the Consensus Parties Reply Comments at [Page or Paragraph Number]; we refer to comments received in response to the Supplemental Comments of the Consensus Parties using the following format: Comments/Reply Comments of [Party Name] to Supplemental Comments of the Consensus Parties at [Page or Paragraph Number].

²⁰ See ¶ 107 *infra*.

²¹ See ¶ 130 *infra*.

licensees receiving such information to notify ESMR and cellular telephone licensees of changes in system parameters.²²

11. Under the second prong of the *Report and Order*, we take steps to reconfigure the 800 MHz band to separate public safety, CII, and other non-cellular systems on the one hand, and ESMR systems, such as Nextel's, on the other:

- We designate fourteen megahertz in the upper portion of the 800 MHz band (817-824 MHz/862-869 MHz) for ESMR systems, while designating eighteen megahertz in the lower portion of the 800 MHz band (806-815 MHz/851-860 MHz) for use by public safety, CII, and other non-cellular systems.²³ Between the upper and lower band segments, we establish an Expansion Band and a Guard Band to separate ESMR operations from public safety and CII operations and protect the latter from interference.
- As part of band reconfiguration, we require Nextel to relinquish all of its 800 MHz band spectrum holdings below 817 MHz/862 MHz.²⁴ This will result in an additional average of 4.5 megahertz of 800 MHz band spectrum becoming available to the public safety community, particularly in the major markets where the shortage of public safety spectrum is most acute.
- We require band reconfiguration to be completed through a phased transition process within thirty-six months of release of a Public Notice announcing the start date of reconfiguration in the first NPSPAC region.²⁵ We provide for an independent Transition Administrator to oversee the band reconfiguration process.²⁶
- We assign financial responsibility to Nextel for the full cost of relocation of all 800 MHz band public safety systems and other 800 MHz band incumbents to their new spectrum assignments with comparable facilities, *i.e.*, systems with comparable technological and operational capability.²⁷ We adopt financial, licensing, and administrative safeguards to ensure completion of band reconfiguration regardless of Nextel's financial condition.²⁸

12. In connection with the reconfiguration of the 800 MHz band, as described above, we take the following additional spectrum-related actions:

- We accept Nextel's relinquishment of its current spectrum rights in the 700 MHz Guard Band and contemplate a future *Further Notice of Proposed Rulemaking* to determine the

²² See ¶¶ 124-127 *infra*.

²³ See ¶ 151 *infra*.

²⁴ See ¶ 198 *infra*.

²⁵ See ¶ 201 *infra*.

²⁶ See ¶¶ 190-200 *infra*.

²⁷ See ¶¶ 177-178 *infra*.

²⁸ See ¶¶ 180-187 *infra*.

disposition of this spectrum.²⁹

- In exchange for the spectrum rights Nextel is surrendering, coupled with the obligations it is incurring to accomplish 800 MHz band reconfiguration, we will modify certain Nextel licenses to provide Nextel with nationwide authority to operate in ten megahertz of spectrum at 1910-1915 MHz/1990-1995 MHz.³⁰ We require Nextel to reimburse UTAM Inc. (UTAM) for the cost of clearing the 1910-1915 MHz band, and to clear the 1990-2025 MHz band of BAS incumbents within thirty months of the effective date of this *Report and Order*.³¹
- To ensure that Nextel is treated equitably but does not realize an undue windfall, we condition the grant of 1.9 GHz band spectrum rights to Nextel on its meeting the obligations imposed by this *Report and Order*, and on its payment to the U.S. Treasury of any difference between the value of the 1.9 GHz band spectrum rights, the value of spectrum rights relinquished by Nextel, and Nextel's costs incurred in reconfiguring the 800 MHz band and clearing the 1.9 GHz band.³²
- We reject Nextel's proposed relinquishment of 900 MHz spectrum as part of the Consensus Parties' proposal,³³ but allow 900 MHz band Private Land Mobile Radio (PLMR) service licensees to initiate CMRS operations on their currently authorized spectrum or to assign their authorizations to others for CMRS use.³⁴

III. MAJOR FINDINGS AND DECISIONS

A. The 800 MHz Interference Problem and Solutions

13. In the *NPRM*, the Commission documented the increasing incidence of interference to 800 MHz band public safety systems from high density ESMR and cellular telephone systems.³⁵ We tentatively concluded that interference to public safety represented "a sufficiently serious problem that a solution must be found."³⁶ We find that the record in this proceeding supports the following findings:

- The public safety interference problem described in the *NPRM* is serious and will only increase in severity as private, public safety and commercial use of the 800 MHz band intensifies.

²⁹ See ¶¶ 207-209 *infra*.

³⁰ See ¶¶ 217-222 *infra*.

³¹ See ¶¶ 239-263 *infra*.

³² See ¶ 212 *infra*.

³³ See ¶ 207 *infra*.

³⁴ See ¶¶ 335-337 *infra*.

³⁵ See *Improving Public Safety Communications in the 800 MHz Band; Consolidating the 900 MHz Industrial/Land Transportation and Business Pool Channels*, WT Docket No. 02-55, *Notice of Proposed Rulemaking*, 17 FCC Rcd 4873, 4482 ¶ 16 (2002), as modified in *Erratum*, 17 FCC Rcd 7169 (PSPWD 2002) (*NPRM*).

- Public safety agencies are becoming increasingly dependent on the 800 MHz band to meet their communications needs as spectrum used by public safety in lower bands has become congested, particularly in urban areas.³⁷
- Although many ESMR and cellular telephone licensees have been commendably cooperative in bearing the responsibility for identifying and promptly curing interference at their own expense, their ability to continue to do so effectively will become problematic as more intense use is made of 800 MHz band and cellular telephone spectrum.
- Despite the claims by some that licensees in the cellular telephone bands cause little interference to 800 MHz band public safety systems,³⁸ strong evidence exists to the contrary.³⁹
- We must take the actions necessary to ensure that first responders—both public safety and CII personnel—have communications channels free of unacceptable interference and thereby suitable for mission-critical operations including rapid response to major incidents that threaten Homeland Security.

14. Until now, the Commission's approach to interference resolution in the 800 MHz band has been to urge the involved parties to make voluntary technical changes to prevent or reduce interference at particular sites.⁴⁰ This is consistent with the policy reflected in current rules that require affected licensees to resolve interference through mutually satisfactory arrangements.⁴¹ While these measures have helped to alleviate interference in some instances, the record leads us to conclude that the interference problem will only intensify as cellular-architecture licensees make more intensive use of their spectrum and that voluntary measures alone will not stem the growth of unacceptable interference. We thus are convinced that unacceptable interference will be stemmed in an efficient and effective manner, only by the actions we take today to establish mandatory interference-abatement rules.

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³⁶ *Id.* at 4882 ¶ 16.

³⁷ Although the Commission has designated spectrum for public safety use in the spectrally adjacent 700 MHz band (764-776 MHz and 794-806 MHz), that band currently is not usable by public safety in most of the population centers of the United States because of the presence of high-power television station incumbents. See Section 337(a) of the Communications Act, 47 U.S.C. § 337(a), as amended by § 3004 of the Balanced Budget Act of 1997, Pub. L. No. 105-33, 111 Stat. 251 (1997). See also 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. As a result, the potential for the public safety community to access the 700 MHz band in the near future is limited.

³⁸ See, e.g., Verizon Comments at 3; Cingular and Alltel Comments at 2-3. Some parties argued that reports of interference were anecdotal in nature, and for that reason, did not represent a true evaluation of the problem. See Cinergy Comments at 7-9.

³⁹ See, e.g., *ex parte* comments, dated June 10, 2003, from City and County of Denver (Denver June 10 *Ex Parte*); *ex parte* comments, dated July 29, 2003, from Anne Arundel County (Anne Arundel July 29 *Ex Parte*).

⁴⁰ In 2000, public safety and CMRS entities incorporated many of these technical changes into a *Best Practices Guide*. See Avoiding Interference Between Public Safety Wireless Communications Systems and Commercial Wireless Communications Systems at 800 MHz, a Best Practices Guide, December 2000 at 5 (*Best Practices Guide*).

⁴¹ *C.f.* 47 C.F.R. § 90.173(b); see also 47 C.F.R. § 90.403(e).

15. In this proceeding, parties have presented us with two long-term alternatives for addressing the 800 MHz interference problem:

- The Consensus Parties have proposed a band reconfiguration plan that would move ESMR systems—most notably Nextel—to the upper portion of the 800 MHz band, move all public safety and “high site” operators to the lower portion of the band, and make additional spectrum in the band available for public safety use.⁴²
- Other parties, including cellular telephone licensees and their representatives, utilities and even some public safety agencies, have questioned the need for band reconfiguration, and aver that technical changes accompanied by certain mandatory procedural requirements, such as prior coordination of cell sites, would suffice to solve the interference problem without the need to reconfigure the 800 MHz band. One group of entities, the 800 MHz User Coalition, refers to this alternative as the “Balanced Approach.”⁴³

16. We agree, in part, with the suggestion by proponents of the Balanced Approach and other parties that we should augment the technical and procedural changes contained in the *Best Practices Guide* and apply certain of them on a mandatory basis. While we do not adopt all of the suggested technical restrictions, we have carefully considered various technical measures suggested by the parties and supplemented them with certain procedural rules. Hereinafter, we refer to this Commission-derived set of practices and procedures as Enhanced Best Practices.

17. On this record, however, we disagree with those parties that contend that exclusive reliance on Enhanced Best Practices on a case-by-case basis is the best long-term solution to the interference problem.⁴⁴ Although case-by-case treatment of potential and actual interference under an Enhanced Best Practices regime provides clear benefits over the current voluntary regime, we conclude that that approach, by itself, does not provide the best long-term answer to the problem of interference to public safety and other non-cellular operations in the 800 MHz band. Our finding in that regard rests on the following facts:

⁴² The designations “high-site” and “low-site” are often used to distinguish cellularized from non-cellularized systems. Thus, for example, the typical public safety 800 MHz system will employ one, or only a few, base stations with antennas located on high terrain, towers, buildings, etc. to provide wide-area coverage from the base station. Cellular-architecture systems, by comparison, make use of multiple, localized coverage, base stations whose antennas generally are mounted on low towers or other structures. We note, however, that the term “low-site” is often used to denominate cells *within* a cellularized system that have *very low* antenna elevations, e.g. thirty-foot and, accordingly, have a greater potential to cause interference than high-elevation cells in the system. See ¶¶ 170-174 *infra*.

⁴³ See http://www.fix800mhznow.com/documents/800_MHz_COALITION_10_29_03.pdf. The 800 MHz Users Coalition consists of: ALLTEL Communications, Ameren Corporation, American Electric Power (AEP), Applied Technology Group, Inc., AT&T Wireless Services, Inc., Cinergy Corporation, City of Baltimore, Maryland, City of Colorado Springs, Colorado, Consumers Energy Co., Edison Electric Institute (EEI), Fresno Mobile Radio, Inc., Holy Cross Electric Association, Mobile Relay Associates, National Rural Electrical Cooperative Association (NRECA), Palomar Communications, Preferred Communication Systems, Small Business in Telecommunications, Southern Company/Southern LINC, Supreme Radio Communications, Inc., U.S. Cellular Corp., UTC, and Western Wireless.

⁴⁴ See, e.g., Letter, dated May 29, 2003, from Jill Lyon, Esq., Vice President and General Counsel, UTC to Marlene H. Dortch, Secretary, Federal Communications Commission (800 MHz Users Coalition May 29, 2003 *ex parte*).

- Addressing interference on a case-by-case basis is both labor-intensive and expensive.⁴⁵
 - The transactional costs of applying Enhanced Best Practices as an exclusive remedy would increase as new public safety and other non-cellular systems were implemented and ESMR and cellular licensees increased the capacity of their systems by adding more cells.
 - The increased costs and labor burden disproportionately affects public safety agencies, many of which operate with very limited human, technical, and financial resources.
 - Some interference situations respond poorly, if at all, to the use of the techniques contained in the Enhanced Best Practices.
 - ESMR and cellular systems will continue to expand. This will increase congestion in the 800 MHz band as well as the attendant interference to public safety systems operating in the band. We would disserve the public interest if we allowed unacceptable interference to become ubiquitous before addressing the fundamental causes of this interference.
18. In contrast, band reconfiguration confers the following greater benefits over the long-term:
- Band reconfiguration addresses interference comprehensively and proactively by eliminating the current interleaving of public safety and commercial channels in the 800 MHz band and separating cellularized multi-cell and non-cellularized high-site systems within the band.
 - Although there are significant short-term costs associated with band reconfiguration, it is the solution most likely to yield maximum interference protection benefits for the least cost over the long run.⁴⁶
 - Once implemented, a reconfigured band will reduce both the upfront amount of coordinated engineering work necessary to prevent interference and the burden of troubleshooting interference incidents on a case-by-case basis.
 - Eliminating interleaving of public safety and commercial channels will reduce the number of “band edges” between spectrum utilized by the two different network architectures thus significantly reducing the risk of interference to public safety systems.
 - With adoption of band reconfiguration, public safety entities will have access, on average, to 4.5 megahertz of additional 800 MHz spectrum, which they can readily incorporate into existing systems to enhance their ability to protect the safety of life and property. Moreover, public safety entities that wish to do so will have the option of using spectrum in the Expansion Band or the Guard Band, subject to the technical and operational limitations on those bands.

⁴⁵ We also note that the record reflects instances in which, despite diligent effort on the part of all concerned, technical changes have been unable to abate interference. *See e.g.*, Denver June 10 *Ex Parte* at 12 -13; Anne Arundel July 29 *Ex Parte*.

⁴⁶ We note that the interference abatement measures used prior to band reconfiguration will remain necessary even after band reconfiguration is completed. Thus, although we expect instances of interference to be far less frequent under the reconfigured band plan, the availability of Enhanced Best Practices will ensure the quick and effective abatement of any residual interference that may occur.

- The relocation of the current NPSPAC channels from their current position to the lowest segment of the 800 MHz band will result in a greater potential for interoperability with public safety systems in the spectrally adjacent 700 MHz public safety band.
- The adoption of a reconfigured 800 MHz band plan will provide certainty to licensees planning to implement new 800 MHz systems or modify existing systems.

B. Entitlement to Interference Protection

19. We are adopting a new objective technical standard for determining whether a public safety or other non-cellular 800 MHz band licensee is entitled to interference protection. We adopt this standard to more finely adapt our rules to the technologies being deployed in the 800 MHz band. Specifically:

- “Unacceptable interference” is defined, for the limited purpose of this proceeding, as a function of threshold median received power levels of desired signals. Specifically, “unacceptable interference” occurs when the signals from a cellular architecture station or stations, cause the carrier-to-noise plus interference ratio of a radio meeting TIA-equivalent Class A standards to degrade below 20 dB in an area in which the median measured received signal power of the desired signal is equal to or greater than -104 dBm for mobile units or -101 dBm for portable units.⁴⁷ In the case of data radios, unacceptable interference occurs when the received signal power criteria, above, are met and the bit error rate of the radio exceeds the value specified by the radio’s manufacturer for reliable operations.⁴⁸
- Under the rules adopted in this Order, desired signals from systems operating in the 806-816 MHz/851-861 MHz band segment that equal or exceed the threshold are entitled to protection from unacceptable interference as defined above. Non-cellular systems operating from 816-817 MHz/861-862 MHz in the Guard Band are also provided interference protection, but to a lesser degree.⁴⁹
- In recognition of the role that receiver characteristics play in the interference calculus, we are affording full protection against unacceptable interference only to systems whose mobile or portable receivers are capable of satisfactory operation at the threshold signal power in the absence of interference.⁵⁰ Other systems will receive lesser protection as a function of the degree to which their receivers exhibit inferior performance.

20. The method of interference abatement we adopt herein leaves to the involved parties—and not the Commission—the choice of how best to ensure that their systems do not cause unacceptable interference. Thus, a given party may choose from a variety of methods encompassed in the Enhanced Best Practices in each area where interference occurs, including, but not limited to, modification of the cell that is the source of interference or technical improvements to the affected public safety system or

⁴⁷ See ¶¶ 105-107 *infra*.

⁴⁸ *Id.*

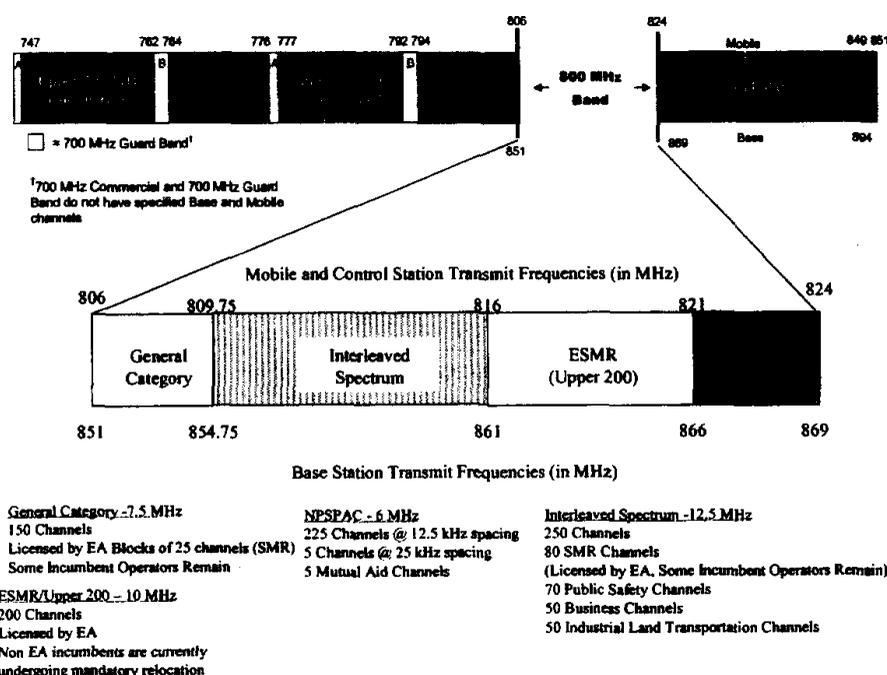
⁴⁹ See ¶ 158 and Figure 1 *supra*.

⁵⁰ In this Report and Order, we are relating entitlement to full interference protection to conformance with certain sensitivity, selectivity, and intermodulation-rejection performance standards typical of TIA “Class A” receivers. See ¶ 109 *infra*.

other non-cellular 800 MHz systems (at the commercial operator's expense).⁵¹ In addition, to the extent that interference results from the combination of signals from multiple transmitters, and potentially multiple licensees, we place joint and several responsibility on such CMRS licensees to eliminate unacceptable interference using the remedies of their choice. In not imposing new, across-the-board emission limitations that would necessitate highly expensive technical changes to most, if not all, ESMR and cellular systems nationwide, we have heeded the filings of those parties who have decried the expense of such technical micromanagement and urged that the same goal can be achieved otherwise, for example, by the less intrusive means we adopt today.⁵²

C. 800 MHz Band Reconfiguration

21. The 800 MHz band is currently configured as follows:

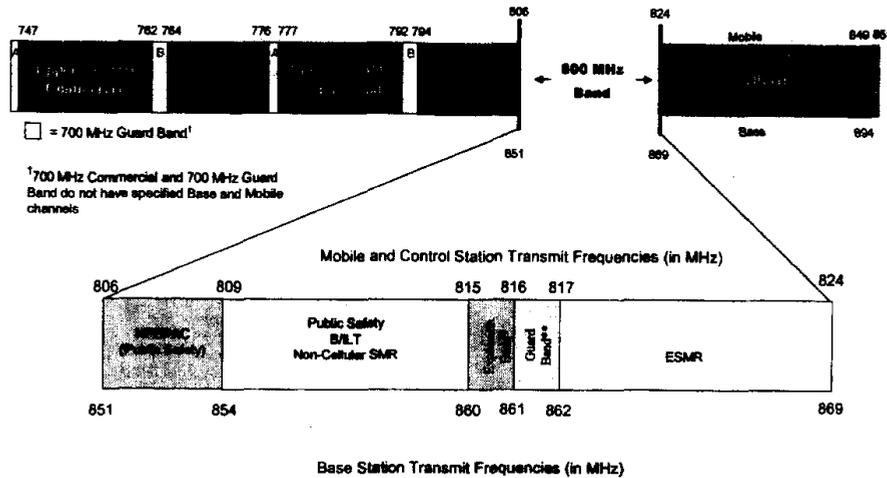


22. Our plan for reconfiguration of the 800 MHz band is designed to spectrally segregate public safety systems from ESMR and cellular telephone systems. In reaching this spectrum management decision, we are guided by the principle that we can minimize unacceptable interference in the 800 MHz band by placing similar system architectures in like spectrum and isolating dissimilar architectures from one another.⁵³ Under the new band plan adopted in this *Report and Order*, the 800 MHz band will be configured as follows:

⁵¹ We stress, however, that we expect parties to vigorously implement Enhanced Best Practices to abate interference even if this involves implementing a "channel swap" prior to official rebanding. See ¶ 123 *infra*.

⁵² See Public Safety Wireless Network Comments at 18. See also Reply Comments of Rural Telecommunications Group to Supplemental Comments of the Consensus Parties.

⁵³ See FCC Staff Report, Spectrum Policy Task Force Report in ET Docket No. 02-135, 4, 22 (released Nov. 22, 2002).



*No public safety system will be required to remain in or relocate to the Expansion Band; although they may do so if they choose.

**No public safety or CII licensee may be involuntarily relocated to occupy the Guard Band.

23. The new band plan will have the following impact on existing licensees in the band:

- Systems in the current NPSPAC band will be relocated to 806-809/851-854 MHz in the current General Category band.⁵⁴ To accommodate NPSPAC relocation, Nextel will relinquish its General Category licenses and other existing General Category systems will be relocated elsewhere in the 800 MHz band.⁵⁵
- Existing public safety systems and non-cellular B/ILT and SMR systems operating on interleaved channels between 809.75-816 MHz/854.75-861 MHz will continue to operate on those channels.
- Nextel will relocate to the 817-824 MHz/862-869 MHz band, and will vacate all channels it now uses in the 806-817 MHz/851-862 MHz band segment. Public safety, and later CII agencies will have exclusive access to all channels vacated by Nextel in the interleaved portion of the band below 815 MHz/860 MHz for a limited-year period of time.⁵⁶
- No public safety licensee will be required to operate in the 815-816 MHz/860-861 MHz Expansion Band. Any public safety system currently located in the Expansion Band will be relocated to spectrum below the Expansion Band unless it exercises its option to remain in the

⁵⁴ See ¶ 37 *infra*.

⁵⁵ In some circumstances, public safety and CII systems operating in the 809-809.75 /854-854.75 MHz portion of the General Category band will not have to be relocated. Public safety will also have exclusive access to spectrum vacated by Nextel in this portion of the General Category Band for five years, and CII licensees will have access from year three to year five.

⁵⁶ These channels will be restricted to public safety eligibles for three years from the effective date of this *Report and Order*. Thereafter, for an additional two-year period, only public safety and CII eligibles may apply for said channels. At the end of this five-year period, any eligible applicant may apply.

Expansion Band.⁵⁷

- No public safety or CII licensee will be required to operate in the 816-817 MHz/861-862 MHz Guard Band. Only licensees who voluntarily choose to relocate to the Guard Band will occupy this portion of the band.⁵⁸
- Unless the subject of mutual agreement among affected parties, non-Nextel ESMR operations below 816/861 MHz may stay where they are, subject to a stringent non-interference obligation.⁵⁹

24. Providing public safety with additional spectrum rights in the 800 MHz band, instead of elsewhere as others have proposed,⁶⁰ has significant advantages. First, spectrum rights in the 800 MHz band are currently more valuable to public safety licensees than spectrum rights in the 700 MHz public safety band which can be subject to interference from incumbent television stations. This interference may foreclose extensive use of the 700 MHz public safety band in certain markets for several years. Second, 800 MHz band spectrum rights are of particular value to public safety licensees because new channels can be integrated into their existing infrastructure at little additional cost: the additional channels can be added to existing base station sites with, typically, only minor hardware changes; and most existing public safety mobile and portable radios can be adapted to receive the additional channels with only minor modification or reprogramming. In sum, providing public safety with access to additional spectrum in the 800 MHz band can provide a virtually instant capacity increase for public safety systems and will facilitate interoperability with other agencies—an important capability for Homeland Security operations. To the extent that band reconfiguration may require extensive replacement of existing 800 MHz band public safety equipment, manufacturers likely will achieve economies of scale in the process. We urge manufacturers to pass on such savings to public safety agencies.

25. In crafting the band plan adopted herein, we examined all proposals submitted in the course of this proceeding. While we did not adopt any proposal in its entirety, we did extract elements from several proposals and adopted a modified version of the only band plan that with an effective, comprehensive approach for resolving the interference problems that jeopardized public safety.⁶¹ We nonetheless

⁵⁷ Under the relocation provisions we adopt today, public safety licensees will generally be located outside of the Expansion Band, except when a public safety licensee currently operating in these bands either explicitly declines to relocate or requests a channel therein. Those public safety systems operating in the Expansion Band will receive the same interference protection as if they were located outside of this band. See ¶¶ 154-156 *infra*.

⁵⁸ The Guard Band is carved from current ESMR spectrum. Therefore, no public safety licensees currently occupy the Guard Band and no public safety licensees will need to be relocated from this portion of the band. Systems that choose to relocate to the Guard Band will be entitled to limited interference protection as described at ¶¶ 158 and Figure 1 *infra*.

⁵⁹ In some Southeastern markets where both Southern LINC and Nextel offer ESMR service, insufficient spectrum exists in the 816-824/861-869 MHz band segment to accommodate existing ESMR systems and ESMR systems that may seek to exercise their option to relocate from the lower channels. In order not to unduly restrict ESMR operations in this region, we define the ESMR band in these markets as the band segment 813.5-824 MHz/858.5-869 MHz. The Expansion Band in this region will extend from 812.5-813.5 MHz/857.5-858.5 MHz. All licensees operating below 813.5 MHz/858.5 MHz in this region will be afforded full protection against unacceptable interference as specified in the *Report and Order*. See ¶¶ 164-169 *infra*.

⁶⁰ See Comments of Preferred Communications to Supplemental Comments of the Consensus Parties at 19-20.

⁶¹ For example, only one proposal contained a feasible means of paying for band reconfiguration. See Supplemental Comments of the Consensus Parties at ii (Nextel commitment to provide up to \$850 million for band (continued....))

recognize that the band plan we adopt is in some respects inconsistent with current international agreements. As a result, implementing the band plan in areas of the United States bordering Mexico and Canada will require modifications to international agreements for use of the 800 MHz band in the border areas. Since we value highly our agreements with these countries we intend to promptly pursue those modifications during our bilateral discussions with those countries' relevant regulatory bodies.⁶² During the pendency of such modifications, all 800 MHz band operations (both cellular and non-cellular alike) must continue to be consistent with current international agreements. Consequently, if a region containing a border area is reconfigured, all 800 MHz band operations within the border area must conform to all international agreements unless and until such international agreements are amended to reflect a reconfigured 800 MHz band. We envision and intend that interference-free cross-border mutual-aid capability remain paramount during this interim period preceding modification of the applicable international agreements.

D. Band Reconfiguration Process

26. We recognize that our decision to reconfigure the 800 MHz band raises significant transition issues, particularly with respect to the relocation of public safety and other non-cellular licensees from old to new frequency assignments. We are sensitive to the concerns raised about service and operational disruption and are committed to ensuring that the band reconfiguration process does not result in degradation of existing service or an adverse effect on public safety communications and operations. We therefore have adopted rules that ensure both continuity of service and that relocating licensees receive "comparable facilities" on their new frequency assignments, whether this requires retuning existing equipment or providing replacement equipment.⁶³

27. In an effort to further ensure a smooth transition to the new 800 MHz band plan, the relocation process will be managed by an independent Transition Administrator.⁶⁴ A committee of major 800 MHz band stakeholders will select the Transition Administrator who will perform a variety of administrative functions and mediate, or refer to mediation, any disputes that may arise in connection with band reconfiguration. Should any such disputes not be resolved by mediation, the Transition Administrator will compile a record and transmit it to the Commission. The Commission then will review the disputed matter *de novo*.⁶⁵

28. We are committed to having band reconfiguration completed through a phased transition process within thirty-six months of release of a Public Notice announcing the start date of reconfiguration

(Continued from previous page)

reconfiguration). We note, also, that, later in this proceeding, the proponents of the Balanced Approach said that certain of their members were committed to pay the cost of implementing Best Practices applied on a case-by-case basis when their facilities were involved. We commend that commitment, which is consistent with the interference abatement responsibility policy we adopt herein. See ¶¶ 128-131 *infra*.

⁶² Commission staff meet periodically, and whenever needed, with their regulatory counterparts from Mexico and Canada to discuss cross border issues and, when duly authorized, to derive recommended changes to existing international agreements. When formal amendments to agreements are needed, they are made through a process that requires the sanction of the government entity officially designated with the responsibility for international treaty consultations, which in the case of the United States is the Department of State.

⁶³ See ¶ 201 *infra*.

⁶⁴ See ¶¶ 190-200 *infra*.

⁶⁵ Such *de novo* Commission review is anticipated only after all other avenues have been exhausted, *e.g.*, mediation, arbitration or other alternative dispute resolution techniques based on the good faith effort of the parties.

in the first NPSPAC region. To ensure timely completion, we require Nextel to meet both an interim benchmark and a final benchmark. As an interim benchmark, within eighteen months of release of a Public Notice announcing the start date of reconfiguration in the first NPSPAC region Nextel must complete, and the Transition Administrator must certify that Nextel has completed, the retuning of Channels 1-120 for twenty NPSPAC Regions. If Nextel fails to meet this interim benchmark, for reasons that Nextel, with the exercise of due diligence, could reasonably have avoided, the Commission may consider and exercise any appropriate enforcement action within its authority, including assessment of monetary forfeitures or, if warranted, license revocation.⁶⁶ At thirty-six months, Nextel must complete, and the Transition Administrator must certify, all relocation of 800 MHz incumbents required by this Report and Order. If Nextel fails to meet this benchmark, for reasons that Nextel could reasonably have avoided, the Commission will determine whether forfeitures should be imposed and/or whether Nextel licenses, including, but not limited to, its 1.9 GHz licenses, should be revoked.

E. Guarantee of Sufficient Funds for Band Reconfiguration

29. Nextel has committed to pay up to \$850 million for retuning and replacement expenses associated with its own relocation and the related relocations discussed in this *Report and Order*, an amount it claims is sufficient to cover all such costs. We do not believe, however, that Nextel should be able to cap its obligation to pay relocation costs, because doing so could leave public safety and other relocating entities without the means to complete the relocation process in the event that Nextel's estimates prove low and relocation costs exceeded any such cap. Therefore, we decline to "cap" Nextel's obligations at \$850 million or any other amount but instead require Nextel to pay all costs of band reconfiguration, as defined in this *Report and Order*.

30. In addition, to protect against possible changes to Nextel's financial condition, we require Nextel to secure its commitment by means of an irrevocable letter of credit in the amount of \$2.5 billion, within sixty days of the date this *Report and Order* is published in the Federal Register.⁶⁷ We believe this letter of credit strikes the appropriate balance between Nextel's estimate that band reconfiguration would cost \$850 million and others' contention that Nextel's estimates were unrealistically low. We further note that Nextel may be required to obtain additional letters of credit if ongoing experience with band reconfiguration show the initial letter of credit to be inadequate.

F. Equitable Compensation for Band Reconfiguration

31. Nextel proposes that, as compensation for its relinquishment of some of its spectrum rights in the 700, 800 and 900 MHz bands and its commitment to pay 800 MHz band incumbent relocation costs, it should receive a nationwide license for ten megahertz of spectrum in the 1.9 GHz band.⁶⁸ We conclude that it is in the public interest to compensate Nextel for the surrendered spectrum rights and costs it incurs

⁶⁶ We note that the Commission has issued Notices of Apparent Liability for Forfeiture assessing substantial penalties on carriers that have failed to comply with Commission rules intended to enhance the safety of life and property. See *In re T-Mobile USA, Inc., Notice of Apparent Liability for a Forfeiture*, 18 F.C.C.R. 3501 (EB 2003); see also *In re AT&T Wireless Services, Inc., Notice of Apparent Liability for a Forfeiture*, 17 F.C.C.R. 9903 (EB 2002).

⁶⁷ See ¶ 182 *infra*.

⁶⁸ This modification of Nextel's original White Paper position was first put forth in December 2001 in an *ex parte* filing by the Consensus Parties. See n. 172 *infra*. We note that other parties contend that the value of the spectrum rights Nextel seeks substantially exceeds the value of spectrum rights it has offered to give up, and therefore would constitute an unwarranted windfall to Nextel. See n. 661 *infra*.

as a result of band reconfiguration. By facilitating band reconfiguration, giving up spectrum rights, and bearing the financial burden of the relocation process for all affected incumbents, Nextel will play a critical role in solving the 800 MHz band public safety interference problem.⁶⁹

32. However, we agree with the parties who have urged us to reject modifying Nextel's licenses on a "megahertz-for-megahertz" basis whereby Nextel would receive rights to ten megahertz of spectrum in the 1.9 GHz band region in exchange for the rights to approximately ten megahertz of combined spectrum it offers to surrender in the 700, 800, and 900 MHz bands.⁷⁰ We reject this approach, *inter alia*, because we perceive insufficient benefit to public safety,⁷¹ and do not find the spectrum rights offered to be comparable in value to the spectrum rights sought. Instead, to ensure that the public and our licensees including Nextel are treated equitably, and that Nextel does not gain undue advantage, we will compensate Nextel on a "value for value" basis.

33. Accordingly, by means of a *Fifth Report and Order* in ET Docket No. 00-258 we designate two paired five megahertz blocks in the 1910-1915 MHz and 1990-1995 MHz bands for the provision of new services, including AWS, which we make available to Nextel as part of the public safety rebanding approach described above. In addition, we adopt a *Fourth Memorandum Opinion and Order* in ET Docket No. 95-15 to provide for clearing of incumbents from this spectrum. More specifically:

- We make the 1910-1915 MHz block available by redesignating the band from Unlicensed Personal Communications Services (UPCS) use to licensed fixed and mobile services to be used for AWS, and adopt a plan that provides reimbursement compensation to UTAM for relocation expenses it has incurred in relocating incumbents from the band and allows for the relocation of remaining incumbent licensees.
- In the 1990-1995 MHz block, which has already been reallocated for fixed and mobile services, we make the band available to Nextel subject to the condition that it relocate incumbent BAS licensees in the 1990-2025 MHz band within thirty months.⁷² We also address several petitions for reconsideration and clarification regarding the existing relocation and reimbursement plan for incumbent BAS licensees in the 1990-2025 MHz band.

34. Nextel will receive rights to the 1.9 GHz band spectrum conditioned on its meeting the obligations imposed by this *Report and Order*, and on its payment to the U.S. Treasury of any difference

⁶⁹ We provide this compensation under the authority granted us by Sections 4, 301, 303 and 316 of the Act, 47 U.S.C. §§ 316, 303, 301, and 154(i). We set forth a detailed description of our legal authority in ¶¶ 62-87 *infra*.

⁷⁰ See, e.g., Comments of Access Spectrum to Supplemental Comments of Consensus Parties at 11-12; Comments of Boeing to Supplemental Comments of Consensus Parties at 19; Comments of CTIA to Supplemental Comments of Consensus Parties at 15-16.

⁷¹ We note that the Commission has previously designated twenty-four megahertz of spectrum to public safety in the 700 MHz band. See ¶ 40 *infra*. We note that a "megahertz for megahertz" comparison of the spectrum currently held by Nextel and the spectrum it seeks is unjustified, *inter alia*, because the bands differ in spectral characteristics, operating parameters, the number and kind of incumbent licensees and the number of markets in which Nextel holds its spectrum. Moreover, under the band reconfiguration plan we adopt today, Nextel may require its 900 MHz band spectrum in order to make up for spectrum it may need to vacate in the 800 MHz band in order to accommodate other ESMR licensees in the ESMR segment of the 800 MHz band. See ¶¶ 159-163 *infra*.

⁷² If Nextel fails to meet this benchmark, for reasons that Nextel could reasonably have avoided, the Commission will determine whether forfeitures should be imposed and/or whether Nextel licenses, including, but not limited to, its 1.9 GHz licenses, should be revoked.

between the value of 1.9 GHz band spectrum rights and Nextel's costs incurred in reconfiguring the 800 MHz band and clearing the 1.9 GHz band. Specifically, the amount due the U.S. Treasury will be the net of our estimate of the current value of the 1.9 GHz band spectrum rights, discounted by the actual cost of 800 MHz band reconfiguration (including Nextel's own relocation costs), clearing the 1.9 GHz band, and the value of the additional 800 MHz band and 700 MHz band spectrum rights that Nextel will relinquish.

35. At the conclusion of the thirty-six month band reconfiguration process specified herein, but no later than six months thereafter, the following financial reconciliation will be made:

- Nextel will be allotted a \$1.607 billion credit⁷³ for relinquishing rights to an average of 4.5 megahertz of spectrum in the 800 MHz band.
- Nextel will provide the Transition Administrator an accounting of the funds spent:
 - to reconfigure its own systems in the 800 MHz band;⁷⁴ and
 - to clear the 1.9 GHz band of incumbents and to reimburse UTAM.
- Nextel will also provide the Transition Administrator an accounting of the funds received as reimbursement for clearing the 1.9 GHz band.
- The Transition Administrator shall provide an accounting of the funds spent to reconfigure the systems of incumbent operators in the 800 MHz band, including its own salary and expenses. This accounting shall include certifications from each relocated licensee that all necessary reconfiguration work has been completed and that Nextel and said licensee agree on the sum paid for such work.
- Upon verification of these accountings, Nextel will be allotted an appropriate credit.
- To the extent that those combined credits total less than the value of the 1.9 GHz band spectrum, Nextel shall be obligated to make a payment to the United States Treasury at the conclusion of the relocation process equal to the difference.
- Within ten days of the calculation of the amount of this payment, the Wireless Telecommunications Bureau will issue a Public Notice specifying the amount that Nextel will pay the United States Treasury. If Nextel does not make payment of any amount that it owes within thirty days of issuance of this Public Notice, the amount Nextel owes will be paid from the letter(s) of credit. If the letter(s) of credit do not secure sufficient funds, then the Commission will determine whether forfeitures should be imposed and/or whether Nextel licenses, included, but not limited to its 1.9 GHz licenses, should be revoked.

⁷³ "Credit," as used in this context, means the amount that will be deducted from the sum that Nextel will be required to deposit with the U.S. Treasury after completion of band reconfiguration. The calculation of the credit is discussed at ¶ 323 *infra*.

⁷⁴ Nextel's credit for this category of expenditure shall be strictly limited to those costs absolutely essential to implement band reconfiguration and shall not include any costs for improvement, by way of equipment replacement or otherwise, of the capacity or features of Nextel's infrastructure or subscriber units.

IV. REGULATORY BACKGROUND

A. 800 MHz Band

36. In the mid-1970's, the Commission reallocated spectrum in the 806-947 MHz band for land mobile operations and designated portions of this spectrum for high capacity common carrier mobile communications (*i.e.* cellular systems) and PLMR; and reserve spectrum for future land mobile communications needs.⁷⁵ The Commission allotted one-third of the spectrum for conventional operation and the remaining two-thirds for trunked operation.⁷⁶ By the close of the 1970's, the Commission had released a portion of reserve 800 MHz spectrum to alleviate spectrum shortages confronting users of conventional channels.⁷⁷ In the early 1980's, the Commission adopted rules for the release of the remaining reserve spectrum according to radio service categories and established the 800 MHz Public Safety, B/ILT, and SMR service categories.⁷⁸ The specific channel pairs allotted to the various services differ along the U.S. border areas with Mexico and Canada.⁷⁹ The Commission did not make contiguous spectrum available to each radio service because technology limitations at that time did not readily accommodate the use of contiguous spectrum at a single base station site.⁸⁰ Instead, the channel pairs made available to each radio service were "interleaved" between channels allotted to the other radio services.⁸¹ The Commission provided for inter-category sharing (*i.e.*, sharing between radio services) to permit licensees access to spectrum in instances in which the channels assigned to a licensee's particular

⁷⁵ See Inquiry Relative to the Future Use of the Frequency Band 806-960 MHz and 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, *First Report and Order and Second Notice of Inquiry*, 19 Rad. Reg. 2d (P&F) 1663 (1970). See also Inquiry Relative to the Future Use of the Frequency Band 806-960 MHz and 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 (1974), *reconsidered*, *Memorandum Opinion and Order*, 51 FCC 2d 945 (1975).

⁷⁶ *Id.*

⁷⁷ See Inquiry Relative to the Future Use of the Frequency Band 806-960 MHz and 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, *Order* (on further reconsideration), FCC 78-854 (1978); *aff'd sub nom. NARUC v. FCC*, 525 F.2d 630 (D.C. Cir. 1976), *cert. denied* 425 U.S. 992 (1976).

⁷⁸ The initial allotment to public safety was fifty channels. See Amendment of Part 90 of The Commission's Rules to Designate Frequencies in the 806-821 and 851-866 MHz Bands for Slow-Growth Land Mobile Radio Systems of Utilities and Public Safety Agencies, PR Docket No. 79-191 *Report and Order*, 48 Rad. Reg. 2d (P&F) 837, FCC 80-663 (1980). This was later increased to seventy channels. See Amendment of Part 90 of the Commission's Rules to Release Spectrum in the 806-21/851-866 MHz Bands and to Adopt Rules and Regulations Which Govern Their Use; Amendment of Part 90 of the Commission's Rules to Facilitate Authorization of Wide-Area Mobile Radio Communications Systems; An Inquiry Concerning the Multiple Licensing of 800 MHz Radio Systems (community repeaters); Amendment of Section 90.385(c) of the Commission's Rules to Allow Transmission of Non-Voice Signals at 800 MHz, PR Docket No. 79-191, PR Docket No. 79-334, PR Docket No. 79-107, PR Docket No. 81-703, *Second Report and Order*, 90 FCC 2d 1281, 52 Rad. Reg. 2d (P&F) 11, FCC 82-338 (1982) (*Pool Order*). Subsequently, the Commission added 225 25 kHz channels spaced 12.5 kHz apart and five 25 kHz channels spaced 25 kHz apart at 866-869 MHz—the so-called "NPSPAC Channels." See ¶ 37 *infra*.

⁷⁹ See, *e.g.*, 47 C.F.R. §§ 90.617, 90.619.

⁸⁰ See *NPRM*, 17 FCC Rcd at 4877.

⁸¹ *Id.*

radio service had been exhausted.⁸² At the time, the Commission contemplated that the radio service categories could be phased out in three years.⁸³ However, the categories proved to have continuing utility and remain in use today. In 1986, based on experience with the radio service category structure in the 800 MHz band, the Commission adopted a similar structure for the 900 MHz band land mobile spectrum.⁸⁴

37. In 1986, the Commission designated six megahertz of spectrum at 821-824 MHz/866-869 MHz for public safety use and established the NPSPAC to advise the Commission on rules for this spectrum.⁸⁵ After the NPSPAC filed its Initial Report, the Commission issued rules for the new public safety spectrum, which became known as the "NPSPAC Band," including five channels devoted to mutual aid (interoperability) use.⁸⁶ Thereafter, many jurisdictions began planning and implementing wide-area (often state-wide) 800 MHz band public safety systems that utilize NPSPAC and Public Safety Category channels.⁸⁷

38. In 1990, the Commission established the General Category Radio Service at 806-809.75 MHz/851-854.75 MHz for either conventional or trunked operation by any eligible 800 MHz licensee.⁸⁸ A year later, the Commission waived its rule requiring SMR licensees to complete system construction in one year, to accommodate SMR licensees' interest in accumulating large numbers of 800 MHz channels and using advanced technology to increase spectrum reuse by employing cellular-type architecture to

⁸² *Id.*

⁸³ See *Pool Order*, 90 FCC 2d 1303-1304 ¶ 66. In 1995, the Commission imposed a freeze on intercategory sharing, because, after the Commission elected to auction SMR licenses on a wide-area geographical basis, SMR applicants filed a disproportionate number of requests for intercategory sharing. See Amendment of Part 90 Of The Commission's Rules To Facilitate Future Development Of SMR Systems in the 800 MHz Frequency Band, PR Docket No. 93-144, *Second Report and Order*, 12 FCC Rcd 19079 (1997). This resulted in a shortage of channels for applicants in the other pools. See in the Matter Of Inter-Category Sharing Of Private Mobile Radio Frequencies in the 806-821/851-866 MHz Bands, *Order*, 10 FCC Rcd 7350 (WTB 1995) (*Intercategory Freeze Order*). To date, the freeze on intercategory sharing in the 800 MHz band remains in effect.

⁸⁴ See Amendment of Parts 2 and 22 of the Commission's Rules Relative to Cellular Communications Systems Amendment of Parts 2, 15, and 90 of the Commission's Rules and Regulations to Allocate Frequencies in the 900 MHz Reserve Band for Private Land Mobile Use Amendment of Parts 2, 22 and 25 of the Commission's Rules to Allocate Spectrum for, and to Establish Other Rules and Policies Pertaining to the Use of Radio Frequencies in a Land Mobile Satellite Service for the Provision of Various Common Carrier Services, GEN Docket No. 84-1231 RM-4812, GEN Docket No. 84-1233 RM-4829, GEN Docket No. 84-1234, *Report and Order*, 2 FCC Rcd at 1825 ¶ 46 (1986).

⁸⁵ *Id.* at 1837.

⁸⁶ See Development and Implementation of a Public Safety National Plan and Amendment of Part 90 to Establish Service Rules and Technical Standards for Use of the 821-824/866-869 MHz Bands by the Public Safety Services, GEN Docket No. 87-112, *Report and Order*, 3 FCC Rcd 905 (1987).

⁸⁷ See, e.g., State of Ohio, *Memorandum Opinion and Order*, 17 FCC Rcd 439 (WTB, PS&PWD 2002); State of Florida, *Memorandum Opinion and Order*, 16 FCC Rcd 2174 (WTB 2001); Commonwealth of Pennsylvania and GPU Energy, *Order*, 14 FCC Rcd 14029 (WTB, PS&PWD 1999); New Jersey Transit Authority, *Order*, 14 FCC Rcd 4334 (WTB 1999); State of South Carolina and Scana Communications, Inc., *Order*, 13 FCC Rcd 8787 (WTB 1997); State of Florida, *Order*, 12 FCC Rcd 11567 (WTB 1997); Seminole County, Florida, *Order*, 11 FCC Rcd 4105 (WTB 1996).

⁸⁸ See *Trunking in the Private Land Mobile Radio Services for More Effective and Efficient Use of the Spectrum*, PR Docket No. 87-213, *Report and Order*, 5 FCC Rcd 4016 (1990).

efficiently serve wide areas and large numbers of subscribers.⁸⁹ Thereby, it afforded Fleet Call, the predecessor of Nextel, sufficient time to develop and implement an SMR system offering wide-area digital voice and data service.⁹⁰

39. In 1994, the Commission proposed a new licensing framework for SMR systems in the 800 MHz band.⁹¹ After release of the *Further Notice*, there was a significant increase in the number of requests for General Category channels made by SMR applicants and licensees.⁹² On October 4, 1995, the Wireless Telecommunications Bureau imposed a freeze on acceptance of new applications for the General Category channels to ensure that resolution of the spectrum allocation issues raised in the *Further Notice* would not be compromised.⁹³ In December 1995, the Commission established geographic area licensing and new service rules for the "upper 200" 800 MHz SMR channel pairs at 816-821 MHz/861-866 MHz where such wide-area digital voice and data services eventually proliferated.⁹⁴ The Commission subsequently redesignated the General Category channels exclusively to the 800 MHz SMR service, whereby mutually exclusive initial applications would be subject to competitive bidding, and excluded PLMR licensees from eligibility for this spectrum.⁹⁵ On reconsideration, however, the Commission reversed its decision concerning eligibility and reinstated the eligibility of PLMR applicants for General Category channels.⁹⁶ The Commission also partially lifted the freeze on General Category channels to permit Economic Area (EA) applicants⁹⁷ to relocate incumbents from the upper ten megahertz block of

⁸⁹ See *NPRM*, 17 FCC Rcd at 4878 ¶ 9.

⁹⁰ See, e.g., *Fleet Call, Inc., Memorandum Opinion and Order*, 6 FCC Rcd 1533, *recon. dismissed*, 6 FCC Rcd 6989 (1991).

⁹¹ Amendment of Part 90 of the Commission's Rules to Facilitate Future Development of SMR Systems in the 800 MHz Frequency Band, *Further Notice of Proposed Rule Making*, PR Docket No. 93-144, PP Docket No. 93-253, 10 FCC Rcd 7970 (1994) (*Further Notice*).

⁹² The General Category is comprised of 150 contiguous twenty-five megahertz channels in the 800 MHz band. See 47 C.F.R. § 90.615.

⁹³ Licensing of General Category Frequencies in the 806-809.750/851-854.750 MHz Bands, *Order*, 10 FCC Rcd 13190 (WTB 1995).

⁹⁴ See Amendment of Part 90 of the Commission's Rules to Facilitate Future Development of SMR Systems in the 800 MHz Frequency Band, PR Docket No. 93-144, *First Report and Order, Eighth Report and Order, and Second Further Notice of Proposed Rule Making*, 11 FCC Rcd 1463 (1995) (*800 MHz Report and Order*). Geographic licensing was also adopted for the General Category SMR channels.

⁹⁵ Amendment of Part 90 of the Commission's Rules to Facilitate Future Development of SMR Systems in the 800 MHz Frequency Band, *First Report and Order, Eighth Report and Order and Second Further Notice of Proposed Rulemaking*, PR Docket No. 93-144, GN Docket No. 93-252, PP Docket No. 93-253, 11 FCC Rcd 1463 (1995) (*800 MHz SMR Report and Order*); *Memorandum Opinion and Order on Reconsideration*, PR Docket No. 93-144, GN Docket No. 93-252, PP Docket No. 93-253, 12 FCC Rcd 9972 (1997) (*800 MHz SMR Memorandum Opinion and Order*).

⁹⁶ *800 MHz SMR Memorandum Opinion and Order*, 12 FCC Rcd at 9975 ¶ 4.

⁹⁷ In the *800 MHz SMR Report and Order*, the Commission adopted geographic licensing based on EAs for the upper ten megahertz of the 800 MHz SMR service. See *800 MHz SMR Report and Order*, 11 FCC Rcd at 1484 ¶¶ 24-25. The U.S. Department of Commerce Bureau of Economic Analysis has established 172 EAs which cover the continental United States. See *Final Redefinition of the BEA Economic Areas*, 60 Fed. Reg. 31114 (Mar. 10, 1995).

800 MHz spectrum to the General Category channels.⁹⁸ In all other respects, the Commission maintained the freeze so as not to frustrate its efforts regarding future licensing of General Category channels.⁹⁹

B. 700 MHz Band

40. Prior to 1997, the 700 MHz band (TV Channels 60-69) was exclusively used by broadcasters. In the Balanced Budget Act of 1997, Congress directed the Commission to reallocate twenty-four megahertz of this spectrum for public safety use and to auction thirty-six megahertz of this spectrum for commercial use.¹⁰⁰ Incumbent analog television stations on the 700 MHz band frequencies are allowed to remain in operation until December 31, 2006, and, under certain circumstances, well beyond that date.¹⁰¹ These stations render the 700 MHz band unusable for public safety systems in the majority of metropolitan areas at this time.

41. In January 2000, the Commission established two paired 700 MHz guard bands (the 700 MHz Guard Bands), one of four megahertz and one of two megahertz, in the commercial use spectrum immediately adjacent to the public safety spectrum to insulate public safety operations from unacceptable interference from 700 MHz commercial services.¹⁰² In the *Upper 700 MHz Second Report and Order*, the Commission adopted technical, operational, and licensing requirements for the 700 MHz Guard Bands,¹⁰³ including a ban on cellular operations.¹⁰⁴ The Commission's restriction on cellular operations stems from its experience in the 800 MHz land mobile band in which the incompatibility of "high-site" operations and cellular operations led to the instant rule making.¹⁰⁵ The Commission determined that the 700 MHz Guard Bands would be licensed by competitive bidding to a new class of commercial user called a Guard Band Manager who would lease the spectrum for value to third parties on a for-profit basis.¹⁰⁶ The Commission

⁹⁸ See *800 MHz SMR Report and Order*, 11 FCC Rcd at 1508 ¶¶ 74-75.

⁹⁹ *Id.* at 1509 ¶ 76.

¹⁰⁰ See Section 337(a) of the Act, 47 U.S.C. § 337(a), as amended by § 3004 of the Balanced Budget Act of 1997, Pub. L. No. 105-33, 111 Stat. 251 (1997). The Commission's Wireless Telecommunications Bureau subsequently set a June 19, 2002, date for this auction. See *Auction of Licenses in the 747-762 and 777-792 MHz Bands* (Auction Nos. 31 and 44) scheduled for June 19, 2002, DA 01-2394, *Public Notice*, 16 FCC Rcd 18510 (2001). The spectrum assigned for public safety use corresponds to Television Channels 63-64 and 68-69.

¹⁰¹ See 47 U.S.C. §§ 309(j)(14) and 337(e). See also *Advanced Television Systems and Their Impact Upon Existing Television Broadcast Service*, MM Docket No. 87-268, *Reconsideration of Fifth Report and Order*, 13 FCC Rcd 6860, 6887 (1998).

¹⁰² The Guard Bands consist of paired one megahertz sub-bands at 746-747 MHz and 776-777 MHz and two paired two megahertz sub-bands at 762-764 MHz and 792-794 MHz. See *Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission's Rules*, WT Docket No. 99-168, *First Report and Order*, 15 FCC Rcd 476, 489-91 ¶¶ 30-34 (2000) (*Upper 700 MHz First Report and Order*).

¹⁰³ See *Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission's Rules*, WT Docket No. 99-168, *Second Report and Order*, 15 FCC Rcd 5299 (2000) (*Upper 700 MHz Second Report and Order*).

¹⁰⁴ See 47 C.F.R. §§ 27.2(b); 27.601(a).

¹⁰⁵ See *Upper 700 MHz Second Report and Order*, 15 FCC Rcd 5299.

¹⁰⁶ *Upper 700 MHz Second Report and Order*, 15 FCC Rcd at 5311-13 ¶¶ 26-28. The Commission determined that this licensing scheme was consistent with the provisions of 47 U.S.C. § 337(a)(2) requiring that this (continued....)

believed this process would allow third parties to more readily acquire spectrum for varied uses, enable these parties to take advantage of the efficiencies of site-by-site licensing, and streamline the Commission's spectrum management responsibilities.¹⁰⁷ In September 2000, the Commission completed the auction of the 700 MHz Guard Band spectrum.¹⁰⁸ However, in the Auction Reform Act of 2002, Congress directed the Commission to postpone auctioning the remaining thirty megahertz of the upper 700 MHz spectrum (747-762 MHz/777-792 MHz) until resolution of the 800 MHz public safety interference issues that are the subject of the instant rule making proceeding.¹⁰⁹

C. 900 MHz Band

42. In 1986, based on experience with the pool structure in the 800 MHz band, the Commission adopted the same pool structure for the 900 MHz band land mobile spectrum and established the SMR, B/ILT Pools.¹¹⁰ Given that success of inter-category sharing in the 800 MHz band, the Commission concluded that inter-category sharing should be implemented in the 900 MHz pool channels.¹¹¹

43. The 900 MHz SMR service¹¹² was established in order to alleviate congestion in the 800 MHz SMR band.¹¹³ To expedite service in major markets where demand for SMR service was greatest, the Commission elected to use a two-phase licensing process. In Phase I, licenses were assigned in forty "Designated Filing Areas" (DFAs) comprised of the top fifty markets. Following Phase I, the Commission

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spectrum be allotted for commercial use. *Upper 700 MHz Second Report and Order*, 15 FCC Rcd at 5316 ¶ 36; 47 U.S.C. § 337(a)(2).

¹⁰⁷ *Upper 700 MHz Second Report and Order*, 15 FCC Rcd at 5312-13 ¶¶ 27-28.

¹⁰⁸ *See 700 MHz Guard Band Auction Closes; Winning Bidder Announced, Public Notice*, 15 FCC Rcd 18026 (WTB 2000) (Auction No. 33).

¹⁰⁹ The Auction Reform Act of 2002, Pub. L. No. 107-195, 116 Stat. 715, § 2(4) (2002). Pub.L. 107-195 § 2(4) (Auction Reform Act of 2002) provided that: "The Federal Communications Commission is also in the process of determining how to resolve the interference problems that exist in the 800 megahertz band, especially for public safety. One option being considered for the 800 megahertz band would involve the 700 megahertz band. The Commission should not hold the 700 megahertz auction before the 800 megahertz interference issues are resolved or a tenable plan has been conceived." Previously, Section 309(j)(14) of the Communications Act required the Commission to assign spectrum recovered from broadcast television using competitive bidding and envisioned that the Commission would conduct an auction of this spectrum prior to September 30, 2002. *See* 47 U.S.C. § 309(j)(14).

¹¹⁰ *See Amendment of Parts 2 and 22 of the Commission's Rules Relative to Cellular Communications Systems Amendment of Parts 2, 15, and 90 of the Commission's Rules and Regulations to Allocate Frequencies in the 900 MHz Reserve Band for Private Land Mobile Use Amendment of Parts 2, 22 and 25 of the Commission's Rules to Allocate Spectrum for, and to Establish Other Rules and Policies Pertaining to the Use of Radio Frequencies in a Land Mobile Satellite Service for the Provision of Various Common Carrier Services*, GEN Docket No. 84-1231 RM-4812, GEN Docket No. 84-1233 RM-4829, GEN Docket No. 84-1234, *Report and Order*, 2 FCC Rcd 1825 ¶ 46 (1986). We observe that the Commission suggested that the pool framework would only be for a limited time period. *Id.*

¹¹¹ *Id.* at ¶ 52.

¹¹² The "900 MHz" SMR band refers to spectrum allocated in the 896-901 and 935-940 MHz bands. *See* 47 C.F.R. § 90.603.

¹¹³ *Id.* at ¶ 46.

envisioned licensing facilities in areas outside these markets in Phase II. In the meantime, however, licensing outside the DFAs was frozen after 1986, when the Commission opened its filing window for the DFAs.¹¹⁴

44. In 1993, the Commission adopted a *First Report & Order and Further Notice of Proposed Rulemaking* in PR Docket 89-553, modifying its Phase II proposal and seeking comment on whether to license the 900 MHz SMR band to a combination of nationwide, regional, and local systems.¹¹⁵ Shortly after the *First Report & Order/Further Notice*, Congress amended the Communications Act to reclassify most SMR licensees as CMRS providers and establish the authority to use competitive bidding to select from among mutually exclusive applicants for certain licensed services.¹¹⁶ Accordingly, the Commission deferred further consideration of Phase II and incorporated the 900 MHz docket (as well as the companion docket relating to 800 MHz SMR),¹¹⁷ into its CMRS proceeding to ensure that the regulation of all SMRs would be consistent with the regulation of competing CMRS services such as cellular and PCS¹¹⁸ and to consider the impact of auction authority on the record of the pending 900 MHz proceeding.¹¹⁹

45. In the *CMRS Third Report & Order*, the Commission further revised its Phase II proposals and established the broad outlines for the completion of licensing in the 900 MHz SMR band. The Commission concluded that (1) the 900 MHz SMR band would be licensed in twenty ten-channel blocks using MTAs as service areas; (2) licensing of mutually exclusive applicants for this spectrum would be based on competitive bidding; and (3) incumbent licensees in the band would retain the right to operate under their existing authorizations, but would be required to obtain the relevant MTA license (or obtain the consent of the MTA licensee) to be able to expand their systems.¹²⁰ In 1996 the Commission

¹¹⁴ See Private Land Mobile Application Procedures for Spectrum in the 896-901 MHz and 935-940 MHz Bands, Public Notice, 1 FCC Rcd 543 (1986). In 1989, the Commission adopted a Notice of Proposed Rule Making in PR Docket 89-553, proposing to begin Phase II licensing of SMR facilities nationwide. The NPRM contained proposals intended to add flexibility to SMR systems. The Commission continued its freeze on licensing outside the DFAs while the rulemaking was pending, but some DFA licensees elected to become licensed for secondary sites (i.e., facilities that may not cause interference to primary licensees and must accept interference from primary licensees) outside their DFAs to accommodate system expansion. 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 Bands Allotted to the Specialized Mobile Radio Pool, *Notice of Proposed Rulemaking*, PR Docket No. 89-553, 4 FCC Rcd 8673 (1989).

¹¹⁵ See 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 Bands Allotted to the Specialized Mobile Radio Pool, *First Report and Order and Further Notice of Proposed Rulemaking*, PR Docket No. 89-553, 8 FCC Rcd 1469 (1993) (*Phase II First Report & Order & Further Notice*).

¹¹⁶ Omnibus Budget Reconciliation Act of 1993, Pub.L. No. 103-66 (Budget Act), § 6002(b), 107 Stat. 312, 392 (1993) (codified at 47 U.S.C. § 332).

¹¹⁷ Amendment of Part 90 of the Commission's Rules to Facilitate Future Development of SMR Systems in the 800 MHz Frequency Band, *Further Notice of Proposed Rulemaking*, PR Docket No. 83-144, FCC 94-271, 59 Fed.Reg. 60,111 (Nov. 22, 1994) (*800 MHz Further Notice*).

¹¹⁸ See Implementation of Sections 3(n) and 332 of the Communications Act-- Regulatory Treatment of Mobile Services, Second Report and Order, 9 FCC Rcd 1411 (1994) (*CMRS Second Report & Order*); *CMRS Third Report & Order*, 9 FCC Rcd 7988 (1994).

¹¹⁹ *Id.*

¹²⁰ *CMRS Third Report & Order* at ¶ 119. The Commission noted that some licensees had been granted authorizations to construct facilities outside of the DFAs, so they could link facilities in different markets. With (continued....)

completed its auction of 900 MHz SMR licenses and announced the winning bidders to use 900 MHz SMR in major MTAs.¹²¹

46. In the Balanced Budget Act proceeding, the Commission amended its rules to permit CMRS use of PLMRS frequencies in the 800 MHz land mobile band and allowed PLMRS licensees to transfer their licenses to CMRS entities.¹²² In the *BBA R&O and FNPRM*, the Commission asked comment on whether, in the interest of regulatory symmetry, it should extend the same rules to 900 MHz band land mobile spectrum.¹²³ In the *NPRM* initiating this proceeding we sought comment on this issue in light of Nextel's proposal to accommodate 800 MHz incumbents in the 900 MHz band.¹²⁴

D. 1.9 GHz Band

47. The Commission identified a large number of potential bands to support the types of innovative mobile services that it has broadly described as AWS in the January 2001 *Notice of Proposed Rulemaking and Order*,¹²⁵ and in the August 2001 *Memorandum Opinion and Order and Further Notice of Proposed Rule Making* in the ET Docket No. 00-258 proceeding.¹²⁶ Collectively, in the *Notice* and the *Further Notice*, the Commission sought comment on the suitability for use by AWS of frequency bands that included the 1910-1930 MHz band (designated for UPCS), the 1990-2025 MHz band (allocated for Mobile-Satellite Service (MSS)) and other bands. Subsequent decisions have narrowed the spectrum bands under consideration. In the September 2001 *First Report and Order and Memorandum Opinion and Order*, the Commission modified the existing allocation in the 2500-2690 MHz band to provide additional flexibility, but did not reallocate the band to AWS.¹²⁷ In the November 2002 *Second Report*

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respect to those unprotected sites (i.e., "secondary sites"), the Commission stated that those that were licensed on or before August 9, 1994, would be entitled to primary site protection. *Id.* The Commission also eliminated bonding requirements for future MTA licensees, but retained them for incumbent 900 MHz SMR licensees that do not obtain MTA licenses. *Id.* at ¶ 194.

¹²¹ In FCC Auction No. 7, the Commission auctioned 1,019 900 MHz SMR licenses in 51 MTAs. The FCC granted most of the licenses on August 12, 1996. See *Public Notice*, "FCC Announces Grant of 900 MHz Specialized Mobile Radio MTA Licenses," 12 FCC Rcd 13055 (1996).

¹²² See Implementation of Sections 309(j) and 337 of the Communications Act of 1934 as Amended; Promotion of Spectrum Efficient Technologies on Certain Part 90 Frequencies; Establishment of Public Service Radio Pool in the Private Mobile Frequencies Below 800 MHz; Petition for Rule Making of the American Mobile Telecommunications Association, Report and Order and Further Notice of Proposed Rule Making, WT Docket No. 99-87, RM-9332, RM-9405, RM-9705, 15 FCC Rcd 22709, 22760-22761 (1999) (*BBA R&O and FNPRM*).

¹²³ *Id.* at 22773-22774.

¹²⁴ *NPRM*, 17 FCC Rcd at 4918 ¶ 86.

¹²⁵ Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, Including Third Generation Wireless Systems, ET Docket No. 00-258, *Notice of Proposed Rulemaking and Order*, 16 FCC Rcd 596 (2001) (*AWS Notice*).

¹²⁶ Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, Including Third Generation Wireless Systems, ET Docket No. 00-258, ET Docket No. 95-18, and IB Docket No. 99-81, *Memorandum Opinion and Order and Further Notice of Proposed Rule Making*, 16 FCC Rcd 16043 (2001) (*AWS Further Notice*).

¹²⁷ Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, Including Third Generation (continued....)

and Order, the Commission allocated ninety megahertz of spectrum for AWS, consisting of forty-five megahertz of Federal Government-use spectrum in the 1710-1755 MHz band and forty-five megahertz in the 2110-2155 MHz band.¹²⁸

48. Most recently, in its February 2003 *Third Report and Order, Third Notice of Proposed Rulemaking and Second Memorandum Opinion and Order*, the Commission considered use of spectrum in the 1910-1930 MHz band, as well as spectrum allocated to the 2 GHz MSS service in the 1990-2025 MHz and 2165-2200 MHz bands.¹²⁹ In the *Third R&O*, the Commission reallocated the 1990-2000 MHz, 2020-2025 MHz, and 2165-2180 MHz bands for Fixed and Mobile services.¹³⁰ In the *AWS Third NPRM*, the Commission identified a portion of the UPCS band at 1910-1920 MHz band as spectrum that could be made available for AWS or other purposes and sought comment with regard to using it for paired or unpaired operations—including entirely new AWS applications, expansion of existing Broadband PCS operations to support new and innovative mobile services, and as relocation spectrum for existing services. In a separate proceeding, ET Docket No. 95-18, the Commission had established the procedures by which 2 GHz MSS licensees would relocate BAS and FS licensees from the 1990-2025 MHz and 2165-2200 MHz bands, respectively. In light of the reallocation of a portion of this spectrum to support new fixed and mobile services, we issued a *Third Report and Order* in ET Docket No. 95-18 revising these relocation procedures to account for the new entrants into the band.¹³¹

49. Although the decisions we have made in the larger AWS and related proceedings directly affect the decisions we make today, the instant action focuses exclusively on allocations we make in the 1910-1915 MHz and 1990-1995 MHz bands. Accordingly, we address each of those bands individually, and then address the merits of creating a paired allocation consisting of the two bands.

1. 1910-1915 MHz Band

50. The 1910-1915 MHz band is a subset of a larger twenty megahertz band at 1910-1930 MHz that is allocated to the fixed and mobile services on a primary basis,¹³² and is designated for use by UPCS (Continued from previous page)

Wireless Systems, ET Docket No. 00-258, *First Report and Order and Memorandum Opinion and Order*, 16 FCC Rcd 17222 (2001) (*AWS First R&O and MO&O*).

¹²⁸ Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, Including Third Generation Wireless Systems, ET Docket No. 00-258, *Second Report and Order*, 17 FCC Rcd 23193 (2002) (*AWS Second R&O*).

¹²⁹ Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems, ET Docket No. 00-258, IB Docket No. 99-81, *Third Report and Order, Third Notice of Proposed Rulemaking and Second Memorandum Opinion and Order*, 18 FCC Rcd 2223 (2003) (*AWS Third R&O, Third NPRM, and Second MO&O*).

¹³⁰ *Id.* at 2238 ¶ 28. We note that there are pending petitions for reconsideration that request changes to decisions made in the *AWS Third R&O*. The thirty megahertz was reallocated as follows: fourteen megahertz of spectrum that was held in "reserve" from the 2 GHz MSS licensees, and sixteen megahertz of spectrum that was "abandoned" as a result of 2GHz MSS licensees not meeting initial milestones. *Id.* at 2239 ¶ 32.

¹³¹ See Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for use by the Mobile Satellite Service, ET Docket No. 95-18, *Third Report and Order and Third Memorandum Opinion and Order*, 18 FCC Rcd 23638 (2003) (*MSS Third R&O*).

¹³² See 47 C.F.R. § 2.106.

devices.¹³³ Under the current rules, the 1910-1920 MHz portion of the band may be used for asynchronous (generally data) UPCS devices and the 1920-1930 MHz portion may be used for isochronous (generally voice) UPCS devices.¹³⁴

51. Before the 1910-1930 MHz band was made available for UPCS applications, this band was used by fixed point-to-point microwave links. To facilitate the introduction of UPCS systems, the Commission established policies in the *Emerging Technologies* proceeding for the relocation of incumbent microwave systems from this band and designated a single entity, UTAM, to coordinate and manage the transition.¹³⁵ Unlike Broadband PCS, the record for UPCS deployment has been mixed. Currently, the most widespread application of the 1920-1930 MHz UPCS band is for wireless PBX systems.¹³⁶ A search of our equipment authorization database reveals no UPCS equipment authorized for the 1910-1920 MHz band.

52. In the *AWS Third NPRM*, we revisited the issue of redesignating all or a portion of the 1910-1930 MHz band for fixed and mobile services with the intent of promoting AWS use, pairing this band with spectrum in the 1990-2000 MHz band, and establishing reimbursement procedures for UTAM's relocation of incumbent microwave links in the UPCS band. As an initial matter, we decided to retain the 1920-1930 MHz band for isochronous UPCS use, given the existing voice applications that have been deployed in that band segment.¹³⁷ In the *AWS Third NPRM*, we also sought comment on reallocation options for the 1910-1920 MHz band. Specifically, we noted that asynchronous UPCS applications had not been developed since the service was authorized in 1994, and concluded the public interest would not be served if the ten megahertz of spectrum designated for asynchronous use in the 1910-1920 MHz band remained fallow when there were many applications that could put it to good use.¹³⁸

53. In conjunction with its proposal to redesignate as much as ten megahertz in the 1910-1920 MHz band, the Commission recognized that new licensees in the band would reap the benefits of UTAM's band clearing efforts and concluded that UTAM should be adequately reimbursed for its efforts. Therefore, we sought comment on proposals for reimbursing UTAM. In particular, we proposed that

¹³³ See 47 C.F.R. Part 15 – Radio Frequency Devices. Subpart D of Part 15 is titled “Unlicensed Personal Communications Service Devices.”

¹³⁴ Asynchronous devices are defined as those “that transmit RF energy at irregular time intervals, as typified by local area network data systems,” and isochronous devices are defined as those “that transmit at a regular interval, typified by time-division voice systems.” See 47 C.F.R. § 15.303(a)-(d). To minimize the potential of systems in each band interfering with other systems operating in the same band, the Commission adopted rules requiring UPCS devices to monitor the spectrum prior to transmitting. Specific requirements for the operation of asynchronous devices in the 1910-1920 MHz band are codified at 47 C.F.R. § 15.321 and specific requirements for the operation of isochronous devices in the 1920-1930 MHz band are codified at 47 C.F.R. § 15.323.

¹³⁵ See Amendment of the Commission's Rules to Establish New Personal Communications Services, GEN Docket No. 90-314, *Fourth Memorandum Opinion and Order*, 10 FCC Rcd 7955 (1995). UTAM is the Commission's frequency coordinator for UPCS devices in the 1910-1930 MHz band. The UPCS band relocation policies are codified at 47 C.F.R. §§ 101.69-101.81.

¹³⁶ *AWS Third NPRM*, 18 FCC Rcd 2223 ¶ 40.

¹³⁷ *Id.* at ¶ 46.

¹³⁸ In 1994, the Commission anticipated that the 1910-1920 MHz band would be used for data applications such as high-speed, high-capacity LANs. See Amendment of the Commission's Rules to Establish New Personal Communications Services, GEN Docket No. 90-314, *Second Report and Order*, 8 FCC Rcd 7700 (1993).

UTAM be entitled to a percentage of the total reimbursement expenses incurred for the 1910-1930 MHz band as of the effective date of any final rules adopted in the AWS proceeding.¹³⁹

54. We also note that there are several outstanding petitions that relate to use of the 1910-1915 MHz band segment. There are four petitions for waiver filed by Lucent, UTStarcom & Drew University, Ascom, and Alaska Power;¹⁴⁰ and two petitions for rulemaking filed by WINForum¹⁴¹ and UTStarcom,¹⁴² most of which request various unlicensed uses of the band. In the *AWS Further Notice*, the Commission sought comment on whether a portion of, or the entire, 1910-1930 MHz band should be redesignated for AWS or as relocation spectrum for incumbents in other frequency bands that are displaced by new AWS licensees.¹⁴³

2. 1990-1995 MHz Band

55. The 1990-2110 MHz band (2 GHz BAS band) is currently used extensively by the BAS for mobile TV pickup (TVPU) operations, including electronic newsgathering (ENG) operations to cover events of interest.¹⁴⁴ The original 2 GHz BAS channel plan divided the band into seven channels, each

¹³⁹ For example, the redesignation of five megahertz of the twenty megahertz band would entitle UTAM to twenty-five percent of its total.

¹⁴⁰ In its petition for waiver, Lucent requests that it be allowed to use the 1910-1920 MHz band for its Definity PBX voice system within the confines of Cook County, Illinois. Also, UTStarcom & Drew University request permission to use the 1910-1920 MHz band to install the UTStarcom Personal Access System (PAS) on the campus of Drew University in Madison, New Jersey, in order to provide wireless telephone service to the students and staff, as an extension of the university's wired telephone system. In addition, Ascom requests that it be allowed to use the 1910-1920 MHz band for its Freeset DCT 1900 PBX voice system within the confines of Cook County, Illinois; New York City; and San Francisco County, California, because several of its customers, which are boards of trade or stock exchange entities, need high-capacity indoor wireless communications. Finally, Alaska Power requests a waiver of Part 15 asynchronous spectrum etiquette to operate a community wireless voice system over the 1910-1920 MHz (data) band, in order to serve small rural areas in Alaska that are currently unserved or underserved by wireless service providers.

¹⁴¹ In its petition for rulemaking, WINForum asks the Commission to allow isochronous UPCS devices to use the 1910-1920 MHz band and to phase out asynchronous use in this band, thereby providing twenty megahertz of spectrum (1910-1930 MHz) for isochronous devices, and also to modify certain technical requirements for UPCS devices in Part 15.

¹⁴² In its rulemaking petition, UTStarcom requests that the 1910-1920 MHz band be made available for licensing via competitive bidding to permit the establishment of community wireless network service, using the UTStarcom PAS which is based on Japan's RCR-28 Personal Handy Phone System (PHS) standard.

¹⁴³ *AWS Further Notice*, 16 FCC Rcd 16043 ¶ 9.

¹⁴⁴ A TVPU station is a land mobile station used for the transmission of TV program material and related communications from scenes of events back to the TV station or studio. See 47 C.F.R. § 74.601(a) (listing classes of TV broadcast auxiliary stations). The band is also used by fixed BAS operations such as studio-transmitter link (STL) stations, TV relay stations, and TV translator relay stations, but the majority of those operations are in higher frequency bands allocated to the BAS. See 47 C.F.R. § 74.601(b). See generally 47 C.F.R. § 74.600 ("Eligibility for license"). In addition, BAS spectrum in the 2 GHz band is authorized for use by the Cable Television Relay Service (CARS) and the Local Television Transmission Service (LTTS). See 47 C.F.R. §§ 74.602, 78.18(a)(6) and 101.801. We will refer to these services collectively as "BAS," and all decisions apply to CARS and LTTS operations in the band, as well as to BAS.

consisting of between 16.5 and 18 megahertz.¹⁴⁵ In the *MSS Second R&O*, the Commission reallocated the 1990-2025 MHz segment to the MSS and established a relocation plan for incumbent BAS.¹⁴⁶ The Commission adopted a two-phase relocation plan with a cutover schedule based on market size in which the BAS would eventually have access to seven 12 megahertz channels in the 2025-2110 MHz band at the end of the transition.¹⁴⁷ The Commission also identified four broad categories of BAS markets—"LA" (Los Angeles television market), "Metro" (remaining top 30 television markets), "Light" (television markets 31-100), and "Rural" (television markets 101 and above).¹⁴⁸ The Commission specified different relocation schedules for BAS facilities based on the size of the market.¹⁴⁹ For example, BAS incumbents in markets 1-30 were to be relocated on an earlier schedule than incumbents in markets 31-100.

56. In the *MSS Third R&O*, the Commission modified the plan that 2 GHz MSS licensees were to follow when relocating incumbent BAS licensees to the 1990-2025 MHz band.¹⁵⁰ The modified plan provides for the relocation of BAS licensees to the 2025-2110 MHz band in a single step, retains the distinction of BAS licensees by market size, and requires the relocation of those licensees within the time periods specified for their respective market categories.¹⁵¹ The Commission also noted that, subsequent to its establishment of the BAS relocation plan, it had reallocated fifteen megahertz of spectrum in the 1990-2025 MHz band for new AWS entrants.¹⁵² The Commission concluded that it was necessary to give these new AWS entrants a realistic opportunity to seek early use of the band in exchange for the relocation of incumbent users, while minimizing the disruption to BAS incumbents to the extent possible.¹⁵³ The

¹⁴⁵ The original 2 GHz BAS channel plan, which is still in use, is as follows: Channel 1 (1990-2008 MHz), Channel 2 (2008-2025 MHz), Channel 3 (2025-2042 MHz), Channel 4 (2042-2059 MHz), Channel 5 (2059-2076 MHz), Channel 6 (2076-2093 MHz), and Channel 7 (2093-2110 MHz).

¹⁴⁶ See Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for use by the Mobile-Satellite Service, ET Docket No. 95-18, *Second Report and Order and Second Memorandum Opinion and Order*, 15 FCC Rcd 12315 (2000) (*MSS Second R&O*).

¹⁴⁷ The Phase I channel plan—an interim channel plan using 102 megahertz of spectrum at 2008-2110 MHz during the transition—consisted of seven channels (six 14.5-megahertz wide channels and one 15-megahertz wide channel). The Phase II channel plan consisted of seven channels (six 12.1-megahertz wide channels and one 12.4-megahertz wide channel) within the final 85 megahertz of spectrum at 2025-2110 MHz.

¹⁴⁸ *MSS Second R&O*, 15 FCC Rcd at 12323 ¶ 19.

¹⁴⁹ *Id.* at 12326-27 ¶¶ 29-32.

¹⁵⁰ *MSS Third R&O*, 18 FCC Rcd 23638. In the *MSS Third R&O*, the Commission also modified the plan for relocating incumbent FS microwave licensees in the 2180-2200 MHz band to specify appropriate interference standards and relocation guidelines that new fixed and mobile licensees should use when entering the band. Any 2 GHz MSS system that can share spectrum with BAS and/or FS incumbents is exempt from relocation obligations in the band it can share. *Id.* at 23669-70 ¶¶ 62-63, 23671 ¶ 68.

¹⁵¹ The new BAS channel plan consists of seven twelve-megahertz channels and two 500-kilohertz data return link (DRL) channels. *Id.* at 23666 ¶ 55.

¹⁵² Specifically, the fifteen megahertz of spectrum was reallocated from MSS in the 1990-2025 MHz band to support new fixed and mobile services—ten megahertz occupy the lower end (1990-2000 MHz) of the band and five megahertz are situated at the upper end (2020-2025 MHz). See *AWS Third R&O, Third NPRM, and Second MO&O*, 18 FCC Rcd 2223 ¶ 15.

¹⁵³ *MSS Third R&O*, 18 FCC Rcd at 23653-61 ¶¶ 29-44. The Commission noted that, although some time will be required to establish service rules and license new fixed and mobile entrants before they can secure entry into the band, the entry of these new AWS licensees may occur relatively quickly. Thus, the Commission expected (continued....)

Commission found that given the need to provide for rapid introduction of AWS in the 2 GHz BAS band a two-phase relocation was no longer appropriate.¹⁵⁴

57. In order to provide early access to the 1990-2025 MHz spectrum for MSS licensees while maintaining the integrity of the BAS system, the Commission set up a negotiation structure that provided for a one-year mandatory negotiation period, consistent with those procedures established in the *Emerging Technologies* proceeding.¹⁵⁵ Under this structure, incumbent BAS licensees in television markets 1-30 are required to negotiate in good faith with the new MSS entrant to facilitate relocation from the band.¹⁵⁶ Upon expiration of the mandatory negotiation period, the new MSS entrant may involuntarily relocate incumbent BAS licensees to the seven narrower channels in the 2025-2110 MHz band that make up the revised BAS channel plan.¹⁵⁷ Once BAS licensees in markets 1-30 and all fixed BAS stations, regardless of market size, have been relocated, MSS licensees may begin their nationwide operations in the 2000-2020 MHz band. On the date the first MSS licensee begins operations, all BAS licensees in markets 31-210 must immediately cease operations on existing channels 1 and 2 (1990-2025 MHz), and BAS operations will no longer be permitted in that spectrum. Also on this date, a one-year mandatory negotiation period will begin between MSS licensees and BAS incumbents in markets 31-210. Although MSS licensees may involuntarily relocate BAS incumbents at any time after the expiration of the one-year mandatory negotiation period, BAS incumbents in markets 31-100 must be relocated to the seven narrower channels in the 2025-2110 MHz band that make up the revised BAS channel plan within three years of the date the first MSS licensee begins operations, and BAS incumbents in markets 101-210 must be relocated within five years of this date.¹⁵⁸

(Continued from previous page)

the band to be used more fully and more quickly by the combination of the remaining MSS licensees and new AWS licensees than was anticipated in the *MSS Second R&O*, when the band was to be exclusively used by MSS licensees whose systems were expected to be deployed and to grow consistent with then distant milestones.

¹⁵⁴ The Commission determined that the initiation of the Phase I relocation and a subsequent quick transition to Phase II would undercut the principal rationale for a two-phase transition—that the potential to leave substantial amounts of spectrum unused for a long period of time would result in inefficient use of valuable 2 GHz spectrum. See *MSS Second R&O*, 15 FCC Rcd at 12327 ¶ 34 (stating that a phased approach will “assur[e] efficient use of the spectrum”). In addition, the Commission reasoned that, if Phase II of the transition was initiated during the time in which Phase I relocations are taking place, BAS operations could be on three different band plans, and some BAS licensees would face the disruption and down time associated with being twice relocated in a short period of time. See *MSS Third R&O*, 18 FCC Rcd at 23655 ¶ 33.

¹⁵⁵ *MSS Second R&O*, 15 FCC Rcd at 12328-31 ¶¶ 38-49. See generally, 47 C.F.R. § 101.73 (good faith negotiation requirement).

¹⁵⁶ For purposes of the relocation plan, BAS markets consist of Nielsen Designated Market Areas (DMAs) as they existed on June 27, 2000. *MSS Second R&O*, 15 FCC Rcd at 12331 ¶ 42.

¹⁵⁷ *MSS Second R&O*, 15 FCC Rcd at 12331 ¶ 48. See generally, 47 C.F.R. § 101.75. Under involuntary relocation, the new MSS entrant may, at its own expense, make necessary modifications to or replace the incumbent licensee’s BAS equipment such that the BAS licensee receives comparable performance from the modifications or replaced equipment. The current mandatory negotiation periods adopted in the *MSS Third R&O* are as follows: MSS licensees and BAS incumbents in markets 1-30 and all BAS fixed stations, regardless of market size, begin a mandatory negotiation period that lasts for one year from December 8, 2003. *MSS Third R&O*, 18 FCC Rcd at 23659-60 ¶ 42. The Commission also provided for a sunset date, December 8, 2013, after which a new licensee’s obligation to relocate an incumbent BAS operator in the 1990-2025 MHz band will end. At that time, BAS operations in the band (if any remain) will operate on a secondary basis. See *MSS Third R&O*, 18 FCC Rcd 23661-62 ¶¶ 45-47.

¹⁵⁸ *MSS Third R&O*, 18 FCC Rcd at 23657 ¶ 38.

58. Petitions for reconsideration or clarification of BAS relocation decisions made in the *MSS Third R&O* were filed by the Association for Maximum Service Television (MSTV), National Association of Broadcasters (NAB), Society of Broadcast Engineers (SBE) and Boeing Company (Boeing). The Radio-Television News Directors Association (RTNDA) filed comments in support of the petition filed by the other broadcast parties. MSTV/NAB and Boeing filed oppositions. ICO Global Communications Limited (ICO), NAB/MSTV/SBE and Boeing filed reply comments. We will address the BAS relocation issues raised in these petitions in this proceeding.¹⁵⁹

3. Band Pairing

59. In the *AWS Third NPRM*, we noted that the 1910-1920 MHz band (or a portion thereof) and the 1990-2000 MHz band (or a portion thereof) were well suited to be part of a paired spectrum allocation, and tentatively concluded that it would serve the public interest to adopt a five + five megahertz or a ten + ten megahertz pairing within these bands.¹⁶⁰ We noted that such a pairing would allow for a number of new uses, including an expansion of systems using the adjacent Broadband PCS bands. Moreover, both Nextel and parties representing MDS licensees in the 2150-2160 MHz band have expressed interest in obtaining this paired spectrum. In both instances, these parties proposed to make use of paired spectrum in the 1910-1920 MHz and 1990-2000 MHz band to offset spectrum they would no longer use, in order to address public safety interference concerns (in the case of Nextel) or would lose because the spectrum had been reallocated as part of the AWS proceeding (in the case of MDS licensees).

60. We noted that such an allocation might allow for quicker design and deployment of new equipment because existing Broadband PCS systems operate on adjacent bands, and that because the 1910-1920 MHz band lacks incumbent UPCS users, new licensees need only address relocation as it pertains to the relocation of incumbent point-to-point microwave systems in the band. We also noted that a five + five megahertz block pairing could accommodate the design specifications of both existing high-power mobile applications (such as Broadband PCS) and systems (such as WCDMA and CDMA-2000) that have commonly been proposed for AWS deployment.¹⁶¹

V. RECORD OVERVIEW OF THE 800 MHZ PUBLIC SAFETY INTERFERENCE PROCEEDING

61. Our decisions in this *Report and Order* stem from a record that extends well beyond the typical comment/reply comment cycle. The record of over 2200 filings depicts an evolving understanding among the parties of how interference occurs in the 800 MHz band and how best to attack it at its source. Parties to the proceeding have contributed engineering, economic, legal and policy analyses, enabling us to craft a solution that is technically sound, effective, and equitable to the parties, consistent with precedent and in all respects realizable. Although we carefully reviewed all submissions in this docket, we list some of the major milestones on the road to that solution below:

- In April 2000, the Commission convened a meeting of representatives from APCO, Nextel, the CTIA, Motorola and the Public Safety Wireless Network (PSWN) to address the growing problem of interference to 800 MHz public safety systems. As an outcome of the meeting, the

¹⁵⁹ See ¶¶ 264-276 *infra*. We note that there is an additional pending petition for clarification and reconsideration of FS relocation decisions made in the *MSS Third R&O* filed jointly by the American Petroleum Institute and UTC, but we will address the FS issues raised in this petition at a later date.

¹⁶⁰ *AWS Third NPRM*, 18 FCC Rcd 2223 ¶ 48.

¹⁶¹ *Id.* at ¶¶ 48-49.

parties published the *Best Practices Guide*, which contained technical modifications and procedures to reduce interference.¹⁶²

- On November 21, 2001, Nextel filed a White Paper proposing reconfiguration of the 800 MHz band to abate the interference being caused to 800 MHz public safety systems.¹⁶³ The White Paper proposed moving all non-cellular SMR and B/ILT licensees to other bands.¹⁶⁴ The 800 MHz spectrum available to public safety would double.¹⁶⁵ Nextel was to pay up to \$500 million of the costs incurred by public safety entities in changing channels to facilitate band reconfiguration.¹⁶⁶ Other 800 MHz licensees were to bear their own cost of relocation to other bands.¹⁶⁷ Nextel also would relinquish its 700 MHz and 900 MHz band spectrum rights.¹⁶⁸ In return, Nextel would receive a nationwide allotment of ten megahertz of spectrum in the 2.1 GHz band.¹⁶⁹
- On December 21, 2001, the National Association of Manufacturers (NAM) and MRFAC, one of the Commission's certified frequency coordinators, made a joint filing wherein they advanced a band reconfiguration plan which they claimed could be implemented without the need to give Nextel the requested 2.1 GHz spectrum.¹⁷⁰
- On March 15, 2002, the Commission issued the *NPRM* seeking comment on the two band reconfiguration proposals (Nextel and NAM/MRFAC) and on a variety of other issues, all related to abatement of interference to 800 MHz public safety systems.
- The Commission received 139 comments in response to the *NPRM* during the comment period of April 5, 2002, to May 6, 2002; and seventeen reply comments during the thirty-day reply comment period which ended on June 4, 2002.¹⁷¹ In those comments, several parties advanced alternative band reconfiguration proposals. Other parties argued that technical measures short of band reconfiguration would remedy the interference problem. Some B/ILT and non-cellular SMR licensees objected to being required to relocate to other bands at their own expense.
- Although most of the reply comments were rebuttals to the comments, the Consensus Parties

¹⁶² See n. 40 *supra*.

¹⁶³ See generally White Paper.

¹⁶⁴ *Id.* at 7-8.

¹⁶⁵ *Id.* at 25.

¹⁶⁶ *Id.* at 8.

¹⁶⁷ *Id.* at 41 n. 54.

¹⁶⁸ *Id.* at 28-30.

¹⁶⁹ *Id.* at 8.

¹⁷⁰ See Letter, dated Dec. 21, 2001, from Jerry Jasinowski, President National Association of Manufacturers and Clyde Morrow, Sr., President, MRFAC, Inc. to Michael Powell, Chairman, Federal Communications Commission (NAM/MRFAC Proposal).

¹⁷¹ Two additional reply comments were filed on June 5, 2002.

filed an extensive new proposal that effectively superseded the White Paper.¹⁷² The new proposal included a band reconfiguration plan that would not displace B/ILT and non-cellular SMR licensees from the 800 MHz band. Nextel continued its commitment to pay up to \$500 million for relocation of 800 MHz public safety systems and proposed to relinquish certain of its 700 MHz, 800 MHz, and 900 MHz spectrum rights. Nextel argued that it should be “made whole” for doing so as part of a “spectrum swap” that would net it ten megahertz of spectrum rights at 1.9 GHz.

- Because the reply comments contained new matters on which other parties had not had the opportunity to comment, a public notice establishing a September 23, 2002 deadline for the submission of comments addressing the new proposal was issued.¹⁷³ We received sixty-five comments, including one late-filed comment, in response to the *September 6th Public Notice*.
- On December 24, 2002, the Consensus Parties filed a supplement to their proposal in which Nextel agreed to pay up to \$850 million of the costs of relocating any system—public safety, ESMR, non-cellular SMR or B/ILT—as necessary to implement the previously submitted band reconfiguration proposal.¹⁷⁴ Non-cellular 800 MHz systems were to be afforded protection against ESMR and cellular telephone interference, provided the desired signal was adequate in the area in which interference was being encountered.¹⁷⁵ The supplement also contained a proposed band plan for use in the Canadian and Mexican border areas.¹⁷⁶
- Because the revisions to the proposal were so extensive, on January 3, 2003, another pleading cycle was initiated, inviting comment on the Supplemental Comments of the Consensus Parties.¹⁷⁷ Sixty-four comments and thirty-nine reply comments were filed in response to the *January 3rd Public Notice*. Comments were received on February 3, 2003; reply comments on February 18, 2003, at which time the record was closed. However, as discussed below, we received an exceptionally large number of filings made pursuant to our rules allowing *ex parte* communications in a permit but disclose rulemaking proceeding such as this.¹⁷⁸

¹⁷² See ITA Reply Comments filed Aug. 7, 2002 (Consensus Party Reply Comments). Although ITA filed the comments, the comments represented the views of the Consensus Parties. *Id.* at iii.

¹⁷³ See Wireless Telecommunications Bureau Seeks Comment on “Consensus Plan” filed in the 800 MHz Public Safety Interference Proceeding, WT Docket 02-55, *Public Notice*, 17 FCC Rcd 16755 (2002) (*September 6th Public Notice*). Following the *September 6th Public Notice*, interested parties inquired whether comments could also be filed on the other band plans or proposals advanced in reply comments. On September 17, 2002, the Bureau released a *Public Notice* clarifying that all such comments were welcomed in the interest of developing a complete record. See Wireless Telecommunications Bureau Clarifies Scope of Comments Sought in 800 MHz Public Safety Proceeding, WT Docket 02-55, *Public Notice*, 17 FCC Rcd 17226 (2002) (*September 17th Public Notice*).

¹⁷⁴ See Supplemental Comments of the Consensus Parties, *ex parte* filing dated Dec. 24, 2002 (Supplemental Comments of the Consensus Parties).

¹⁷⁵ *Id.* at 39-44.

¹⁷⁶ *Id.* at 35-39.

¹⁷⁷ See Wireless Telecommunications Bureau Seeks Comment on “Consensus Plan” filed in the 800 MHz Public Safety Interference Proceeding, WT Docket 02-55, *Public Notice*, 18 FCC Rcd 30 (2003) (*January 3rd Public Notice*) (comments and reply comments were due February 3, 2003, and February 18, 2003, respectively).

¹⁷⁸ 47 C.F.R. § 1.1200 *et. seq.*

- On April 18, 2003, the Chief of the Commission's Office of Engineering and Technology wrote to equipment manufacturers inquiring whether there were any recent developments in receiver technology that would aid in the reduction of interference to 800 MHz public safety systems.¹⁷⁹
- On May 6, 2003, Motorola filed a letter reporting that it had developed an improved receiver with enhanced capability for rejecting intermodulation interference using switchable attenuators;¹⁸⁰ provided the receiver was presented with a sufficiently strong public safety signal.
- On May 29, 2003, a new party—the 800 MHz Users Coalition¹⁸¹—filed an *ex parte* document characterized as a “Balanced Approach” to interference abatement. The Balanced Approach was a set of specific procedures for identifying and eliminating interference to incumbent users and suggesting specific changes to the technical rules for the 806-824 MHz/851-869 MHz band to prevent future harmful interference to public safety and other licensees operating there. The 800 MHz Users Coalition claimed that the Balanced Approach would solve the interference problem completely and, therefore, that band reconfiguration was unnecessary.
- On July 29, 2003, Anne Arundel County, Maryland filed an *ex parte* letter confirming that the County reached a “channel swap” agreement with Nextel.¹⁸² The County observes that the frequency exchange agreement will relocate the County from the “middle portion” of the interleaved spectrum to slightly lower in the 800 MHz band. While the County believes that the exchange will improve the County's spectrum access and coverage, the County states that it will still be “interleaved” and near Nextel and cellular carrier's operations. Accordingly, the County submits, the channel swap, alone, cannot sufficiently eliminate all intermodulation and out-of-band emission (OOBE) interference;¹⁸³ and a permanent interference solution will require de-interleaving the channels used for noise-limited public safety systems from those allocated for high-capacity, multi-cell cellular systems.
- On August 7, 2003, the Consensus Parties filed an *ex parte* document which contained a rebuttal to the 800 MHz Users Coalition May 29, 2003 *Ex Parte* and an analysis purporting to show that the improved Motorola receivers, discussed *supra*, would not themselves provide sufficient relief from unacceptable interference; but that they would be a valuable adjunct to

¹⁷⁹ See, e.g., Letter, dated Apr. 18, 2003, from Edmond J. Thomas, Chief, Office of Engineering and Technology, Federal Communications Commission, to Steve Sharkey, Director, Spectrum and Standards Strategy, Motorola, Inc.

¹⁸⁰ See Letter, dated May 6, 2003, from Steve B. Sharkey, Director, Spectrum and Standards Strategy, Motorola, Inc. to Marlene H. Dortch, Secretary, Federal Communications Commission (Motorola May 6 *Ex Parte*).

¹⁸¹ See Letter, dated May 29, 2003, from Jill Lyon, Vice President and General Counsel, UTC to Marlene H. Dortch, Secretary, Federal Communications Commission (800 MHz Users Coalition May 29, 2003 *Ex Parte*).

¹⁸² See Anne Arundel *ex parte* letter dated July 29, 2003; see also Letter, dated May 21, 2003, from James R. Hobson, Esq., Counsel for Anne Arundel County to Marlene H. Dortch, Secretary, Federal Communications Commission (describing frequency exchange discussions between the County and Nextel) (Anne Arundel *ex parte* letter dated May 21, 2003).

¹⁸³ See ¶¶ 90-91 *infra*.

band reconfiguration.¹⁸⁴

- On October 27, 2003, Verizon Wireless filed an economic study purporting to show that adoption of the Consensus Plan, including the allocation of ten megahertz of 1.9 GHz spectrum to Nextel, would increase the value of Nextel's spectrum rights by \$7.2 billion.¹⁸⁵
- On October 29, 2003, the Commission received comments from Industry Canada on the Consensus Parties' Plan. These comments addressed what Industry Canada perceived as shortcomings in the proposal for reconfiguring the 800 MHz band in the border area.¹⁸⁶
- On November 3, 2003, Motorola filed an *ex parte* description of the embedded base of Motorola products in the 800 MHz band indicating which Motorola radios could be supplied with, or converted to, switchable attenuator circuitry.¹⁸⁷
- On November 6, 2003, the City of Denver filed a "channel swap" agreement it had reached with Nextel. Nextel and Denver entered into this agreement because implementation of the technical fixes identified in the *Best Practices Guide* had been ineffective in completely abating interference to Denver's 800 MHz public safety system.¹⁸⁸
- On November 20, 2003, Nextel filed an *ex parte* economic evaluation of the Consensus Plan, the Motorola Plan, the July 9, 2003 CTIA economic estimates and the CTIA/UTC plan.¹⁸⁹

¹⁸⁴ See Ex Parte Submission of the Consensus Parties, *ex parte* filing dated August 7, 2003 (Consensus Parties August 7 Ex Parte).

¹⁸⁵ See "Determination of the Fair Market Value of the Certain Portions of FCC Licensed Wireless Spectrum Proposed For Realignment by Nextel Communications, Inc. under FCC WT Docket No. 02-55 as of December 31, 2002," by Kane Reece Associates, Inc., attached to Letter, dated Oct. 27, 2003, from John T. Scott, III, Esq., Vice President and Deputy General Counsel, Verizon Wireless to Marlene H. Dortch, Secretary, Federal Communications Commission (Kane Reece Study). See also Letter, dated May 27, 2004, from John T. Scott, III, Vice President and Deputy General Counsel, to Marlene H. Dortch, Secretary, Federal Communications Commission (arguing that contiguous spectrum is more valuable than non-contiguous spectrum).

¹⁸⁶ The Industry Canada comments were dated March 26, 2003. Industry Canada did not include an identifying docket number when it filed the document with the Commission's Secretary. Consequently, the filing was not associated with the docket file until October 29, 2003, when a Wireless Telecommunications Bureau attorney discovered a copy of the comments and directed that they be entered them into the record as an *ex parte* filing. See 47 C.F.R. § 1.1200 *et. seq.*

¹⁸⁷ See Letter, dated November 3, 2003, from Steve B. Sharkey, Director, Spectrum and Standards Strategy, Motorola, Inc. and Dr. Robert Kubik, Manager, Spectrum and Standards Policy, Motorola, Inc. to Edmond Thomas, Chief, Office of Engineering and Technology, Federal Communications Commission and John Muleta, Esq., Chief, Wireless Telecommunications Bureau, Federal Communications Commission (Motorola November 3 Ex Parte).

¹⁸⁸ See Letter, dated November 3, 2003, from Alan S. Tilles, Esq., Counsel to the City and County of Denver to John Muleta, Esq., Chief, Wireless Telecommunications Bureau, Federal Communications Commission. Because this filing contains a Statement of Work the parties refer to it as the Denver SOW.

¹⁸⁹ See Letter, dated November 20, 2003, from Lawrence R. Krevor, Esq., Vice President-Government Affairs, Nextel to Marlene H. Dortch, Secretary, Federal Communications Commission. Attached to one letter is an economic study authored by Dr. Gregory L. Rosston (Nextel Rosston Ex Parte). Attached to the second letter is "The Consensus Plan: Promoting the Public Interest," by Sun Fire Group, LLC, in which the value of the 1.9 GHz (continued....)

- On December 24, 2003, the City and County of San Diego filed a “channel swap” agreement that the City and County reached with Nextel due to their belief that the Consensus Plan, as designed, in and of itself, will not work in San Diego.¹⁹⁰ The City and County agreement incorporates certain aspects of the Consensus Plan (*i.e.* Appendix F, as amended August 2003) and some revisions to the Balanced Approach Plan¹⁹¹ in order to adequately address the City and County’s concerns for reliable communications, mutual aid NSPAC channels, and interoperability.
- On February 10, 2004, Verizon Wireless filed a study by Kane Reece Associates contesting the spectrum evaluation contained in the Nextel Sunfire *ex parte*.¹⁹²
- On February 19, 2004, Verizon Wireless filed a document entitled “Determination of the Fair Market Value of the Spectrum Proposed for Realignment by Nextel Communications, Inc.” which reiterated their claim that adoption of the Consensus Plan, including the allocation of ten megahertz of 1.9 GHz spectrum rights to Nextel, would increase the value of Nextel’s spectrum rights by \$7.2 billion.¹⁹³ In addition, Verizon filed the following documents:
 - Pro Forma Analysis of Cingular/AT&T Wireless Transaction as of February 17, 2004, by Kane Reece;
 - Legg Mason, Spectrum Swap Looks Headed Nextel’s Way, But With Wrinkle, January 22, 2004; and
 - Goldman Sachs, NXL (U/C) & FCC moving towards negotiated agreement on spectrum issues, October 5, 2003.
- On March 18, 2004, Nextel filed an analysis of the Kane Reece Spectrum Valuation challenging that valuation’s conclusion that adoption of the Consensus Plan would result in a windfall to Nextel.¹⁹⁴

(Continued from previous page)

spectrum was inferred from the prices of recent secondary market transactions, asserted to be comparable spectrum licenses (Sun Fire Study).

¹⁹⁰ See *ex parte* comments, dated December 24, 2003, from City and County of San Diego (San Diego *Ex Parte*). The “San Diego Solution” described negotiations between the County, City, Nextel, APCO, UTC and representatives of the 800 MHz Users’ Coalition.

¹⁹¹ See *id.* at Attachment 1 (Balanced Approach – San Diego City and County Revision).

¹⁹² See Kane Reece Analysis of Sunfire Study, dated February 9, 2004, attached to Letter, dated February 10, 2004, from John T. Scott III, Esq., Vice President and Deputy General Counsel – Regulatory Law, Verizon Wireless to Marlene Dortsch, Secretary, Federal Communications Commission (Kane Reece Study II).

¹⁹³ See Determination of the Fair Market Value of the Spectrum Proposed for Realignment by Nextel Communications, Inc., filed February 19, 2004.

¹⁹⁴ See Economic Analysis of the Kane Reece Spectrum Valuation by Dr. Gregory R. Rosston, dated March 18, 2004, attached to Letter, dated February 10, 2004, from Lawrence R. Krevor, Esq., Vice President-Government Affairs, Nextel to Marlene H. Dortch, Secretary, Federal Communications Commission. See also Analysis of the Kane Reece Spectrum Valuation by American Appraisal Associates, dated May 6, 2004 attached to Letter, dated May 6, 2004, from Lawrence R. Krevor, Esq., Vice President-Government Affairs, Nextel to Marlene H. Dortch, Secretary, Federal Communications Commission. *But see* Letter, dated April 8, 2004, from John T. Scott, III, Verizon Vice President and Deputy General Counsel to Marlene H. Dortch, Secretary, Federal (continued....)

- On March 31, 2004, Verizon Wireless filed a petition requesting that the Commission auction spectrum rights in the 1910-1915 MHz and 1990-1995 MHz bands.¹⁹⁵ On April 8, 2004, Verizon Wireless informed the Wireless Telecommunications Bureau that it is prepared to submit an initial opening round bid of \$5 billion in such an auction.¹⁹⁶
- On April 14, 2004, Verizon Wireless filed a letter indicating that Nextel had originally sought replacement spectrum in the 2.1 GHz band, instead of 1.9 GHz.¹⁹⁷
- On April 22, 2004, Nextel filed a letter stating that it could not accept spectrum rights in the 2.1 GHz band in exchange for its commitment to fund the reconfiguration of the 800 MHz band.¹⁹⁸
- On April 29, 2004, CTIA filed a proposal in which Nextel would establish a Public Safety Trust Fund with a minimum deposit of \$3 billion. An independent trustee would administer this fund, which would fund band reconfiguration.¹⁹⁹ In exchange, CTIA proposes the Commission grant Nextel spectrum rights to ten megahertz in the 2.1 GHz band.
- On May 3, 2004, Nextel submitted a plan for relocating BAS licensees out of the 1990-2025 MHz band. Under this plan, Nextel would commit to funding the entire cost of relocating all BAS incumbents nationwide from the 1990-2025 MHz band, subject to Nextel's being assigned replacement spectrum in the 1910-1915/1990-1995 MHz band and receiving full credit for its contributions to the BAS relocation costs, which MSTV, NAB and Nextel estimate at \$512 million.²⁰⁰

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Communications Commission (critique of Rosston Study); Letter, dated May 24 from Kane Reece Associates, Inc., to Donald C. Brittingham, Verizon, Director of Wireless Spectrum Policy attached to Letter, dated May 27, 2004, from John T. Scott, III, Verizon Vice President and Deputy General Counsel to Marlene H. Dortch, Secretary, Federal Communications Commission (critique of American Appraisal Associates analysis of Kane Reece Spectrum Valuation).

¹⁹⁵ Petition of Verizon Wireless for Expedited Action to License 1.9 GHz Spectrum for Personal Communications Services through Competitive Bidding, filed March 31, 2004.

¹⁹⁶ See Letter, dated April 8, 2004, from Margaret P. Feldman, Vice President Business Development, Verizon Wireless to John B. Muleta, Chief, Wireless Telecommunications Bureau, Federal Communications Commission.

¹⁹⁷ See Letter, dated April, 14, 2004, from R. Michael Senkowski, to Marlene H. Dortch, Secretary, Federal Communications Commission.

¹⁹⁸ See Letter, dated April 22, 2004, from Robert S. Foosaner, Senior Vice President and Chief Regulatory Officer, Nextel to Marlene H. Dortch, Secretary, Federal Communications Commission. See also Letter, dated May 11, 2004, from Timothy M. Donahue, Chief Executive Officer and President, Nextel to Michael K. Powell, Chairman, Federal Communications Commission; Letter, dated May 14, 2004, from Robert S. Foosaner, Senior Vice President and Chief Regulatory Officer, Nextel to Marlene H. Dortch, Secretary, Federal Communications Commission.

¹⁹⁹ See Letter, dated April 29, 2004, from Steve Largent, President and Chief Executive Officer, CTIA to Kevin J. Martin, Commissioner, Federal Communications Commission (CTIA April 29 *Ex Parte*).

²⁰⁰ See Joint Proposed BAS Relocation Plan, dated May 3, 2004, from David Donovan, MSTV, Edward O. Fritts, President and CEO, NAB, and Roberts S. Foosaner, Senior Vice President and Chief Regulation Officer, Nextel. (MSTV/NAB/Nextel May 3, 2004 *Ex Parte*). See also Letter dated May 12, 2004, from Jack Goodman, (continued....)

- On May 7, 2004, CTIA filed an analysis of the band clearing costs, propagation characteristics, equipment costs and valuation of the 2.1 GHz band.²⁰¹
- On June 4, 2004, Nextel offered to surrender its rights to an additional two megahertz of 800 MHz spectrum as well as its rights to 700 MHz Guard Band Spectrum in forty markets, thus estimating that Nextel's spectrum and financial contributions would total \$5.1 billion.²⁰²
- On June 16, 2004, Nextel modified its June 4 submission to include a sliding scale of interference protection in the 816-817 MHz/861-862 MHz band segment.²⁰³
- On June 30, 2004, Verizon Wireless submitted a legal analysis claiming that awarding Nextel spectrum rights in the 1.9 GHz band violated the Anti Deficiency Act (ADA)²⁰⁴ and the Miscellaneous Receipts Act (MRA).²⁰⁵
- On July 1, 2004, Verizon Wireless supplemented its June 30, 2004 legal analysis to further contend that the Nextel/BAS relocation plan violates the ADA and MRA.²⁰⁶

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Senior Vice President and Council, NAB to Marlene H. Dortch, Secretary, Federal Communications Commission (expressing support for Nextel/BAS relocation plan).

²⁰¹ See Letter, dated April 29, 2004, from Diane J. Cornell, Vice President, Regulatory Policy, CTIA to Marlene H. Dortch, Secretary, Federal Communications Commission. See also Letter, dated May 13, 2004, from Diane J. Cornell, Vice President, Regulatory Policy, CTIA to Marlene H. Dortch, Secretary, Federal Communications Commission (arguing that CTIA compromise plan is superior than Consensus Plan). See also Letter, dated May 27, 2004, from Helgi Walker, Council to Verizon Wireless to Marlene H. Dortch, Secretary, Federal Communications Commission (concurring with CTIA proposal). See also Letter dated May 19, 2004 from Steve Largent, President and Chief Executive Office, CTIA, to Michael K. Powell, Chairman, Federal Communications Commission (responding to Nextel May 14 letter).

²⁰² See Letter, dated June 4, 2004, from Robert S. Foosaner, Senior Vice President and Chief Regulatory Officer, Nextel to Marlene H. Dortch, Secretary, Federal Communications Commission (Nextel June 4, 2004 *Ex Parte*); Letter, dated June 21, 2004, from Regina Keeney, Counsel to Nextel to Marlene H. Dortch, Secretary, Federal Communications Commission (revising estimate to \$5.4 billion to reflect increased filter costs) (Nextel June 24, 2004 *Ex Parte*). See generally, Letter dated June 14, 2004, from Vincent R. Stiles, APCO President, to Michael Powell, Chairman, Federal Communications Commission (supporting 4.5 MHz proposal). But see Letter, dated June 9, 2004, R. Michael Senkowski, Counsel to Verizon Wireless to Marlene H. Dortch, Secretary, Federal Communications Commission; Letter, dated June 16, 2004, R. Michael Senkowski, to Marlene H. Dortch, Secretary, Federal Communications Commission (criticizing 4.5 MHz proposal) (Nextel June 9, 2004 *Ex Parte*).

²⁰³ See Letter, dated June 16, 2004, from Lawrence R. Krevor, Vice President-Government Affairs, Nextel to Marlene H. Dortch, Secretary, Federal Communications Commission. See also Letter, dated June 9, 2004, from Robert S. Foosaner, Senior Vice President and Chief Regulatory Officer, to Marlene H. Dortch, Secretary, Federal Communications Commission (describing technical details of 4.5 MHz proposal).

²⁰⁴ 31 U.S.C. § 1341.

²⁰⁵ 31 U.S.C. § 3302. See Letter, dated June 28, 2004, from William Barr, Verizon to Michael Powell, Chairman, Federal Communications Commission; Letter dated June 30, 2004, from Walter Dellinger to Michael Powell, Chairman, Federal Communications Commission. See also Letter dated April 8, 2003, from Helgi C. Walker, Counsel to Verizon Wireless to Marlene H. Dortch, Secretary, Federal Communications Commission.

²⁰⁶ See Letter, dated July 1, 2004, from Helgi Walker, Counsel to Verizon Wireless to Michael K. Powell, Chairman, Federal Communications Commission.

- On July 1, 2004, Nextel submitted a legal analysis claiming that awarding Nextel spectrum rights in the 1.9 GHz band would not violate the ADA and MRA.²⁰⁷
- On July 27, 2004, Nextel filed confirmations of its earlier record estimates of the costs it will incur installing filters in order to limit emissions into the lower-adjacent band and its retuning costs in order to complete band reconfiguration. The filing also discussed the eighteen month milestone.²⁰⁸

VI. DISCUSSION

A. The Commission's Spectrum Management and Legal Authority

62. Section I of the Act charges the Commission with "promoting safety of life and property through the use of wire and radio communication."²⁰⁹ In the face of this mandate, we cannot fail to take effective action to address the untenable situation that has developed in the 800 MHz band—the fact that the safety of life and property is placed at risk daily when 800 MHz public safety radios fail due to interference from ESMR and cellular systems, thereby severing the communications link that public safety officers rely upon to summon help, coordinate actions with their fellow officers, request emergency medical services, and respond to incidents that threaten our Homeland Security. If unacceptable interference in the 800 MHz band were to remain unabated, this Commission would fail to achieve one of its prime directives: to manage the spectrum in a manner that promotes safety of life and property.

63. We conclude that in order to abate the interference in the 800 MHz band, the Commission has the authority to modify licenses so as to locate licensees in other portions of the spectrum. Indeed, in the Auction Reform Act of 2002, Congress found that one "option" available to the Commission to resolve the interference problem that exists in the 800 MHz band would involve the use of spectrum outside of the 800 MHz band.²¹⁰ Clearly Congress indicated its approval of our consideration of allocating spectrum in the Upper 700 MHz band, as well as other options, to resolve the interference problems in the 800 MHz band. As we discuss *infra*, over the course of this proceeding, we have considered several bands, including the Upper 700 MHz band, to facilitate the restructuring of the band. While the Upper 700 MHz band has not proven to be a viable option because of the inherent fluidity of the transition to DTV, we have found that the 1.9 GHz band is an option, and, in fact, the most viable and best option, to facilitate the restructuring of the 800 MHz band as contemplated by Congress.

64. We find we have legal authority under the Communications Act to implement the spectrum

²⁰⁷ See Letter, dated July 1, 2004, from Regina M. Keeney, Counsel to Nextel to Marlene H. Dortch, Secretary, Federal Communications Commission, accompanied by Letter, dated July 1, 2004, from Richard Thornburgh to Michael Powell, Chairman, Federal Communications Commission.

²⁰⁸ See Letter, dated July 27, 2004, from Regina M. Keeney, Counsel to Nextel to Marlene H. Dortch, Secretary, Federal Communications Commission.

²⁰⁹ 47 U.S.C § 151. See also 4.9 GHz Band Transferred from Federal Government Use, WT Docket No. 00-32, *Memorandum Opinion and Order and Third Report and Order*, 18 FCC Rcd 9152 (2003) (allocating spectrum for public safety in furtherance of Commission's Section I obligation to promote safety of life and property); E911 Accuracy Standards Imposed on TIER III Carriers for Locating Wireless Subscribers Under Rule Section 20.18(H), WT Docket No. 02-377, *Order*, FCC 03-297, (2003) (denying a petition for forbearance from certain E911 requirements because of the strong connection between such requirements and the Commission's obligation to promote safety of life).

²¹⁰ The Auction Reform Act of 2002. See n. 109 *supra*

management plan set forth in this *Report and Order* including the authority to (i) modify Nextel's licenses to permit operations in the 1.9 GHz band and (ii) include relocation and potential "anti-windfall" payments from Nextel within the rebanding plan. Pursuant to Sections 316, 303, 301, and 4(i) of the Act,²¹¹ we have broad authority to effectuate a spectrum management plan that includes license modifications to serve the public interest. Further, the courts have recognized and deferred to our policy responsibilities in assessing the public interest and exercising this authority.²¹²

65. The Commission has the authority to modify licenses pursuant to Section 316 to solve the interference problems in the 800 MHz band. Specifically, Section 316(a)(1), provides that "[a]ny station license . . . may be modified by the Commission . . . if in the judgment of the Commission such action will promote the public interest, convenience and necessity."²¹³ As the D.C. Circuit recently explained in *California Metro Mobile Communications v. FCC (CMMC)*, "Section 316 grants the Commission broad power to modify licenses; the Commission need only find that the proposed modification serves the public interest, convenience and necessity."²¹⁴ The D.C. Circuit has held that such modifications do not have to be consensual²¹⁵, that license holders may be moved on a service-wide basis, without license-by-license consideration,²¹⁶ and that eliminating harmful interference is an accepted basis for ordering license modifications.²¹⁷

66. Furthermore, the D.C. Circuit has upheld the Commission's authority to allocate the relocation costs associated with license modifications among the affected licensees. In *Teledesic, LLC v. FCC*, 275 F.3d 75, n. 212 *supra*, the court upheld the Commission's rules requiring satellite owners to pay

²¹¹ 47 U.S.C. §§ 316, 303, 301, and 154(i).

²¹² See, e.g., *Teledesic LLC v. Federal Communications Commission*, 275 F.3d 75, 84 (D.C. Cir. 2001) ("[W]hen it is fostering innovative methods of exploiting the spectrum, the Commission 'functions as a policymaker and, inevitably, a seer—roles in which it will be accorded the greatest deference by a reviewing court.'" (citation omitted)).

²¹³ 47 U.S.C. § 316 (a)(1).

²¹⁴ *California Metro Mobile Communications v. FCC*, 365 F.3d 38, 45 (D.C. Cir.2004) (*CMCC*). In *CMCC*, the court upheld the authority of the Commission to modify *CMCC*'s license by deleting a frequency which had the potential to cause interference to an existing licensee. The Commission undertook the action to correct an error of a frequency coordinator, who recommended that the Commission grant *CMCC* a license after the coordinator had incorrectly determined that the requested frequencies would not cause interference to any existing licensee. Among other things, the court found that section 316 is not unambiguous and therefore deferred to the Commission's interpretation that "section 316 contains no limitation on the time frame within which it may act to modify a license and that its action under the section is not subject to the limitations on revocation, modification or reconsideration imposed by [s]ection 405." 365 F.3d at 45 (*citations omitted*). The court also found that the Commission's modification served the public interest, even though the modification was based on potential rather than actual interference, and it caused a minor disruption in *CMCC*'s operations. *Id.* at 46.

²¹⁵ *Peoples Broadcasting Co. v. United States*, 209 F.2d 286, 288 (D.C. Cir. 1953). In *Peoples Broadcasting*, the court upheld the Commission's authority to modify a television station license without an application by the licensee for such a modification, noting that "if modification of licenses were entirely dependent upon the wishes of existing licensees, a large part of the regulatory power of the Commission would be nullified."

²¹⁶ *Community Television, Inc. v. FCC*, 216 F.3d 1133, 1140 (D.C. Cir. 2000). In *Community Television*, the court upheld the FCC's rules establishing procedures and timetable under which television broadcasting would migrate from analog to digital technology.

²¹⁷ See *CMCC*, 365 F.3d 38, n. 214 *supra*.

the relocation costs of terrestrial users that they chose to displace as part of a rebanding of shared spectrum. The court noted that the approach to allocating relocation costs was similar to approaches that the Commission had adopted in both the Emerging Technologies and 2 GHz MSS relocation proceedings.²¹⁸

67. The D.C. Circuit also has upheld license modifications that involve relocating existing licensees to new spectrum, outside of the auction process. Specifically, the court found that the Commission may approve spectrum swaps between existing licensees, without offering the swapped spectrum to alternative users.²¹⁹ The Commission also has moved licensees to unassigned spectrum under its modification authority. In the *MSS Order* the Commission, citing *Rainbow Broadcasting*, exercised its authority under Section 316 to assign open spectrum in the upper and lower L-bands to Motient Services (Motient).²²⁰ The spectrum replaced spectrum that the Commission had assigned to Motient in the upper L-band that the United States had been unable to coordinate internationally for use by a U.S. licensee.²²¹ The Commission found that it was in the public interest to ensure that the existing MSS licensee was afforded sufficient spectrum to provide a viable service to remote and sparsely populated areas expeditiously, before opening up this spectrum to additional applications.²²² Similarly, in the *DEMS Relocation Order*,²²³ the Commission, pursuant to Section 316, modified licenses to relocate the operations of certain Digital Electronic Message Service (DEMS) licensees from the 18 GHz band to the 24 GHz band, in order to accommodate Department of Defense military systems.

68. Here, we have determined that the subject license modifications clearly serve the public interest, convenience and necessity, as required by Section 316, because—as the record in this proceeding establishes—these modifications are essential components of the most effective and equitable band restructuring plan required to resolve serious and heretofore intractable interference problems—problems that have impaired and continue to impair public safety operations in the 800 MHz band.²²⁴ As we stated at the outset of this *Report and Order*, to ensure that the Nation's public safety agencies can effectively carry out their Homeland Security obligations, we must remedy the problem of interference in the 800

²¹⁸ *Teledesic LLC v. Federal Communications Commission*, 275 F.3d at 86.

²¹⁹ See *Rainbow Broadcasting v. FCC*, 949 F.2d 405, 410 (D.C. Cir. 1991) (*Rainbow Broadcasting*), in which the court held the Commission had the authority to allow noncommercial and commercial television licensees to exchange channels without exposing licensees to competing applications, despite third-party interest in acquiring swapped license. We disagree with commenters who assert that subsequent amendments in the Balanced Budget Act of 1997, which generally requires auctions whenever mutually exclusive applications for initial licenses are filed, change the applicability of these cases. See Attachment to Letter, dated April 2, 2004 from R. Michael Senkowski, Esq. to John Rogovin, General Counsel, Federal Communications Commission at 6. For the reasons we discuss at ¶ 73 *infra*, we believe that Section 309(j), as amended by the Balanced Budget Act, is consistent with our conclusion that we have the authority to avoid mutual exclusivity in this context if it is in the public interest to do so.

²²⁰ Establishing Rules and Policies for the Use of Spectrum for Mobile Satellite Services in the Upper and Lower L-Band, *Report and Order*, 17 FCC Rcd 2704 (2002) (*MSS Order*).

²²¹ *MSS Order*, 17 FCC Rcd at 2795 ¶ 1.

²²² *MSS Order*, 17 FCC Rcd at 2713-2714 ¶ 25.

²²³ Amendment of the Commission's Rules to Relocate the Digital Electronic Message Service from the 18 GHz Band to the 24 GHz band and to Allocate the 24 GHz Band for Fixed Service, *Order*, 12 FCC Rcd 3471 (1997).

²²⁴ See ¶ 61 *supra* and ¶¶ 213-216 *infra*.

MHz band and ensure that public safety agencies have access to sufficient spectrum. Relocating public safety users out of the 800 MHz band is not a viable option, for the reasons discussed at ¶ 207, *infra*. Without the removal of all of Nextel's 800 MHz spectrum below 817 MHz and the relocation of other licensees in the band (including public safety licensees), the spectrum-based problems facing public safety agencies in the 800 MHz band cannot be satisfactorily resolved. For practical reasons, we cannot place the financial burden of relocation on the thousands of incumbent non-cellular 800 MHz licensees, including state and local public safety agencies with very limited resources, and expect that the interference problem would be resolved in either a timely or acceptable manner. And, we would be failing to carry out our statutory duties as spectrum manager if we were to allow the current interference crisis to languish. By modifying Nextel's licenses to authorize operations in the 1.9 GHz band, we have created a mechanism to enable the band restructuring to occur without despite the significant, spectral, operational, financial and other obstacles. As the record demonstrates, this is the best option available to us.²²⁵

69. We also find that public safety rebanding does not trigger an auction requirement. We disagree with parties who argue that the *Ashbacker* doctrine and Section 309(j) of the Communications Act preclude us from granting the 1.9 GHz spectrum rights to Nextel pursuant to Section 316. In *Ashbacker*,²²⁶ the Supreme Court held that under Section 309(a) of the Act,²²⁷ in cases in which there are mutually exclusive applications for a license, the Commission must provide a hearing for each applicant. *Ashbacker*, however, did not preclude the Commission from adopting licensing mechanisms through its rulemaking process that foreclose competing applications. Subsequent to *Ashbacker*, Congress enacted Section 309(j) of the Act, which generally requires the Commission to dispose of mutually exclusive applications by auction.²²⁸ Nothing in Section 309(j) requires the Commission to accept mutually exclusive applications in the first place. Moreover, Section 309(j) applies only to initial licenses. As noted above, the D.C. Circuit has found that reassignments to new spectrum are not fundamental changes to the original licenses that themselves trigger the requirements for license revocation and reissuance.²²⁹ Here, our order changing the frequency of licensees' facilities neither triggers a right to file competing applications under *Ashbacker* nor compels an auction pursuant to Section 309(j). As the court found in the *Rainbow* case,²³⁰ the Commission is not required to open all frequencies for competing applications, as long as it provides a reasoned explanation of its decision not to do so. These principles are consistent with other Commission decisions where we modified licenses pursuant to Section 316. For example, in the *MSS Order*, where the Commission exercised its authority under Section 316 to assign to one licensee the rights for up to twenty megahertz of open spectrum, the Commission found that the proceeding "did not

²²⁵ See ¶¶ 217-222 *infra*.

²²⁶ *Ashbacker v. FCC*, 326 U.S. 327 (1945).

²²⁷ 47 U.S.C. § 309(a). This provision authorizes the Commission, upon examination of an application for a station license, to grant it if the Commission determines that the public interest, convenience, and necessity would be served by the grant.

²²⁸ 47 U.S.C. § 309(j)(1) provides "[i]f, consistent with the obligations described in paragraph (6)(e), mutually exclusive applications are accepted for any initial license or construction permit, then . . . the Commission shall grant the license or permit to a qualified applicant through a system of competitive bidding that meets the requirements of this subsection."

²²⁹ See *Community Television, Inc. v. FCC*, 216 F.3d 1133, n. 229 *supra*.

²³⁰ *Rainbow Broadcasting*, 949 F.2d at 409-410.

involve initial applicants and the hearing rights of eligible new applicants under Section 309.”²³¹

70. We also disagree with parties who argue that the 1.9 GHz spectrum to be assigned to Nextel is so much more valuable than the spectrum it is currently authorized to operate that the difference elevates the modification process to a “grant of an initial license, which under Section 309(j) [must] be subject to auction procedures.”²³² To support this position, CTIA cites the Commission’s *Competitive Bidding Second Report and Order* in which it adopted rules for competitive bidding pursuant to Section 309(j):

Where a modification would be so major as to dwarf the licensee’s currently authorized facilities and the application is mutually exclusive with other major modifications or initial applications, the Commission will consider whether these applications are in substance more akin to initial applications and treat them accordingly for purposes of competitive bidding.²³³

71. As a preliminary matter, the modification of Nextel’s licenses does not create a circumstance in which an “application is mutually exclusive with other major modifications or initial applications.” The Commission has accepted no other applications for the 1.9 GHz spectrum.²³⁴ At least one commercial provider has stated its intention to participate in an “immediate auction of the 1.9 GHz spectrum.”²³⁵ Nevertheless, we have not authorized the filing of applications for this spectrum, have never proposed to do so, and, for the reasons set forth herein relating to important public safety concerns, conclude that it is not in the public interest to open the spectrum for competitive applications.

72. The above-quoted language from the *Competitive Bidding Second Report and Order* also indicates that the Commission “will consider” the nature of the modification if it works a major change, and this is exactly what we have done here. The plan we adopt today places Nextel in a comparable position to that which it now occupies and contains a cash payment mechanism that would become effective if necessary to ensure that Nextel does not reap a windfall from savings in reconfiguration costs. As detailed elsewhere in this *Report and Order*, we have found that the license modifications that we are ordering in this proceeding clearly promote the public interest, convenience, and necessity, as required by Section 316, and that an alternative process that does not assign the 1.9 GHz band for use in connection

²³¹ *MSS Order 17 FCC Rcd at 2175 ¶ 27. See also Amendment of the Commission’s Rules to Relocate the Digital Electronic Message Service from the 18 GHz Band to the 24 GHz band and to Allocate the 24 GHz Band for Fixed Service, Memorandum Opinion and Order, 13 FCC Rcd 15147 at 15173 ¶ 59 (1998) (“Because its actions [to relocate DEMS licensees to new spectrum] were license modifications under authority of Section 316, and did not involve the grant of initial licenses, the Commission was not authorized under 309(j) of the Act to use auction procedures.”).*

²³² See, e.g., U.S. Cellular Comments at 5; CTIA December 4, 2003 *Ex Parte* at 8.

²³³ CTIA December 4, 2003 *Ex Parte* at 8-9, citing *Implementation of Section 309(j) of the Communications Act—Competitive Bidding*, PP Docket No. 93-253, *Second Report and Order*, 9 FCC Rcd 2348, 2355 ¶ 37 (1994).

²³⁴ Verizon Wireless submitted a ULS application and a Form 175 application for the 1910-1915 MHz/1990-1995 MHz band but these applications were dismissed on July 7, 2004. See Letter, dated July 7, 2004, from Kathryn Garland, Deputy Chief, Auctions and Spectrum Access Division, Wireless Telecommunications Bureau, Federal Communications Commission to John T. Scott, III, Cellco Partnership d/b/a Verizon Wireless; Letter, July 7, 2004, from Wireless Telecommunications Bureau to John T. Scott, III, Cellco Partnership d/b/a Verizon Wireless.

²³⁵ Verizon Wireless White Paper at 9 (April 1, 2004) citation omitted

with the public safety rebanding would, at best, provide fewer and less effective public interest benefits²³⁶

73. Moreover, Section 309(j) supports our conclusion that we have the authority to avoid mutual exclusivity in this context when it is in the public interest to do so. Although 309(j) generally requires auctions whenever mutually exclusive applications for initial licenses are filed, Section 309(j)(6)(E) provides that “[nothing in this subsection shall] be construed to relieve the Commission of the *obligation in the public interest* to continue to use engineering solutions, negotiation, threshold qualifications, service regulations, and other means in order to avoid mutual exclusivity *in application and licensing proceedings*.”²³⁷ Thus, in Section 309(j)(6)(E), Congress recognized that the Commission can determine that its public interest obligation warrants action that avoids mutual exclusivity, and that this obligation extends to “application and licensing proceedings” (which include license modifications), not just initial licensing matters. Other provisions of the Act confirm our conclusion that the auction requirements of Section 309(j), with their statutory limitations and qualifications that recognize the existence of potentially higher public uses for spectrum, do not preclude our furtherance of the public interest by adopting a band restructuring approach that avoids mutual exclusivity, promotes public safety, and provides Nextel access to substitute spectrum with which it may continue the development of its

²³⁶ Similarly, we disagree with parties who assert that under *Fresno Mobile Radio v. FCC*, 165 F.3d 965 (D.C. Cir. 1999), the grant of the 1.9 GHz spectrum must be considered an “initial license” subject to auction under Section 309(j). See *Verizon White Paper at 10-11 and CTIA Ex Parte* (December 4, 2003) at 8-9. In *Fresno*, a group of incumbent licensees challenged the Commission's decision to auction newly established geographic-area SMR licenses in the upper 200 channels of the SMR band, arguing that, to the extent the new licenses did not cover a new service, new territory or previously unused spectrum, the Commission should have treated the SMR authorizations as modifications of the incumbents' existing licenses and not as auctionable “initial licenses” within the meaning of Section 309(j)(1). The court disagreed, upholding the Commission's determination that it could classify a new license as an “initial” one, even if the initial and preexisting licenses have such overlap, “if it is the first awarded for a particular frequency under a new licensing scheme, that is, one involving a different set of rights and obligations for the licensee.” *Fresno*, 165 F.3d at 970. As explained above, we do not consider the authorizations that Nextel will hold as a result of the restructuring process to differ significantly enough—in terms of rights and responsibilities—from Nextel's existing authorizations so as to warrant treatment as the issuance of an initial license rather than as a modification of license. Moreover, even if we were to classify the 1.9 GHz authorization as a matter of initial licensing, we have not authorized the filing of mutually exclusive applications; none are, in fact, on file; and, as discussed in ¶ 73, *infra*, we have the authority—and obligation—to impose threshold qualifications that preclude the filing of such mutually exclusive applications if we determine that the public interest requires such an approach.

²³⁷ 47 U.S.C. §309(j)(6)(E) (*emphasis added*). The legislative history of the Balanced Budget Act of 1997 also makes clear that Congress did not want the Commission to interpret its expanded auction authority in a way that would reduce its Section 309(j)(6)(E) obligation: “[T]he conferees emphasize that, notwithstanding its expanded auction authority, the Commission must still ensure that its determinations regarding mutual exclusivity are consistent with the Commission's obligations under section 309(j)(6)(E). The conferees are particularly concerned that the Commission might interpret its expanded competitive bidding authority in a manner that minimizes its obligations under section 309(j)(6)(E), thus overlooking engineering solutions, negotiations, or other tools that avoid mutual exclusivity.” H.R. Conf. Rep. No. 105-217, 105th Cong., 1st Sess., at 572 (1997). See also Commission's Rules Regarding Multiple Address Systems, *Report and Order*, 15 FCC Rcd 11956, 11962-63 (2000) (“Section 309(j)(6)(E) has been construed to give the Commission broad authority to create or avoid mutual exclusivity in licensing, based on the Commission's assessment of the public interest,” citing *DirectTV, Inc. v. FCC*, 110 F.3d 816, 828 (D.C. Cir. 1997)). Cf. *Benkelman Telephone Co. v. FCC*, 220 F.3d 601, 605-606 (D.C. Cir. 2000) (Section 309(j)(6)(E) neither requires the Commission to avoid mutual exclusivity, nor to create it; the touchstone is what best serves the public interest).

services.²³⁸

74. We also note that, as an alternative licensing approach toward the same end, we could have exercised our authority to grant rights to the ten megahertz of spectrum to Nextel as an initial license, without subjecting the spectrum to competitive bidding procedures. The auction requirement of Section 309(j)(1) applies only when the Commission has accepted mutually exclusive applications for an initial license. As with a license modification approach, under an initial licensing scenario, eligibility for the 1.9 GHz spectrum would have to be limited to Nextel for the restructuring plan to address satisfactorily the public interest imperatives that we have identified. That eligibility restriction would be justified in the initial licensing context on the same public interest grounds that we have discussed above in connection with our authority to modify licenses under Section 316.²³⁹

75. Our authority to require a cash payment from Nextel in the future if needed to prevent a windfall that otherwise might flow from its new rights to use the 1.9 GHz spectrum derives from Sections 4(i) and 303(r) of the Act.²⁴⁰ Consistent with the public interest and Nextel's own proposal, Nextel has agreed to assume financial responsibility for reconfiguring the 800 MHz band. As explained below, however, we cannot be certain what Nextel's ultimate costs of fulfilling that obligation will be.²⁴¹ If those reconfiguration costs are unexpectedly high, then Nextel nevertheless will be obligated to incur them. The cash payment mechanism we adopt here addresses the converse possibility that reconfiguration costs will be relatively low. In that situation, the terms of the spectrum exchange with Nextel will reflect those savings, maintaining an equitable exchange. In this way, savings in reconfiguration expenses will be realized as a public benefit (*i.e.*, a payment to the U.S. Treasury), rather than providing Nextel an unwarranted windfall from the license modification.

²³⁸ See 47 U.S.C. § 151 (listing as one of Act's central purposes "promoting safety of life and property through the use of wire and radio communication"). See also 47 U.S.C. §§ 303(c) (instructing the Commission to assign frequencies to individual stations as the public convenience, interest or necessity requires), 309(j)(6)(C) (providing 309(j) should not be construed to diminish the authority of the Commission to regulate or reclaim spectrum licenses); 309(j)(7) (prohibiting Commission from basing the decision whether to auction spectrum on a desire for federal revenue); 309(j)(2)(A) (setting out auctions exemption for public safety radio service licenses, thus recognizing that auctions may not always serve the public interest in connection with public safety licensing), and 309(j)(6)(G) (providing that Section 309(j) shall not be construed to prevent the Commission from awarding licenses to persons who make significant contributions to the development of new telecommunications services or technologies).

²³⁹ The Supreme Court upheld the Commission's authority to limit eligibility to apply for a license where the Commission was able to demonstrate that doing so furthered the public interest. See *United States v. Storer Broadcasting Company*, 351 U.S. 192, 202 (1956). See also 47 U.S.C. § 309 (j)(3), which directs that "in specifying eligibility [,] . . . the Commission shall include safeguards to protect the public interest in the use of the spectrum and shall seek to promote the purposes specified in section 1 of this Act."

²⁴⁰ Section 4(i) of the Act provides that "[t]he Commission may perform any and all acts, make such rules and regulations, and issue such orders, not inconsistent with this Act, as may be necessary in the execution of its functions." 47 U.S.C. § 154. Section 303(r) provides that "the Commission . . . as public convenience, interest, or necessity requires shall [m]ake such rules and regulations and prescribe such restrictions and conditions, not inconsistent with law, as may be necessary to carry out the provisions of this Act..." 47 USC § 303 (r). See *United States v. Storer Broadcasting*, 351 U.S. 192, 202 (1956) (finding that these provisions "grant general rulemaking power not inconsistent with the Act or law").

²⁴¹ See ¶ 179 *infra*.

76. The situation here is analogous in key regards to that addressed in the *Mtel* case,²⁴² where the court upheld the Commission's authority under Section 4(i) to impose a payment requirement on a licensee holding a pioneer's preference license that the Commission had originally awarded without a payment requirement. Specifically, the court upheld the Commission's authority to require payment under Section 4(i) to "ensure the achievement of the Commission's statutory responsibility to grant a license only where the grant would serve the public interest, convenience and necessity [pursuant to Section 309(a)]."²⁴³ The court "accord[ed] substantial deference to the Commission's judgment regarding how the public interest is best served" and cited with approval specific public interest concerns that the Commission Order suggested that the payment requirement would satisfy, including elimination of the possibility of unjust enrichment and "predation by a deep-pocketed Mtel."²⁴⁴ Similar to the payment requirement that was upheld in *Mtel*, in this *Report and Order* we impose a payment requirement pursuant to Section 4(i) and Section 303(r) to ensure that we fulfill our statutory responsibility to modify a license only where the grant would promote the public interest, convenience and necessity. Here, the public interest rationale is at least as compelling as in *Mtel*. In this case, requiring a payment allows us to address the interference problems in the 800 MHz band and provide public safety agencies with additional spectrum rights in a way that places Nextel in a comparable position to that which it now occupies. While addressing public safety concerns is a priority of the highest order, it is in the public interest to do so in a way that does not result in a windfall for Nextel. The anti-windfall payment addresses uncertainty about the exact amount of relocation costs for the 800 MHz band and the 1.9 GHz band. The plan obliges Nextel to pay the costs in the 800 MHz band and its share of the costs in the 1.9 GHz band, no matter how low or high they are. For example, if the costs are at the low end of Nextel's estimates,²⁴⁵ we find that it is in the public interest that the savings benefit the public, rather than Nextel. And similar to the *Mtel* case, the windfall payment also addresses concerns that assigning Nextel spectrum rights in another band as part of this comprehensive solution is unfair because Nextel is receiving free spectrum while its competitors must bid for spectrum at auction.²⁴⁶ For the reasons discussed elsewhere in this *Report and Order*, reducing the amount of 1.9 GHz spectrum granted to Nextel is not a reasonable way of protecting against such a windfall.²⁴⁷ By contrast, the alternative approach of requiring a payment from Nextel to maintain an exchange commensurate with the value of the spectrum it is receiving furthers the public interest objectives of the Communications Act and is consistent with the policy Congress articulated in Section 309(j) of "recover[ing] for the public of a portion of the value of the public spectrum resource made available for commercial use and avoidance of unjust enrichment through the methods employed to award uses of that resource."²⁴⁸

77. Some parties in this proceeding have addressed the intersection of the Commission's authority

²⁴² *Mtel v. FCC*, 77 F.3d 1399 (D.C. Cir. 1996).

²⁴³ *Id.* at 1406.

²⁴⁴ *Id.*

²⁴⁵ See ¶ 299 *infra*.

²⁴⁶ See ¶ 214 *infra*.

²⁴⁷ See ¶¶ 236-238 *infra*.

²⁴⁸ 47 USC § 309 (j)(3)(C). Since an auction of 1.9 GHz licenses is incompatible with the approach adopted herein for solving the 800 MHz band interference problems that compromise the public safety, we have fashioned an alternative that is consistent with our competitive bidding authority and otherwise within our statutory authority.

under the Communications Act and the Commission's responsibilities under other federal statutes. In particular, we received several *ex parte* presentations²⁴⁹ addressing the question of whether the spectrum management plan and license modifications that we approve above violate appropriations statutes including the Anti-Deficiency Act (ADA),²⁵⁰ the Miscellaneous Receipts Act (MRA)²⁵¹ and 18 U.S.C. § 641.²⁵² The Comptroller General has agreed at the request of a U.S. Senator to review the appropriations issues that parties have raised.²⁵³

78. In light of the substantial importance of these issues, we have carefully reviewed the arguments raised in the various presentations and conducted our own, independent analysis of the various legal constraints under which the Commission operates. After this deliberate consideration, we have determined that our statutory obligation to ensure the public safety through our administration of spectrum justifies this order even in the face of the opposition of certain participants in this proceeding. Having reviewed these parties' arguments, we conclude, as discussed below, that appropriations law does not bar the course we pursue in this order. Indeed, we conclude that we would be remiss in our obligations to the public safety community—and indeed to the public at large—if we did not adopt the plan in the form discussed below.²⁵⁴

79. The ADA prohibits any “officer or employee of the United States Government or of the District of Columbia government” from “involv[ing] either government in a contract or obligation for the payment of money before an appropriation is made unless authorized by law.”²⁵⁵ The object of this provision is to prevent executive officers from involving the government in expenditures or liabilities beyond those contemplated and authorized by the lawmaking power.²⁵⁶ The first government-wide ADA was passed in 1870.²⁵⁷ The MRA provides that a government official “receiving money for the Government from any source shall deposit the money in the Treasury as soon as practicable without deduction for any charge or claim.”²⁵⁸ Congress passed the statute in 1849 to address its concern that some executive branch officers, such as customs officers, were failing to deposit all the money they collected in the course of their duties into the treasury, making deductions for their expenses and salaries

²⁴⁹ See Letter, dated June 28, 2004, from William Barr, Verizon to Michael Powell, Chairman, Federal Communications Commission (Verizon Wireless June 28 *Ex Parte*); Letter dated June 29, 2004, from Walter Dellinger to Michael Powell, Chairman, Federal Communications Commission; Letter, dated July 1, 2004, from Richard Thornburgh to Michael Powell, Chairman, Federal Communications Commission.

²⁵⁰ The Anti-Deficiency Act, 31 U.S.C. § 1341(a)(1)(B).

²⁵¹ The Miscellaneous Receipts Act, 31 U.S.C. § 3302(b).

²⁵² Section 641 of Title 18 concerns the embezzlement and theft of public money, property or records and imposes criminal liability on “whoever . . . without authority, sells, conveys, or disposes of anything of value of the United States or of any department or agency thereof.” Our actions today are authorized and clearly do not implicate this provision.

²⁵³ See Verizon Wireless June 28 *Ex Parte* at 6.

²⁵⁴ See ¶¶ 151-158, *infra*.

²⁵⁵ 31 U.S.C. § 1341(a)(1)(B).

²⁵⁶ 21 Atty.Gen. Op. 248 (1895).

²⁵⁷ Act of July 12, 1870, ch. 251, § 7, 16 Stat. 251.

²⁵⁸ 31 U.S.C. § 3302(b).

as they saw fit.²⁵⁹ Neither of these statutes has ever been found applicable to the exercise of the Commission's spectrum management responsibilities.

80. Opponents who have raised challenges under appropriations law have essentially claimed that we are selling spectrum to Nextel in a private sale and using the proceeds to address the public safety interference problems in the 800 MHz band. In fact, what the Commission is doing is proceeding, under its broad section 316 license modification authority, to restructure the 800 MHz band in order to serve significant public interest concerns. In doing so, we set forth a spectrum management plan that provides additional spectrum for public safety and leaves Nextel and the other licensees in a comparable position to where they were before the band restructuring. Courts have repeatedly upheld our authority to implement a new spectrum management plan by modifying licenses when it is in the public interest to do so and to allocate the relocation costs associated with license modifications among the affected licenses.²⁶⁰ And, as noted at ¶ 69 *supra*, neither the *Ashbacker* doctrine nor Section 309(j) poses a barrier to the implementation of our public safety rebanding plan.

81. The appropriations laws do not limit the Commission's power to accomplish rebanding for public safety or to recognize and facilitate Nextel's role in that rebanding. Critically, radio spectrum is not appropriated by Congress and it cannot be obligated, expended, or deposited in the Treasury under those laws. Radio spectrum is a public resource of the United States that Congress has authorized and directed the Commission to manage in the public interest. Indeed, the Commission's most basic spectrum-management power is to assign spectrum to achieve public interest benefits *other than* monetary recovery. Until the enactment of Section 309(j) in Omnibus Budget Reconciliation Act of 1993,²⁶¹ the Commission never obtained cash payments for spectrum. Through spectrum allocation and license assignments, it accomplished public interest objectives such as encouraging the provision of particular types of service, fostering new technologies, or promoting services for underserved customers.²⁶² Even after the Commission was given auction authority, section 309(j)(7) prohibits the Commission from basing the decision whether to auction spectrum on a desire for federal revenue.²⁶³ Even when the Commission does use the auction mechanism, moreover, monetary recovery is just one of several factors the Commission must consider in establishing bidding qualifications and license conditions.²⁶⁴

²⁵⁹ See *Scheduled Airlines Traffic Offices, Inc. v. Department of Defense*, 87 F.3d 1356, 1360 (1996).

²⁶⁰ See ¶¶ 64-67 *supra*.

²⁶¹ Pub. L. No. 103-66, § 6002, 107 Stat. 312, 387-397.

²⁶² See, e.g., *Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies, First Report and Order and Third Notice of Proposed Rulemaking*, 7 FCC Rcd. 6886 (1993) (reallocating 220 MHz spectrum for emerging technologies); *Amendment of Part 90 of the Commission's Rules to Create the Emergency Medical Radio Service, Report and Order*, 71 Rad. Reg. 2d 1305 (1993) (assigning frequencies to improve the communications capabilities of entities providing life support activities); *Basic Exchange Telecommunications Radio Service Report and Order*, 3 FCC Rcd 214 (1988) (establishing a rural radio service designed to make basic telephone service more accessible to household and businesses); and *Educational Television, Report and Order*, 39 FCC 846 (1963) (establishing Instructional Television Fixed Service (ITFS) for the transmission of instructional material to schools). See also 303(g) ("[T]he Commission ... as public convenience, interest, or necessity requires shall ... [s]tudy new uses for radio, provide for experimental uses of frequencies, and generally encourage the larger and more effective uses of radio in the public interest.")

²⁶³ See 47 U.S.C. 309(j)(7).

²⁶⁴ See 47 U.S.C. 309(j)(3).

82. Allocating spectrum to establish a long-term solution to the public safety interference problem and support the associated rebanding is a valid use of spectrum in the public interest. As already noted, the Commission is *required* under Sections 1 and 303 of the Act to use its spectrum assignment powers to promote public safety. And as discussed at ¶ 63 *supra*, the Auction Reform Act of 2002 specifically identified the interference problem in the 800 MHz band as one that the Commission might resolve by allocating spectrum from outside the 800 MHz band.

83. We also conclude that the anti-windfall payment from Nextel directly to the United States Treasury does not raise appropriations laws issues. As discussed in ¶ 76 *supra*, the D.C. Circuit upheld in the *Mtel* case the Commission's authority to require payment under Section 4(i) to "ensure the achievement of the Commission's statutory authority to grant a license only where the grant would serve the public interest, convenience and necessity" (*citations omitted*). Here, the anti-windfall payment is a valid regulatory requirement that serves the public interest because it addresses uncertainty about the exact amount of relocation costs for the 800 MHz and 1.9 GHz bands and obligates Nextel to pay the relocation costs in the 800 MHz band and its share of the costs in the 1.9 GHz band. If the relocation costs are at the low end of the projected range, the anti-windfall payment would ensure that the savings would benefit the public, rather than Nextel.

84. Thus, we conclude that the situation here differs from the facts in a 1963 Comptroller General decision on which Verizon heavily relies in opposing the plan we adopt today. In the 1963 decision, which was overruled in 1972, the Comptroller General reviewed an arrangement in which a non-profit organization raised funds to finance a teacher training program and zoo guidebook by installing a coin-operated audio tour system on government property; the Comptroller General concluded that the arrangement violated both the ADA and the MRA.²⁶⁵ Specifically, the Comptroller General found that Congressional authorization was needed for such an arrangement because the applicable public contracts statute provided that the use of government property by outside parties "shall be for money only."²⁶⁶ Thus, the Comptroller General concluded that the grant of the concession to the non-profit organization would be permissible "only for a solely monetary consideration; if, on the other hand, a monetary consideration were provided, the money would be required to be deposited in the Treasury and would not be available for the proposed uses [for teacher training and a zoo guidebook] unless appropriated therefore by the Congress."²⁶⁷ Here, the Commission's action does not involve a concession or privilege subject to the government contracts statute in the zoo case, nor does it involve a "contract or other obligation for the payment of money" pursuant to the ADA.²⁶⁸ Furthermore, even if the ADA were otherwise implicated, Sections 1, 4(i), 301, 303, 309(j), and 316 of the Communications Act provide the Commission with the authority necessary to adopt the public safety rebanding plan. Accordingly, today's spectrum management plan is "authorized by law" under the ADA.²⁶⁹

²⁶⁵ *To the Sec'y, Smithsonian Inst.*, 42 Comp. Gen. 650 (1963), *overruled*, 51 Comp. Gen. 506 (1972).

²⁶⁶ *Id.* at 652-653 (*citations omitted*).

²⁶⁷ *Id.* at 653.

²⁶⁸ *See* 31 U.S.C. 1341.

²⁶⁹ *See PLC Construction Services, Inc. v. United States* 96 Fed. Appx. 672 (April 7, 2004) (U.S. Bureau of Reclamation did not violate ADA even though contract obligated Bureau to pay more than \$33 million for construction project before Congress appropriated the funds because Bureau was separately authorized to enter into contracts under other provisions providing for the reclamation and irrigation of lands by the federal government); *cf. Association of Civilian Technicians v. Federal Labor Relations Authority*, 269 F.3d 1112 (D.C. Cir. 2001) (court vacated finding by Federal Labor Relations Authority that collective bargaining agreement that would reimburse (continued....))

85. With respect to the MRA, the Communications Act does not require the Commission to auction the 1.9 GHz spectrum. Rather, as discussed *supra* at note 237, section 309(j)(6)(E) gives the Commission broad authority to create or avoid mutual exclusivity in licensing, based on the Commission's assessment of the public interest. The MRA does not nullify the discretion that Congress gave to the Commission and preserved in Section 309(j).²⁷⁰ Here, the principle that funds received for the government should be deposited in the Treasury is fully satisfied, because any cash payment that may be required to protect against a windfall in favor of Nextel will be made to the Treasury, and there are no other government receipts.

86. The Commission has determined that the public interest requires the dedication of new spectrum to addressing the 800 MHz interference problem, and the 1.9 GHz spectrum is uniquely suited to that purpose. Those are public interest judgments for the Commission to make, and they are not changed by the possibility of a greater dollar recovery for the government from auctioning the 1.9 GHz spectrum. Given the vital public safety interest served by this *Report and Order*, moreover, we believe that it is essential to act promptly in this matter. Nonetheless, we recognize that parties have raised novel issues regarding appropriations law and that the Comptroller General is reviewing those issues. Should the Comptroller General unambiguously conclude that our order violates the appropriations statutes, we will address—either on our own motion or on that of moving parties—whether it is appropriate to stay the effect of some aspects of today's order pending a final decision by the court of appeals on any application for review.

87. Furthermore, we will ensure that the public is protected against potential claims by Nextel relating to any 800 MHz reconfiguration costs that it chooses to incur. Specifically, as a condition precedent to commencing operations with the 1.9 GHz band pursuant to any of its licenses modified pursuant to this *Report and Order*, Nextel shall file with the Commission an acknowledgement acceptable to the Commission. The acknowledgement shall state that, by accepting the license modification under the terms of the Order, Nextel acknowledges that it has studied the law and the facts and has made its own estimate of the risks that implementation of the Order may be delayed by judicial review and the Order may, in fact, be declared invalid. Nextel shall further acknowledge that the Commission has not participated in its assessment and is not privy to it, and does not in any way warrant any of the premises upon which Nextel's assessment may be based. Nextel shall acknowledge that it has accepted the risk of delay and invalidity and that, therefore, it cannot recover its costs or any damages associated with implementation or non-implementation of the Order from the Commission or any governmental entity.

B. Interference Abatement

88. Two basic approaches to interference abatement have emerged from the extensive record in this proceeding:

- Application of a variety of technical techniques including those in the *Best Practices Guide*

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employees for out-of-pocket losses resulting from agency cancellation of previously approved leave would violate the Anti-Deficiency Act and remanded the decision for the Authority to consider whether the disputed provisions are "authorized by the collective bargaining law").

²⁷⁰ Cf. *Brazos v. U.S.*, 49 Fed. Cl. 398, 411 (Fed. Cl. 2001) (pre-existing contracts – not the MRA – govern whether the Rural Utilities Service (RUS) should assess a \$16.5 million penalty against an electric utility for prepayment of a promissory note; the MRA merely required the RUS to deposit prepayment funds with Treasury once they were received).

as well those contained in Motorola's *Technical Toolbox*²⁷¹ and the 800 MHz User's Coalition Balanced Approach filing.²⁷²

- Reconfiguration of the 800 MHz band to segregate non-cellular systems from systems using cellular architecture, *i.e.* ESMR and cellular systems.

We do not find these two approaches mutually exclusive; indeed, our ultimate conclusion is that achieving satisfactory interference abatement will require both band reconfiguration and application of Enhanced Best Practices. Moreover, we believe Enhanced Best Practices will play a vital role in protecting the integrity of public safety communications during the transition period to a new 800 MHz band plan and after reconfiguration is complete. Our decisions today on how to best abate unacceptable interference rest on the record as well as on analyses of the nature of interference being encountered and the conditions under which a non-cellular 800 MHz licensee should be able to claim entitlement to interference protection.

1. Types of Interference

89. The predominant types of interference encountered by public safety and other 800 MHz non-cellular systems are intermodulation interference and OOB interference.²⁷³ Some parties claim that most of the interference is of the intermodulation type; others contend that the division between intermodulation interference and OOB interference is approximately equal.²⁷⁴ This disparity in opinion may be due to the difficulty of identifying the exact interference mode under field conditions with limited measurement apparatus and the fact that interfering channels may or may not be simultaneously active at a

²⁷¹ Motorola described its *Technical Toolbox* in a series of *ex parte* letters to the Commission. *See, e.g.*, Motorola May 6 *Ex Parte*, Letter, dated May 30, 2003, from Mary E. Brooner, Motorola, to Marlene H. Dortch, Federal Communications Commission, WT Docket No. 02-55 (attaching May 29, 2003 presentation to the Office of Engineering and Technology) (Motorola May 30 *Ex Parte*); Letter, dated June 20, 2003, from Steve B. Sharkey, Director, Spectrum and Standards Strategy, Motorola, Inc. to James D. Schlichting, Esq., Federal Communications Commission, WT Docket No. 02-55 (Motorola June 20 *Ex Parte*).

²⁷² Collectively, Enhanced Best Practices. *See* ¶ 16 *supra*.

²⁷³ Various parties have divided OOB into more specific categories such as adjacent channel interference, sideband noise, and phase noise. *See, e.g.*, Cingular Comments at 7; Ameren Reply Comments at 4. Except where the context requires otherwise, we will subsume all of these categories under OOB. Some interference encountered by public safety mobiles or portables is caused by what commenting parties have variously characterized as receiver "overload," "desensing," or gain compression. Motorola defines both overload and desensing as, "[a]n informal term often used to describe a scenario where a receiver is functioning other than expected, presumably due to excessive signal power at the receiver RF input port." Motorola July 18 *Ex Parte* at 3. Gain compression occurs when a nearby undesired signal or signals are so exceptionally strong that they exceed the amplification capability of the first active devices in the radio receiver, such that the gain of these active devices begins to decrease with increasing levels of undesired signal(s). It is often defined by the 1 dB compression point—the point at which undesired strong signals reduce the gain of an active device by 1 dB. In some instances of these modes of interference, other circuits in the radio are implicated, such as automatic gain control (AGC) circuits.

²⁷⁴ *See, e.g.*, New York State Comments at 7, 9 (adjacent channel interference is primary cause); Fort Lauderdale Comments at 5 (signal overload is the primary problem); Motorola Comments at 18 (5th order intermodulation interference is the most common type of interference).

given time.²⁷⁵

90. *OOBE Interference.* No radio transmitter can confine its emissions to an assigned channel; some signals invariably “spill over” into adjacent spectrum, i.e., all transmitters create some degree of OOBE. The Commission’s rules specify the maximum permissible OOBE of single ESMR and cellular transmitters. However, there is no Commission rule governing the maximum OOBE that a multiple-channel cell can radiate. Moreover, cell OOBE increases cumulatively as a function of the number of channels active in a given cell or in nearby cells, e.g., a public safety receiver could receive cumulative OOBE from an ESMR cell and a nearby cellular cell. Filters on ESMR and cellular transmitters are effective in reducing OOBE. However, as with all such filters, they are less effective on frequencies close to the transmitter frequency; e.g., a filter may not be as effective in significantly reducing OOBE interference to a public safety receiver attempting to receive a signal on a channel immediately adjacent to the channel being used by a nearby ESMR or cellular cell.

91. *Intermodulation Interference.* This kind of interference occurs in 800 MHz receivers when signals in use at a given cell—or a nearby cell—have a given, readily calculable, mathematical relationship²⁷⁶ and are strong in an area in which a public safety mobile or portable unit is attempting to communicate.²⁷⁷ When strong signals with the appropriate mathematical relationship are presented to the public safety receiver, they cause the active elements in the first stages of the receiver to operate in a non-linear manner.²⁷⁸ The incoming undesired signals mix in the receiver and produce a third frequency—an intermodulation product—which can either correspond or fall near the frequency on which the user of the radio is attempting to communicate.²⁷⁹ If the resultant new signal generated in the first stages of the receiver is sufficiently strong, it can effectively block the incoming signal, rendering the radio unusable at that location.²⁸⁰ The concept of mixing occurring in non-linear devices is sometimes analogized to color

²⁷⁵ Recently, Motorola recommended a measurement technique that allows a more refined analysis of the source of interference. However, even with use of this technique, Motorola’s own field tests showed that it was not always possible to characterize interference. See Motorola June 20 *Ex Parte* at 8.

²⁷⁶ Intermodulation products are categorized according to “order” and can result from the interaction of two or more frequencies. Thus, in the case of two-frequency (F1 and F2), third-order, intermodulation, the intermodulation products (P) within the 800 MHz band are calculated by: $P_{\text{intermod.}} = 2 * F1 - F2$ and $P_{\text{intermod.}} = 2 * F2 - F1$. The fifth order, two frequency intermodulation products within the 800 MHz band are calculated by: $P_{\text{intermod.}} = 3 * F1 - 2 * F2$ and $P_{\text{intermod.}} = 3 * F2 - 2 * F1$. Intermodulation products can also be generated by interaction of three or more transmitters, for example, some third-order, three frequency (F1, F2 and F3) intermodulation products falling in the 800 MHz band can be calculated by $P_{\text{intermod.}} = F1 + F2 - F3$ and $P_{\text{intermod.}} = F2 - F1 + F3$. In general, within the 800 MHz band, fifth order and higher intermodulation products are less significant than third-order products. The greater the number of frequencies involved, the greater the number of intermodulation products generated.

²⁷⁷ See Nextel Comments at 19.

²⁷⁸ *Id.* The first stage of a receiver is usually an amplifier. See also *Best Practices Guide* at 9.

²⁷⁹ See Nextel Comments at 19.

²⁸⁰ See Island SMR Comments, Exhibit A at 10. However, receiver components are not the only source of intermodulation products. A junction of dissimilar metals, when presented with strong signals, can generate intermodulation products. For example, some parties have identified corroded bolts on base station towers as a source of intermodulation products. If a base station combiner allows signals from the final amplifier of one transmitter to enter the final amplifier of another transmitter, the two signals can mix, due to non-linearities in the final amplifiers, and the resultant intermodulation product is radiated from the cell antenna. See *ex parte* communication, dated May 27, 2003, from RACOM, Inc. and I.E. Communications to Michael J. Wilhelm, Esq., (continued....)

mixture. Thus, if a receiver were presented with a strong "blue" ESMR signal and a strong "yellow" cellular signal, the two colors could mix in the first stage of the receiver and form an interfering "green" signal that fell on a public safety frequency. The "mixing" concept is important to the understanding of intermodulation interference because it explains how two or more signals, widely separated (in frequency) from a public safety channel can still generate interference. It is significant here, because locating public safety channels in the lower portion of the band—as far as possible from the ESMR and cellular channels—would provide significant relief from interference on the public safety channels. However, it still leaves open the possibility that ESMR and cellular channels, separated from public safety channels by as much as ten megahertz, could mix in the first stage of the public safety radio and form an intermodulation product—that could fall within the channel the public safety radio is tuned to. Under this scenario, if the two ESMR and cellular signals are strong enough, and the radio does not have good intermodulation rejection capability, interference could still result.

2. Entitlement to Interference Protection

92. In order to implement technical and procedural rules for interference abatement, we must first determine the criteria by which licensees will be entitled to interference protection. At the core of this determination is how to define exactly what constitutes "unacceptable interference" to public safety and other non-cellular 800 MHz systems. With an objective standard for unacceptable interference established, all 800 MHz licensees would have certainty regarding their respective rights and obligations. As a result, licensees will be able to readily identify in what circumstances they can reasonably expect to operate free from unacceptable interference. We emphasize, however, that our determination on what constitutes "unacceptable interference" applies solely to this proceeding.

a. Introduction

93. Historically, the Commission has imposed limits on the area in which land mobile communications systems with given characteristics—effective radiated power (ERP), frequency, antenna height, geographical separation, *etc.*—can expect substantially interference-free operation from other systems. For instance, in some bands, our Rules define these areas geographically, *e.g.*, a public safety system in certain bands can expect interference protection because our Rules prohibit co-channel stations within seventy-miles of the protected station.²⁸¹ In other bands, public safety has a "protected contour" that defines the area in which interference protection from other co-channel or adjacent channel systems can be expected, *e.g.* a 37 dB μ V/m contour (VHF) or a 39 dB μ V/m contour (UHF).²⁸² Under either protection scheme—distance separation or protected contours—the signal level at which the public safety system no longer can expect interference protection is well above the typical receiver noise floor.²⁸³

94. Consequently, when frequencies are assigned based on distance separations or protected contours, the area in which a licensee may operate is limited by the potential of interference from nearby systems, *e.g.* the potential for interference defines the area within which a public safety signal is intelligible, not merely by the strength of the public safety signal above the receiver noise floor. Given

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Federal Communications Commission. It also has been suggested that ferrite used in base station isolators has nonlinear properties that support generation of intermodulation products. *See, e.g.,* Motorola June 20 *Ex Parte* at 1.

²⁸¹ *See* 47 C.F.R. § 90.621(b).

²⁸² *See* 47 C.F.R. § 90.187(b)(2)(iii).

²⁸³ The "noise floor" is the cumulative value of noise generated internally in the receiver and environmental noise, such as that created by automobile ignition systems, high voltage electrical transmission lines and a host of other "incidental radiators." *See* 47 C.F.R. § 15.3.

this fact, we believe that it would be inappropriate, as a matter of responsible spectrum management, to afford public safety systems the noise-limited coverage that some proponents have recommended.²⁸⁴ For example, were we to do so for a given public safety system in the 800 MHz band, it would not only restrict the availability of public safety spectrum in adjoining areas but also would make it virtually impossible for CMRS systems to use channels that contributed the slightest amount of noise to a public safety receiver in the far fringes of its noise-limited coverage area. Such an outcome would result in inefficient utilization of CMRS spectrum. Moreover, the substantial set of measures we are adopting here will provide public safety systems with strong protections against interference, rendering this particular measure unnecessary.

95. We also conclude we should adopt an interference protection standard in the 800 MHz band based on measured, rather than predicted signal strength. While one approach would be to define the coverage area of public safety system by a predicted signal contour, signal level prediction is an inexact science and 800 MHz radio signal propagation can be affected by multiple factors such as buildings and other obstructions, reflection of signals from nearby man-made surfaces, terrain, and foliage. Moreover, system designers frequently predict signal strengths in terms of statistical probability, *e.g.*, the charts and algorithms used for coverage determinations predict the distance from a transmitter at which a given level of signal will be equaled or exceeded at fifty percent of the locations fifty percent of the time.²⁸⁵ Thus, while signal strength predictions are useful for obtaining an overall picture of system coverage, we believe they are of limited utility in predicting the strength of an 800 MHz public safety signal in a localized and relatively small area, which is exactly the type of area in which interference may be encountered from an ESMR or cellular system. Consequently, we conclude that we need to use a basis other than distance separations or predicted signal contours in establishing the threshold determination of entitlement to interference protection.

b. Interference Protection Standard

96. In their August 7, 2003 *ex parte* filing, the Consensus Parties proposed a bright-line test for determining non-cellular 800 MHz licensees' entitlement to interference protection.²⁸⁶ The recommended test procedure relies on measured—rather than predicted—*minimum median signal strength* levels, which, if met or exceeded, would entitle a licensee to interference protection.²⁸⁷ Moreover, the proposal contemplated providing full interference protection only to non-cellular 800 MHz systems that use receivers meeting minimum performance standards.²⁸⁸

97. The proposal defines interference in terms of a parameter known as the carrier²⁸⁹ to interference plus noise ratio $[C/(I+N)]$ of a receiver. The proposal recommended 20 dB as the minimum

²⁸⁴ Some commenting parties suggested the Commission adopt a “zero tolerance” policy whereby any radio system interfering with a public safety signal in the 800 MHz band would immediately have to cease operation until interference-free operation of the public safety system was assured. *See City of New York Comments at 5; IACP Comments at 4; City of New York Comments to Supplemental Comments of the Consensus Parties at 8.*

²⁸⁵ *See, e.g.*, 47 C.F.R. § 73.699, Figures 9, 10 and 10b.

²⁸⁶ Consensus Parties Aug. 7 *Ex Parte* at 45-50 and Appendix F at 2, § 1.2.

²⁸⁷ *Id.* Appendix F at 3, § 2.1.1.

²⁸⁸ *Id.* Appendix F at 8, § 4.1.1a.

²⁸⁹ “Carrier” in the sense used here, equates with “desired signal;” *i.e.* the signal from the public safety, CII or other non-cellular base station.

acceptable C/(I+N) ratio for voice systems;²⁹⁰ and suggested that the equipment manufacturer supply the "information value" for non-voice public safety communications systems.²⁹¹

98. The Consensus Parties' proposal requires that a public safety or other non-cellular radio in the band segment be presented with a signal from the desired station that is greater than or equal to a specified minimum before the licensee of the desired station may claim entitlement to interference abatement.²⁹² As proposed in their filing, the threshold desired signal power in the case of portable units in the 806-816 MHz/851-861 MHz band segment is -101 dBm, or greater, as measured at the radio frequency (R.F.) input to the portable radio's receiver.²⁹³ The corresponding value for mobile units is -104 dBm or greater.²⁹⁴ A specific measurement technique was proposed for determination of the threshold signal powers.²⁹⁵

99. The Consensus Parties proposed that full interference protection would be provided only for systems using receivers that satisfy TIA Class A specifications.²⁹⁶ Receivers not conforming to these specifications would be protected only to some higher desired signal threshold power level.²⁹⁷ Several

²⁹⁰ Consensus Parties Aug. 7 *Ex Parte* Appendix F at 2, § 1.2.1.

²⁹¹ *Id.* Appendix F at 2, § 1.2.2.

²⁹² The median received power level for interference protection in the Guard Band at 816-817/861-862 MHz that Nextel later proposed to be designated for non-ESMR operations increases as a function of frequency. See ¶¶ 157-158 & Figure 1 *infra*.

²⁹³ Consensus Parties Aug. 7 *Ex Parte* Appendix F at 3, § 2.1.1a. This level is the power in decibels above one-milliwatt at the R.F. input terminals of a receiver. The Consensus Parties originally proposed a measured desired signal power of -98 dBm, but lowered these values in response to parties who expressed concern that this level was too stringent and that the resultant area of interference free operation would be smaller than the area in which many public safety systems expect reliable coverage. See Comments of Motorola to Supplemental Comments of the Consensus Parties at 11; Comments of NY OIT to Supplemental Comments of the Consensus Parties at 12-14; Comments of San Diego to Supplemental Comments of the Consensus Parties at 7; Comments of Xcel to Supplemental Comments of the Consensus Parties at 6-7; Comments of Con-Ed to Supplemental Comments of the Consensus Parties at 6; Comments of Entergy Reply to Supplemental Comments of the Consensus Parties at 7-8; Reply Comments of NY OIT to Supplemental Comments of the Consensus Parties at 9-10; Reply Comments of San Diego to Supplemental Comments of the Consensus Parties at 7-8; Reply Comments of Xcel to Supplemental Comments of the Consensus Parties at 5-6.

²⁹⁴ *Id.*

²⁹⁵ *Id.*, Appendix F at 9-10, § 5.0. The Consensus Parties made this amendment in response to one commenting party which argued that the Commission should not set a minimum received power level for interference protection unless and until an agreed-upon procedure for measuring the power level had been established. See Comments of New York OIT to Supplemental Comments of the Consensus Parties at 13; Reply Comments of NY OIT to Supplemental Comments of the Consensus Parties at 10-11.

²⁹⁶ See Consensus Parties Aug 7 *Ex Parte*, Appendix F at 8, § 4.1.1. Class A receivers are those intended for an urban environment; Class B receivers are suitable only for rural environments.

²⁹⁷ *Id.* Appendix F at 8, § 4.1.1b. The amount of the increase above the levels described above would be determined by the amount of desired signal power necessary to restore the receiver in question to the same C/(I+N) ratio as a Class A receiver in the same environment. We note that Motorola has reported that approximately 93 percent of its recent portable receiver inventory meets Class A standards. See Motorola November 3 *Ex Parte* at 5, Table 3. Motorola further reported that eighty-five percent of their 2003 year-to-date shipments of mobile radios met Class A standards. *Id.* The most significant difference between the two classes of receivers lies in their (continued....)

parties supported the Consensus Parties in this regard;²⁹⁸ while others disagreed, pointing out that some of the TIA standard parameters, for example, operating temperature range of the radio are irrelevant to 800 MHz interference and therefore that the Commission should not require compliance with the entire standard but, instead, should simply adopt minimum intermodulation rejection ratios for receivers.²⁹⁹

100. On June 16, 2004, Nextel filed a revised band plan for the 816-817 MHz/861-862 MHz band segment proposing that this additional 2 MHz be designated for non-ESMR use rather than for ESMR, as had been proposed in the August 2003 *ex parte* filing. In that band plan, Nextel proposes that the minimum received signal power threshold necessary for interference protection in the 816-817 MHz/861-862 MHz band segment increase as a function of increasing frequency.³⁰⁰

101. As discussed in greater detail below, we conclude, based on the record in this proceeding, that a readily identifiable objective standard should be established to determine what constitutes unacceptable interference, and which systems are entitled to protection from such interference.³⁰¹ We also believe that both unacceptable interference and the scope of protection afforded to eligible systems should be subject to objective measurement criteria. In this connection, we note that almost all participants in this proceeding agree that the *status quo*—addressing interference to public safety systems on an *ad hoc* basis and reactive fashion—is no longer workable in the 800 MHz band. We agree, and find that certain interference definition and measurement procedures contained in the record allow us to establish a reasonable standard for determining when public safety and other non-cellular systems can expect to operate free from unacceptable interference.³⁰² Specifically, we believe that the operational parameters and system characteristics identified by the Consensus Parties are relevant factors in establishing such a standard. However, in determining the final values we drew not only from the Consensus Parties' proposal but also from proposals submitted by equipment manufacturers, industry associations, 800 MHz licensees, as well as our own technical expertise. We further believe that adoption of the unacceptable interference definition and associated measurement procedures is in furtherance of our goal to employ sound spectrum management principles in resolving the 800 MHz interference problem. In addition, we rely, in part, on the methodology derived by the Telecommunications Industries Association TR-8

(Continued from previous page)

intermodulation rejection performance. Class A portable receivers must have at least a 70 dB intermodulation rejection ratio (Class A mobiles must achieve at least 75 dB of intermodulation rejections); Class B portable receivers must have at least a 50 dB intermodulation rejection ratio (Class B mobile receivers must have at least a 70 dB intermodulation rejection ratio). See TIA/EIA -603-A, August 2001 at 124. See also TIA/EIA TSB102.CAAB, August 1994, at 6 and 7. TIA is an American National Standard Institute-accredited standards development organization and provides technical expertise to the telecommunications industry in a wide range of areas, including system performance, interference abatement, compatibility and interoperability. See <http://www.tiaonline.org/about/overview.cfm>.

²⁹⁸ See Comments of Alliant to Supplemental Comments of the Consensus Parties at 1; Comments of Ameren to Supplemental Comments of the Consensus Parties at 14.

²⁹⁹ See Ameren Reply Comments at 4; UTC Reply Comments at 19; Comments of Preferred to Consensus Parties Reply Comments at 11; Comments of UTC to Supplemental Comments of the Consensus Parties at 15.

³⁰⁰ See ¶¶ 157-158 and Figure 1 *infra*.

³⁰¹ See ¶ 105-107 *infra*.

³⁰² This stems from the questions raised in the NPRM seeking comment on whether to abate interference by requiring increased public safety signals or by reducing CMRS signals. See NPRM, 17 FCC Rcd at 4914 ¶¶ 76-77.

Subcommittee.³⁰³ Based on this analysis, we believe that the measures we adopt here will meet our goal of ensuring that 800 MHz communications critical to the safety of life and property will not be impaired by unacceptable interference.

102. The Consensus Parties recommended that the proposed procedures for defining unacceptable interference and establishing licensees' entitlement to be protected against such interference should not be put into place until reconfiguration of the 800 MHz band had been completed. We disagree. Indeed, it appears to us that establishing an interference abatement entitlement standard must be the very first step in attacking the problem of unacceptable interference to public safety, CII and other non-cellular 800 MHz systems.³⁰⁴ In short, we cannot afford the luxury of awaiting completion of band reconfiguration—and putting critical public safety communications at continued significant risk in the interim—before we determine the conditions under which licensees are entitled to interference protection. Accordingly, our rules for interference protection entitlement and the assignment of responsibility for the abatement of unacceptable interference will become effective sixty days after publication of this *Report and Order* in the Federal Register.

103. We are persuaded by the record that our goals in this proceeding are best met by our bright-line test for interference protection entitlement, coupled with a standardized technical means of determining that entitlement and assigning the task of abating unacceptable interference to the parties best capable of doing so. This approach is, we believe, far preferable—for all concerned—to our attempting to micro manage the technology utilized by the ESMR and cellular industries. Thus, by eschewing imposition of across-the-board new technical standards on the industry, we avoid imposing that unnecessary expense and afford the ESMR and cellular licensees optimum flexibility to design and operate their systems in a manner that will optimize service to subscribers and avoid unacceptable interference to other users of the 800 MHz band. Thus, although we have discussed herein the technical means disclosed in the record to avoid unacceptable interference—especially those that come within the definition of Enhanced Best Practices—we reject as unnecessary, the recommendations of some parties for mandatory restrictions on all ESMR and cellular systems with respect to such parameters as maximum cell ERP,³⁰⁵ combiner technology,³⁰⁶ and specific antenna pattern characteristics.³⁰⁷

104. We also decline to adopt the recommendation of the Consensus Parties that we establish more strict OOB limits for base station transmitters in the 861-895 MHz band.³⁰⁸ Instead, we agree with

³⁰³ See ¶ 108, *infra*. See also Consensus Parties Aug. 7 *Ex Parte* at 48. The TIA TR-8 subcommittee is responsible for mobile and personal private radio standards. See <http://www.tiaonline.org>.

³⁰⁴ See Consensus Parties Aug. 7 *Ex Parte* at Attachment 1.

³⁰⁵ See Motient Comments at 4; Cascade Radio Comments at 2; Supreme Radio Comments at 7; Florida Comments at 8; Comments of Border Area Coalition to Supplemental Comments of the Consensus Parties at 12, 18; Comments of Pinnacle to Supplemental Comments of the Consensus Parties at 9; Comments of UTC to Supplemental Comments of the Consensus Parties at 15; Reply Comments of San Diego to Supplemental Comments of the Consensus Parties at 7.

³⁰⁶ Alliant Energy Comments at 1; UTC Comments at 19; Entergy Reply Comments at 2; Pinnacle Reply Comments at 3-4.

³⁰⁷ With regard to antenna designs, we note that the Commission's Spectrum Policy Task Force (SPTF) recommended that we consider "[p]romoting the use of advanced antenna technology and system design techniques that would enhance the uniformity of transmitted signal strength levels through a service area." See SPTF Report, ET Docket No. 02-135, November 2002, at 32.

³⁰⁸ Consensus Parties Aug. 7 *Ex Parte*, Appendix F at 9 § 4.1.2.

parties such as the Rural Cellular Association, which point out that, in many instances, the additional filtering needed to achieve the Consensus Parties' proposed OOB standards would add cost and complexity—but no benefit—to those cells in a system in which, because of their location, or otherwise, unacceptable OOB interference would not occur.³⁰⁹ In short, although we recognize the efficacy of such technical changes, we are reticent to impose them on every cell of every system in the country; particularly if only a handful of cells in a system might require them. In the final analysis, it is the question of whether unacceptable interference exists or not that is controlling here; not the specific means by which licensees abate it. The technical filings made in this proceeding convince us that licensees are the best stewards of interference abatement technology and are best capable of determining when and to what degree that technology must be applied. However, we reserve the discretion to revisit this issue promptly and impose more specific technical requirements on carriers should our decisions to adopt an objective interference standard and place strict responsibility on carriers to fix any unacceptable interference prove inadequate.

(i) **Signal Strength Threshold for Interference Protection**

105. In the rules we adopt today, we specify that public safety, CII, and other non-cellular 800 MHz systems must receive at least a minimum measured input signal power of -101 dBm for portable (*i.e.*, hand-held) units and -104 dBm for vehicular mobile units in order to be eligible for protection from interference in the 806-816.35 MHz/851-861.35 MHz band segment.³¹⁰ As an initial matter, we note that these signal strengths are quite low. For instance, a signal strength of -98 dBm is the threshold average radiation sensitivity for a Class A "Project 25"³¹¹ portable receiver with an external antenna.³¹² A signal strength of -101 dBm is about one-half that of a signal strength of -98 dBm, and a signal strength of -104 dBm is about one-quarter that of a signal strength of -98 dBm. Some non-cellular 800 MHz licensees contend that they have designed systems to work with a signal strength less than -98 dBm, and we wish, at the margin, to protect such systems providing they provide, at a minimum, a median -101/-104 dBm received signal power.³¹³ However, we do not agree with parties who aver that their systems operate satisfactorily with signal strengths at or below -120 dBm and should be protected to that low level.³¹⁴ In

³⁰⁹ See Reply Comments of Rural Cellular to Supplemental Comments of the Consensus Parties at 2.

³¹⁰ Note that the signal powers are specified in decibels below one milliwatt and thus are negative numbers. Therefore, for example, a -90 dBm signal is stronger than a -100 dBm signal. For our discussion of 816-816.35 MHz/861-861.35 MHz band segment, see ¶¶ 157-158 *infra*.

³¹¹ "Project 25" was an APCO initiative that resulted in a digital standard which was substantially incorporated into the ANSI/TIA/EIA 102 suite of standards. The TIA standard has been adopted as the mandatory standard for public safety radios operating on narrowband interoperability voice and data channels in the 700 MHz public safety band.

³¹² See TIA/EIA-102.CAAB, November 2002, § 3.1.14. Manufacturers' sensitivity specifications indicate that many Class B receivers meet this limit. The average radiation sensitivity of a receiver is the power received by a halfwave dipole measured into a 50 Ω load when substituted for a receiver that is receiving a signal at the reference sensitivity. See TIA-102.CAAA-A, November, 2002 §2.1.14.1.

³¹³ See Comments of San Diego to Supplemental Comments of the Consensus Parties at 7; Comments of Con-Ed to Supplemental Comments of the Consensus Parties at 6-7; Reply Comments of N.Y. OIT to Supplemental Comments of the Consensus Parties at 10; Reply Comments of San Diego Reply to Supplemental Comments of the Consensus Parties at 7.

³¹⁴ See Comments of Palomar Comm. to Supplemental Comments of the Consensus Parties at 7-8; Comments of Consumers Energy to Supplemental Comments of the Consensus Parties at 18; Reply Comments of Xcel to Supplemental Comments of the Consensus Parties at 5; Peak Relay, February 6, 2004 *ex parte* filing.

light of the fact that the reference sensitivity of 800 MHz receivers is typically on the order of -116 to -119 dBm.³¹⁵ We find that mandatory protection of systems to a level below -104 dBm would impose an excessive burden on ESMR and cellular telephone carriers to protect an extremely weak signal. We note that such signal levels are so weak that normal statistical variation, especially at the periphery of service areas, would result in limited service reliability even in the absence of interference or high levels of ambient noise. Nevertheless, ESMR and cellular telephone licensees must respond to complaints of interference even at these low signal levels; and, when possible, voluntarily assist the affected licensee if to do so does not cause the ESMR or cellular telephone licensee undue cost or capacity limitations.

106. In sum, to provide clarity and transparency to all involved parties, we specify that the public safety or other 800 MHz non-cellular signal will be entitled to protection only if the median power of the received signal is greater than or equal to -101 dBm (portable) or -104 dBm (mobile),³¹⁶ in the 806-816 MHz/851-861 MHz band segment. In the band segment 816-817 MHz/861-862 MHz, measured median signal powers for interference abatement increases as a function of frequency, as described in paragraphs 157-158 and Figure 1, *infra*.

107. In defining the term interference within the specific context of "unacceptable interference" as defined for purposes of this proceeding only and as used herein, we examined the filings in the record, standard technical publications and manufacturers' specification sheets. Our analysis closely tracks that of the Consensus Parties and we define unacceptable interference as any impairment to the desired signal that causes the C/(I+N) ratio of a voice radio receiver to drop below 20 dB. However, because the technical parameters necessary for acceptable performance by non-voice systems vary significantly by system, we will use the value(s) reasonably designated by the manufacturer of the equipment.³¹⁷ We recognize that a manufacturer specification may vary from manufacturer to manufacturer and could well change over time as particular equipment evolves.³¹⁸

(ii) Signal Measurement Techniques

108. As an initial matter, all parties involved in a determination of unacceptable interference are free to agree among themselves on how interference protection threshold levels are to be measured. For example, in many cases, it may be possible to measure the desired signal directly because it is not masked by noise or interference to the degree that direct measurement is unreliable. In other instances, it may be possible to conduct a direct measurement reliably if nearby ESMR or cellular telephone transmitters are turned off briefly. However, whenever it is not possible to perform reliable measurements of desired signal received power directly; or in the event there are disputes between or among the parties involved in an interference complaint, the following protocol for indirect measurement of the desired

³¹⁵ See TIA-102.CAAB-A September 2002, § 3.1.4. (minimum reference sensitivity -116 dBm) See also Typical Performance Specifications for Motorola Astro XTS 5000 transceiver. http://www.motorola.com/cgiss/docs/xts5000_service.pdf (reference sensitivity of 0.25 microvolts = -119 dBm).

³¹⁶ Although the Consensus Parties' filings are not clear on the subject, we assume the threshold to be used (-101 or -104 dBm) will be determined by the kind of radio that was in use when interference was encountered. Thus, if the interference complaint originated from a party using a hand-held portable radio, the -101 dBm criterion would apply. However, if the party encountering interference was using a mobile unit, the -104 dBm criterion would apply.

³¹⁷ See Consensus Parties Aug 7 *Ex Parte*, Appendix F at 2, § 1.2.2.

³¹⁸ We note that manufacturers of non-voice equipment generally rely on bit error rate (BER) to specify acceptable system performance, rather than the C/(I+N) ratio used for voice systems. We therefore expect that most manufacturers will specify a BER for non-voice systems.

signal power may be used. These measurement procedures are based on the recommendations of the Consensus Parties with a few minor changes.³¹⁹ Consistent with existing practice, the Office of Engineering and Technology is hereby delegated authority to make changes to this protocol as needed.³²⁰

(a) *Area to be measured.* The area of measurement shall be no less than 91.44 meters x 91.44 meters (300 feet x 300 feet). Local obstructions may determine the size, as well as how large the reported affected area is. If the affected area is quite large, a location of reported problems shall be selected that is large enough to be consistent with coverage predictions and our dBu contour limitations.

(b) *Data collection.* A measurement route shall be defined through the area to be measured that distributes data collection points relatively uniformly across the area being tested. A constant velocity along the route shall be maintained to prevent oversampling in any given location. The sampling rate shall be high enough to ensure multiple samples per wavelength.

(c) *Use of filters.* A lowpass or bandpass filter shall be inserted between the test receiver and its antenna to allow differentiation between receiver-generated IM and OOBE noise by attenuating potential IM contributors from the CMRS portion of the band. The filter's loss on the desired frequency shall be included in all calibrations.

(d) *First test procedure.* With all potentially-interfering channels and the desired signal transmitting constantly, gather "continuous" data over a route that covers the measurement area defined in (a) above, using the data-collection requirements in (b) above. Use this data to determine the median C+I+N. Modulate the desired channel with a test signal to verify whether or not the target receiver unmutes. For digital receivers this occurs at a C/(I+N) of approximately 5 dB. For analog radios adjust the manual squelch setting to cause the receiver to unmute at a C/(I+N) of 5 dB.

(e) *First test threshold.* If the median C+I+N is greater than or equal to 2 dB above the median target value and the receiver was unmuted, then the first threshold test is passed and the public safety/CII system is eligible for interference mitigation. If the median C+I+N is not greater than or equal to 2 dB above the median target value, conduct the second test procedure below to establish eligibility for interference mitigation.

(f) *Second eligibility test.* Repeat (d) with the desired signal not transmitting. At this point the test receiver is measuring only I+N. This test should be run as soon as possible to be sure conditions are similar to the initial test. If the test receiver has automatic frequency control, disable it so it remains on the test frequency and is not pulled toward one of the potential interference contributors. Use this data to determine the median I+N. Since the value of N should be a constant (the thermal noise of the receiver) all else will be interference (I). If OOBE noise is present it will be captured in this data as I.

(g) *Second test threshold.* Determine the median C based on the median C+I+N and I+N. If the calculated median C is close to the target value, repeat (f) to ensure that I+N has not changed.

³¹⁹ See Consensus Parties Aug 7 *Ex Parte*, at Appendix F, §§ 5.0-5.8.

³²⁰ Revision of Parts 2 and 15 of the Commission's Rules to Permit Unlicensed National Information Infrastructure (U-NII) devices in the 5 GHz band, FCC 03-287, ET Docket No. 03-122 ¶ 39 (released Nov. 18, 2003).

c. **Minimum Receiver Performance Criteria**

109. In order for non-cellular 800 MHz licensees to be entitled to full protection against unacceptable interference, they must use mobile and portable voice radios with performance that equals or exceeds the minimum performance standards described *infra*:

- Voice units intended for mobile use: 75 dB intermodulation rejection ratio; 75 dB adjacent channel rejection ratio; -116 dBm reference sensitivity.
- Voice units intended for portable use: 70 dB intermodulation rejection ratio; 70 dB adjacent channel rejection ratio; -116 dBm reference sensitivity.

110. We derived the foregoing values from manufacturers' technical filings contained in the record,³²¹ standard reference works and manufacturers' specification sheets for voice equipment. The data appear to represent the state of the art in affordable public safety and CII radios.³²² We also evaluated the Consensus Parties' recommendation that we require public safety licensees to use receivers which meet TIA Class A standards in order to receive full protection against unacceptable interference.³²³ We decline, however, to adopt the Class A standards on a wholesale basis because: (a) we wish to avoid incorporating technical specifications contained in these standards unless they relate directly to rejection of signals that interfere with 800 MHz public safety communications; and (b) the TIA-102 standard for digital transceivers applies to radios operating with 12.5 kHz bandwidth and thus is inapplicable to radios operating with 25 kHz bandwidth, as is common in the 800 MHz band. Thus, although we did rely, in part, on the TIA-102 standard, we did so only with those portions of the standard that affect intermodulation rejection, adjacent channel selectivity, and receiver sensitivity.³²⁴

111. In setting our criteria for voice receiver performance, we were mindful of the comments of parties which observed that the TIA intermodulation interference testing protocols may not simulate real-world conditions.³²⁵ Thus, although the standards specify that intermodulation interference rejection

³²¹ See Motorola Comments at 21; Motorola November 3 *Ex Parte* at 4.

³²² As with most technical equipment, such radios' performance is bounded by cost and other considerations. For example, the intermodulation rejection ratio of a portable radio is directly tied to the amount of power that the radios' battery can supply. Thus, although a portable radio with an intermodulation rejection ratio better than that specified *supra* could be manufactured; it would either have a battery so heavy that it would not be practical to carry the radio on the person of a public safety official; or, if the battery were light enough to be carried, its amp-hour capacity would not be sufficient for the radio to operate through an entire eight-hour, or more, shift. See Motorola Comments at 20-21; Public Safety 800 MHz Interference, FCC Briefing September 19, 2002 attached to Letter, dated September 20, 2002, from Steve B. Sharkey, Director, Spectrum and Standards Strategy, Motorola, Inc. to Marlene H. Dortch, Secretary, Federal Communications Commission at 13 (Motorola September 20 *Ex Parte*).

³²³ Supplemental Comments of the Consensus Parties, Appendix F at F-7-8, § 4.1.1.

³²⁴ Based in part on an absence of evidence in the record suggesting there are issues regarding minimum receiver performance criteria for non-voice equipment, we find it unnecessary at this time to specify any such criteria.

³²⁵ See CTIA Reply Comments at 9-10; Supplemental Comments of the Consensus Parties, Appendix F at F-7, Item 4.1; Comments of CTIA to Supplemental Comments of the Consensus Parties at 10; Comment of Motorola to Supplemental Comments of the Consensus Parties at 20-21.

should be tested with the desired signal at the reference sensitivity of the receiver,³²⁶ under actual operating conditions the desired signal is usually considerably above the reference sensitivity of the receiver. Therefore, we recommend, but do not require, that TIA and other standards-setting organizations revisit current testing procedures in light of the interference environment in which 800 MHz receivers must currently operate.

112. We note that Motorola data show that approximately seventy-four percent of the receivers that it has shipped to public safety agencies over the past decade meet Class A intermodulation rejection specifications and that this percentage is even higher for receivers shipped in 2003.³²⁷ Accordingly, we believe that public safety agencies predominantly already employ receivers which satisfy the criteria above.³²⁸ However, we are not restricting entitlement to unacceptable interference protection only to radios that meet the standards described *supra*. We recognize that some users, particularly public safety agencies, may be using older radios that do not conform to the standards. Accordingly, we are specifying that 800 MHz licensees asserting an entitlement to interference protection, but which employ receivers that fail to satisfy the criteria above will be afforded interference protection only at higher power levels than -104 dBm (for mobiles), -101 dBm for portables.³²⁹ For example, if a radio meeting the above criteria provided a 20 dB C/(I+N) ratio when presented with a -104 dBm signal, but a non-compliant radio delivered only a 15 dB C/(I+N) ratio when presented with a -104 dBm signal in the same environment, then the interference entitlement for the licensee using the non-compliant radio will be based on receipt of a -99 dBm measured signal power instead of -104 dBm. The net result would be that the licensee with the non-compliant radio would have less interference protection because, to claim entitlement to protection, the licensee would have to show that, in the area in which interference was encountered, the licensee's system would have to provide a 5 dB higher received power level, *i.e.* -104 dBm - (-99 dBm) = 5 dB.

113. Finally, we note Motorola's announcement of prototype receivers with switchable attenuators.³³⁰ In brief, the Motorola prototype senses the signal strength of the incoming desired signal and determines when the signal is sufficiently strong that it can tolerate a given amount of attenuation, *e.g.* 10 dB, without compromising the intelligibility of the incoming communication.³³¹ At that point, attenuation is automatically introduced between the radio's antenna and the first active device in the input chain (the "R.F. preamplifier" or "low noise amplifier") of the receiver.³³² With the signal so attenuated, a significant improvement is realized in the effective intermodulation rejection ratio of the receiver.³³³ Although the information submitted to date is encouraging, it is inconclusive as to the degree of overall interference protection the use of such receivers would provide in a typical system. The attenuator circuitry does not address OOB interference and is able to abate intermodulation interference only in

³²⁶ See TIA- TSB102:CAAA at 2.1.9.2 and TIA/EIA-603-A at 2.1.9.2.

³²⁷ See Motorola November 3 *Ex Parte* at 4-5.

³²⁸ We also note that, in some important respects, there is no difference between Class A and B receiver specifications. For example, the recommended delivered audio quality ("DAQ") for both is 3.4, and that DAQ requires a ratio of C/(I+N) of approximately 20 dB for analog receivers and 17.7 dB for digital receivers. See Table A-1, Annex A of TSB-88A.

³²⁹ See Supplemental Comments of the Consensus Parties, Appendix F at F-8, § 4.1.1b.

³³⁰ See Motorola May 6 *Ex Parte*.

³³¹ *Id.* at 5.

³³² *Id.*

³³³ *Id.* at 7, Figure 1.

areas in which the desired signal is strong enough to activate the attenuator.

114. Motorola stated that it could incorporate switchable attenuators in new products without a significant cost penalty; that it could retrofit switchable attenuators in certain of its earlier radios; and that the attenuation circuitry is not proprietary.³³⁴ However, it has not provided diagrams of the circuitry and no other manufacturer has come forward to endorse use of such radios, much less commit to producing them. Nonetheless, we believe that the potential for improved intermodulation interference rejection through use of switchable attenuators is sufficiently promising that we will continue to monitor manufacturers' development of radios with improved intermodulation rejection ratio—whether by use of switchable attenuators or otherwise—and, if the facts so indicate, will consider reviewing our rules governing intermodulation rejection standards for 800 MHz public safety receivers. We note the statement by Motorola that more interference resistant receivers can be produced at little or no additional cost.³³⁵ With respect to these receivers and other 800 MHz public safety equipment, we strongly encourage the industry as a whole not to seek excessive profits when offering suitable equipment to public safety agencies. In so doing, equipment manufacturers can make a significant contribution to providing first responders with the affordable communications equipment necessary to meet their Homeland Security obligations.

3. Overall Approach to Interference Abatement

a. Role of Enhanced Best Practices

115. As an initial matter, we recognize that some unacceptable interference can originate from multiple sources, e.g., two or more cells, (ESMR, cellular telephone, or both) each contributing to OOBE or intermodulation interference. In such cases, all involved ESMR and/or cellular telephone licensees are jointly and severally responsible for abating the interference, no matter how small their contribution to the problem. In this regard, we believe that adopting rules and policies expressly imposing such responsibilities on such licensees operating in the 800 MHz spectrum is consistent with the mandate in Section 1 of the Act to enhance the safety of life and property.³³⁶ In addition, we emphasize that a reactive approach to interference abatement is per se undesirable because of the concomitant adverse impact on public safety, CII and other 800 MHz communications. Thus, we encourage all 800 MHz licensees, in designing new systems or modifying existing systems, to anticipate and avoid potential interference before it occurs. This encouragement extends to designers of non-cellular 800 MHz systems as well; inasmuch as providing a more robust desired signal contributes significantly to interference abatement. To facilitate system designs that take the relevant interference environment into account, we are adopting rules that require mutual prior notification, on request, of changes or additions to ESMR, cellular telephone, public

³³⁴ See Letter, dated June 20, 2003, from Steve B. Sharkey, Director, Spectrum and Standards Strategy, Motorola, Inc. to James Schlichting, Deputy Chief, Office of Engineering and Technology, Federal Communications Commission at 7-8 (*Motorola June 20 Ex Parte*).

³³⁵ *Id.*

³³⁶ 47 U.S.C § 151. See also 4.9 GHz Band Transferred from Federal Government Use, WT Docket No. 00-32, *Memorandum Opinion and Order and Third Report and Order*, 18 FCC Rcd 9152 (2003) (allocating spectrum for public safety in furtherance of Commission's Section 1 obligation to promote safety of life and property); E911 Accuracy Standards Imposed on TIER III Carriers for Locating Wireless Subscribers Under Rule Section 20.18(H), WT Docket No. 02-377, *Order*, FCC 03-297 (2003) (denying a petition for forbearance from certain E911 requirements because of the strong connection between such requirements and the Commission's obligation to promote safety of life).

safety and CII 800 MHz systems;³³⁷ and are encouraging other voluntary and cooperative interference abatement solutions, such as “channel swaps.”

116. As noted earlier, the majority of the comments in this proceeding support abating harmful interference to public safety systems operating in the 800 MHz band by one of two methods: relying exclusively on Best Practices³³⁸ or by reconfiguring the 800 MHz band. Following publication of the *Best Practices Guide* in 2000, and throughout this proceeding, the Commission has given careful thought to whether Enhanced Best Practices, alone, would suffice to reduce unacceptable interference to the extent necessary to provide reliable 800 MHz public safety communications. In particular, we have carefully analyzed the filings by the Balanced Approach parties which urge adoption of a rule that would essentially codify many of the *Best Practice Guide* remedies and which would contain additional requirements—primarily procedural—to be followed when interference is encountered.³³⁹

117. We recognize that the development of the technical measures described in the *Best Practices Guide*, and subsequent related documents such as the Motorola *Technical Toolbox* represent an enormous amount of work and an almost unprecedented level of cooperation within the 800 MHz user community. We commend both the effort involved in developing these measures and the cooperative spirit they represent. We encourage continued research into interference abatement measures so that Enhanced Best Practices can become even more effective as a tool for remedying unacceptable interference. In so saying, however, we note that the voluntary use of Best Practices to date has abated many, but by no means all, instances of interference to public safety communications.

118. Voluntary Best Practices have often proven effective in abating interference on a case-by-case basis and will continue to be valuable—in the form of Enhanced Best Practices—even after band reconfiguration. Although there are several interference abatement strategies subsumed under the Enhanced Best Practices rubric, they fall into three basic categories: (1) changing the technical parameters of ESMR and/or cellular cell sites; (2) improving the equipment, including portable and mobile units, of the licensee encountering interference; and (3) establishing interference abatement procedures such as, prior notification of cell activation or modification. Details on these three categories of Enhanced Best Practices and the advantages and disadvantages thereof are contained in Appendix D *infra*. Enhanced Best Practices procedures formalize the cooperative efforts that some ESMR and cellular telephone licensees have undertaken to promptly identify and abate unacceptable interference. In furtherance of such efforts we are adopting rules today that require 800 MHz licensees to share technical data on request;³⁴⁰ and that set specific schedules for the identification, notification, assessment and abatement of unacceptable interference.³⁴¹

119. We note, however, that, as with almost any engineering solution, there are technical tradeoffs associated with most Enhanced Best Practices. For example, abating unacceptable interference using Enhanced Best Practices can sometimes be done only at the expense of affecting the coverage and

³³⁷ See ¶¶ 124-127 *infra*.

³³⁸ “Best Practices” as used herein refers to the recommendations for voluntary interference abatement contained in the *Best Practices Guide*. See n. 40 *supra*.

³³⁹ See, e.g., Letter, dated May 29, 2003, from Jill Lyon, Esq., Vice President and General Counsel, UTC to Marlene H. Dortch, Secretary, Federal Communications Commission.

³⁴⁰ See ¶ 124 *infra*.

³⁴¹ See ¶¶ 132-141 *infra*.

subscriber capacity of ESMR and cellular systems, e.g., Enhanced Best Practices that rely on restricting ESMR or cellular channel use or making significant reductions in cell ERP. Proposals advancing the use of Enhanced Best Practices—however defined—as the sole remedy for interference abatement have a significant drawback that makes them problematic as a long-term solution: they incur high transactional costs for all parties and would have to continuously be applied to an increasing number of interference incidents that are inevitable as use of the 800 MHz band intensifies.³⁴² Several parties also note that most of the remedies described in the *Best Practices Guide* are fundamentally reactive because interference must first be encountered before abatement efforts commence.³⁴³ We regard this as another serious drawback. It would be scant consolation for a public safety officer subjected to a life-threatening communications failure to know that he or she could report the problem so that technical fixes could eventually be applied to fix it—or not.

120. The record supports our conclusions about the high transactional costs of employing case-by-case remedies alone to abate harmful interference to public safety systems in the 800 MHz band. Nextel, one of the few parties that submitted comments detailing the costs of implementing Best Practices techniques, asserts that it employs between ten to fifteen full-time employees devoted to coordinating the company's interference abatement measures nationwide and employs over twenty additional technicians to resolve each interference problem.³⁴⁴ Nextel further asserts that it spends at least \$10,000 investigating and temporarily mitigating interference at a single site and that this cost can increase by as much as \$25,000 if additional equipment is required.³⁴⁵ Moreover, according to Nextel, implementing these measures can take from six to ten weeks with no guarantee that the particular technique being implemented will cure the interference problem.³⁴⁶ We further note that the record shows that it is not only CMRS licensees that incur interference mitigation costs. For example, both Anne Arundel County and Denver state that they have spent significant amounts of money and employee time attempting to mitigate interference on a case-by-case basis.³⁴⁷

121. Against this backdrop, we are concerned that the inevitable increase in the number of potential and actual interference situations that will arise, in the 800 MHz band, as currently configured, could strain the effectiveness of the mitigation techniques and increase their cost, possibly rendering interference abatement ineffective and unaffordable. Thus, while we do not question the short-term efficacy of Enhanced Best Practices, we conclude that licensees in the 800 MHz band would be better served by a long-term solution that minimizes this burden. Indeed, in the 700 MHz Guard Band proceeding, the Commission recognized early on the necessity of spectrally separating incompatible

³⁴² This is due to the increased use of this band by public safety licensees as well as the increased use necessitated by the expanding subscribership of ESMR and cellular systems.

³⁴³ See Comments of APCO at 9-10; IACP *et. al.* Comments 4-5; Nextel Reply Comments at 58; Reply Comments of Consensus Parties to Supplemental Comments of Consensus Parties at 13.

³⁴⁴ See Letter, dated December 19, 2003, from Regina M. Keeny, Counsel to Nextel to Michael J. Wilhelm, Esq., Federal Communications Commission at 12.

³⁴⁵ *Id.* at 10-11.

³⁴⁶ *Id.* at 10.

³⁴⁷ *Id.* at 12. Denver contends that it has spent in excess of \$130,000 to mitigate interference and Anne Arundel County estimates these costs to be "hundreds of thousands of dollars." See Letter, dated November 3, 2003 from Alan Tilles, Esq., Counsel to the City and County of Denver to John Muleta, Esq., Chief, Wireless Telecommunications Bureau, Federal Communications Commission. See also Application for Review in WT Docket 02-100, filed August 6, 2003, by Anne Arundel County at 6.

technologies in order to avoid the incidence of interference to non-cellular public safety from cellular operations.³⁴⁸ In drafting up its 700 MHz band plan, the Commission essentially recognized the significance of grouping technically compatible public safety systems in close spectrum proximity and that spectrally separating incompatible systems such as through the use of guard bands required direct regulatory intervention. The Commission further adopted a package of technical rules and interference mitigation procedures to ensure that Guard Band operations would not cause interference to adjacent public safety operations. The Commission's experience in 700 MHz provides ample evidence that combining a forward looking band plan with a customized package of interference avoidance techniques can be successful. Further, the record in this proceeding supports that reconfiguration of the 800 MHz band, while expensive in the short-term, will, over time, minimize the transaction costs incurred by 800 MHz licensees by reducing reliance on Enhanced Best Practices.³⁴⁹ Thus, although Enhanced Best Practices must remain the remedy of first resort until band reconfiguration is complete—and will remain necessary for otherwise intransigent cases of unacceptable interference, their high transactional cost indicates that it would be unwise to rely on Enhanced Best Practices as the exclusive remedy for interference abatement over the long term.

122. Again we emphasize that Enhanced Best Practices remain powerful parts of the interference abatement arsenal. We agree with the Consensus Parties that all feasible remedies—including band reconfiguration and Enhanced Best Practices³⁵⁰—must be applied to the problem if our goal is to be reached. Therefore, we expect 800 MHz ESMR and cellular telephone licensees will continue to use Enhanced Best Practices to abate harmful interference until the completion of band reconfiguration. We do recognize that instances of residual harmful interference will crop up even after band reconfiguration but are confident that ESMR and cellular licensees can apply Enhanced Best Practices to resolve these cases. But, in our judgment, in the final analysis, the best long term solution requires a restructuring of the 800 MHz band to substantially reduce the need for case-by-case interference management.

123. In this connection, we recognize that some interference incidents may not be effectively addressed through use of Enhanced Best Practices. As a result some alternative redress may be needed prior to the completion of reconfiguration of the 800 MHz band. Given that channel swapping is essentially band reconfiguration on a micro scale, we anticipate looking favorably upon proposals mirroring the band plan set forth in this *Report and Order*. Conversely, we anticipate being less inclined to approve proposals that deviate from the band plan. We also delegate to the Chief of the Wireless Telecommunications Bureau the authority to grant whatever waivers are necessary to implement channel swap proposals.

b. Interference Abatement Rules and Procedures

(i) Mutual Notification Requirements Applicable to 800 MHz Licensees

124. We are adopting rules requiring ESMR and cellular telephone licensees to furnish to those

³⁴⁸ See ¶ 41 *supra*.

³⁴⁹ See Letter, dated May 16, 2003, from Robert Foosaner, Senior Vice President and Chief Regulatory Officer to Nextel Marlene Dortch, Secretary, Federal Communications Commission at 14-15; Sun Fire Group Study at 11-13; Denver SOW at 1-2; Letter, dated December 19, 2003, from Regina M. Keeny, Counsel to Nextel to Michael J. Wilhelm, Esq., Federal Communications Commission at 10-11.

³⁵⁰ See Supplemental Comments of the Consensus Parties at 39.

public safety and CII agencies who request it, prior notice of at least ten business days before new cells are constructed or existing cells are modified.³⁵¹ Public safety and CII agencies which receive this information have the reciprocal obligation to inform ESMR and cellular telephone licensees whenever the public safety or CII licensee changes its system parameters. We take these steps in general agreement with those parties who believe that prior notice has a prophylactic effect on interference avoidance. Thus, if the characteristics of a proposed new cell are known in advance, it is possible to analyze the cell's potential for interference and make any necessary revisions to cell parameters before the cell is activated. For example, an ESMR or cellular telephone licensee could furnish the public safety or CII licensee or its representative, e.g. a frequency coordinator, the proposed parameters of a new cell sufficiently far in advance to allow these parties to analyze the cell's potential for interference and suggest any necessary changes that should be made before the cell is activated. This exchange of information can be performed in any manner agreeable to all parties involved. We decide to limit this notification entitlement to only public safety and CII licensees; and then only if they request ESMR and cellular telephone licensees to furnish them the information on a regular basis. We decline the alternative—requiring ESMR and cellular licensees to furnish the information whether requested or not—in the interest of avoiding the burden of producing and receiving unnecessary paperwork, and in fulfillment of our obligations under the Paperwork Reduction Act.³⁵² We do not require notification of other non-cellular 800 MHz licensees in consideration of the fact that their communications are unlikely to be of a mission-critical nature and because of the burden that could be imposed on the ESMR and cellular telephone carriers were it necessary to furnish information to large numbers of licensees, especially in urban areas. However, we do endorse, but do not require, ESMR and cellular telephone licensees furnishing notification information to any 800 MHz licensee requesting it; e.g., because of frequent instances of interference. Finally, we impose a reciprocal obligation on public safety and CII licensees to provide notification of their facilities, and any modifications thereto, to ESMR and cellular telephone licensees requesting same.

125. The 800 MHz Users Coalition argues we should require prior coordination—rather than just notification—using the standards contained in TIA TSB-88A; but they have not stated precisely how TSB-88A would be useful in effecting prior coordination of cell sites.³⁵³ We note that TSB-88A was the result of studies of the impact of spectrum refarming and digital modulation on the frequency coordination of land mobile radio systems and deals primarily with potential co-channel and adjacent channel interference.³⁵⁴ However, in the case of 800 MHz public safety systems, co-channel interference has not been identified as a significant problem. Although adjacent channel interference can be a factor—particularly in the interleaved 800 MHz channels—the interference mechanisms at work in most instances of 800 MHz public safety systems differ from those covered in TSB-88A. Moreover, although TSB-88A makes a passing reference to “noise generated by non-wireline cell sites”³⁵⁵ in its discussion of

³⁵¹ We will not require ESMR or cellular telephone licensees to furnish prior notice information to non-public safety or non-CII licensees although we encourage the exchange of such information when specifically requested by a non-public safety or non-CII licensee.

³⁵² See Appendix B *infra*.

³⁵³ See 800 MHz Users Coalition May 29, 2003 *Ex Parte* at 6.

³⁵⁴ See TSB-88A, June 1999 at vii (Introduction). The TIA document does not contemplate interference from low site ESMR and cellular telephone systems of the kind discussed herein. For example, intermodulation interference is discussed only in the context of base station receivers, not mobile or portable receivers. See *id.* at § 5.4.2-5.4.4.

³⁵⁵ TSB-88A, June 1999 at 36 ¶ 5.1.

“Environmental RF Noise”³⁵⁶ the document is primarily directed to interference between high-site systems. Accordingly, although we believe that some parts of TSB-88A might be useful in 800 MHz interference analysis, e.g. the document’s discussion of coverage reliability;³⁵⁷ we do not think it wholly applicable to the environment in which 800 MHz public safety systems operate. We are aware of no agreed-upon coordination standards that address the OOB and intermodulation interference that occurs in the immediate vicinity of cell sites; and thus are not mandating prior coordination of cell sites. However, we believe that notification of cell site parameters will allow some inferences to be drawn, on a case by case basis, relative to the cell’s potential for generating unacceptable interference.

126. The parameters most relevant to prior notification of a cell are its location, the effective radiated power, the antenna height, and the channels in use.³⁵⁸ Accordingly, we believe that non-cellular 800 MHz licensees should have such information available on request from ESMR and cellular telephone licensees and so require. We impose a similar requirement on public safety licensees (i.e., to, upon request, provide their operating parameters to ESMR and cellular telephone licensees operating within the public safety systems’ coverage areas.). We are aware that some ESMR and cellular telephone licensees regard their operating parameters as proprietary and encourage such licensees to use non-disclosure agreement whereby third parties will not be given access to such information. Failing that, the affected parties may seek a protective order from the Commission.³⁵⁹ We also encourage, but do not require, that the matter be submitted to arbitration, mediation, or other alternative dispute resolution mechanism.

127. We stress that the prior notification provided to the public safety licensee is for informational purposes only: we are not affording public safety or CII licensees the right to accept or reject the activation of a proposed cell or to unilaterally require changes in its operating parameters. The principal purposes of notification are to: (a) allow a public safety or CII licensee to advise the ESMR or cellular telephone licensee whether it believes a proposed cell will generate unacceptable interference; (b) permit ESMR or cellular telephone licensees to make voluntary changes in cell parameters when a public safety or CII licensee alerts them to possible interference; and (c) rapidly identify the source if interference is encountered when the cell is activated. Thus, at the very least, the knowledge that a new ESMR or cellular telephone cell was going to be activated on a given date would allow a public safety or CII representative to attribute interference to that cell if new interference were encountered where it had not existed before.

(ii) Responsibility for Mitigation Pre- and Post- Band Reconfiguration

128. The Consensus Parties envisioned that their unacceptable interference threshold provisions would go into effect only after band reconfiguration was complete. However, the severity of interference currently being encountered is such that we cannot responsibly let it go unaddressed in the interim. Given the demonstrated utility of Enhanced Best Practices, and the extensive other resources—technical, financial and otherwise—available to ESMR and cellular licensees, they currently are capable of eliminating unacceptable interference pending completion of band reconfiguration, albeit at the

³⁵⁶ *Id.*

³⁵⁷ *Id.* at 86.

³⁵⁸ See, e.g., Project 39, Interference to Public Safety 800 MHz Radio Systems, *Interim Report to the FCC*, December 24, 2001 at 12-21. See also *Best Practices Guide* at 7-8; Motorola Comments at 20.

³⁵⁹ See Digital Output Protection Technology and Recording Method Certifications, *Order*, MM Docket 04-68, DA 04-716 (rel. Mar 17, 2004). See also 47 C.F.R §§ 0.457, 0.459.

occasional expense of subscriber capacity limitations or the need to fund improvements to non-cellular systems. Although many ESMR and cellular licensees have been commendably cooperative in bearing the responsibility for identifying and promptly curing interference at their own expense; we believe it prudent to codify this previously voluntary effort into strict responsibility. Under that policy, any ESMR or cellular telephone licensee that causes, or contributes to, unacceptable interference to a non-cellular licensee is responsible for abating it promptly at its own expense. In so assigning responsibility, we place it on the party or parties best qualified and situated to take the actions necessary to ensure that first responders—both public safety and CII personnel—have communications channels free of unacceptable interference and which thus are suitable for mission-critical operations including rapid response to major attacks that threaten Homeland Security. Accordingly, as of the effective date of this *Report & Order*, ESMR and cellular carriers are strictly responsible for abating unacceptable interference as defined *supra*.³⁶⁰

129. We carefully considered alternatives to strict responsibility, including those discussed in the *NPRM* but found them either insufficiently effective or overly burdensome on the ESMR and cellular telephone industries. For example, we considered the comments of parties which advocated across-the-board limits on such cell parameters as maximum power flux density in the immediate vicinity of the cell, reduced effective radiated power, antenna vertical pattern restrictions, limits on the cumulative OOB from cell transmitters and the like.³⁶¹ However, we recognized that such limits would impose heavy burdens on ESMR and cellular telephone licensees, and that the restrictions would require modifications of cells that had little, if any, potential for generating unacceptable interference. Therefore, in lieu of adopting what could be draconian rules, we are affording ESMR and cellular telephone licensees the discretion to make any necessary changes to their own systems—or changes to non-cellular systems affected by unacceptable interference—as may be necessary to eliminate unacceptable interference.³⁶²

130. We assign strict responsibility for eliminating unacceptable interference when an ESMR or cellular telephone signal is solely implicated in an interference incident. In circumstances in which two or more ESMR or cellular telephone signals are implicated, strict responsibility must be reflected in the sources' joint and several responsibility for interference abatement. We say this in the knowledge that the interfering licensees are in the best position to determine their relative contributions to interference problems and to agree upon what specific measures must be undertaken by each licensee in order for interference abatement efforts to be effective. We wish it understood, however, that such responsibility does not attach merely because a licensee's cell is in the immediate vicinity of the locus of interference. Thus, we will not assign joint and several responsibility to ESMR and cellular telephone licensees that can demonstrate that their signals are not involved in a given interference case.³⁶³ However, in so saying, we emphasize that we have discounted claims, made earlier in this proceeding, categorically denying that

³⁶⁰ In imposing strict responsibility for the abatement of unacceptable interference we are doing no more than formalizing the interference-abatement responsibilities underlying the Commission's initial approval of cellular-architecture systems operating in the 800 MHz band. See *Fleet Call, Inc., Waiver Request* at 32-33. There the Commission noted that *Fleet Call's* statement about interference potential "firmly guides our consideration of *Fleet Call's* proposal." *Id.*

³⁶¹ See n. 305 and n. 306 *supra*.

³⁶² We decline to specify what remedies may be necessary in a particular circumstance, but observe that they could include responsibility for furnishing affected non-cellular systems with additional base stations or more interference-resistant mobile and portable radios.

³⁶³ See 47 C.F.R. §§ 22.971(b)(2) and 90.673(b)(2) in Appendix C *infra*.

licensees in the cellular telephone bands cause interference to 800 MHz public safety systems.³⁶⁴ There is strong evidence to the contrary.³⁶⁵ We will, therefore, require all involved parties, ESMR and cellular telephone licensees alike—and each of them severally—to respond to every complaint of interference to a non-cellular 800 MHz system with full cooperation and utmost diligence to abate objectionable interference in the shortest practicable time.

131. In sum, rather than impose stringent, across-the-board emission limits at this time, we are adopting rules that require ESMR and cellular telephone licensees to act only when and where it is evident that unacceptable interference is or will be caused to non-cellular 800 MHz systems, thereby affording such licensees a high degree of technical flexibility and minimizing the cost of interference avoidance.³⁶⁶ However, we will not extend the same level of flexibility to the procedures, and associated time limits, necessary to ensure that ESMR and cellular telephone licensees respond to complaints of interference to public safety/CII systems. Although some ESMR and cellular telephone licensees have been commendably cooperative in abating interference; the record shows that this has not always been the case.³⁶⁷ Thus, we assign ESMR and cellular telephone licensees strict responsibility for effectively curing actual or potential unacceptable interference to 800 MHz public safety/CII systems in the shortest practicable time.³⁶⁸ To a degree, this approach will test the wisdom of our forbearing system-wide stringent regulation of the technical aspects of ESMR and cellular telephone systems pending an assessment of whether licensees can successfully abate interference under the less stringent regulatory regime we establish today.

(iii) Interference Resolution Procedures

132. We agree with those commenting parties that urged adoption of standardized procedures for reporting 800 MHz interference, identifying its source and implementing a solution.³⁶⁹ We believe the effectiveness of such procedures is optimized if they are associated with specific compliance deadlines and the industry's use of a common method of disseminating interference complaint information and related communications.

³⁶⁴ See, e.g., Verizon Comments at 2; Southern LINC Comments at 11; and Cingular Comments at 2-3. Some parties argued that reports of interference were anecdotal in nature, and for that reason, did not represent a true evaluation of the problem. See Cinery Comments at 7-9.

³⁶⁵ See, e.g., Anne Arundel County *ex parte* letter dated July 29, 2003 at 2 (indicating that, in addition to Nextel, both Cingular and Verizon contribute to interference). See also Denver June 10 *Ex Parte* at 1 (stating that field measurements and analysis implicate AT&T Wireless as a source of interference).

³⁶⁶ See 47 C.F.R. §§ 22.972 and 90.674 in Appendix C *infra*.

³⁶⁷ See e.g., City of Portland, Oregon Comments at 3 (describing difficulty in securing Nextel's cooperation in resolving interference); Department of Information Technology, Fairfax County, Virginia Comments (indicating that Nextel causes interference but has implemented no mitigation measures); Attachment to Letter, dated September 17, 2003, from Alan H. Tilles, Counsel for City and County of Denver to Marlene H. Dortch, Secretary, Federal Communications Commission at 4 (stating that AT&T has taken no steps to mitigate ongoing interference).

³⁶⁸ See 47 C.F.R. §§ 22.972(c) and 90.674(c) in Appendix C *infra*.

³⁶⁹ See, e.g., Supplemental Comments of the Consensus Parties, Appendix F at F-5-6; Comments of Alltel, *et al.* to Supplemental Comments of the Consensus Parties, Appendix A at A-2-3; Comments of Consumers Energy to Supplemental Comments of the Consensus Parties, Appendix A at A-2-3; McDermott, Will and Emery *ex parte* presentation dated March 12, 2003, (McDermott, Will and Emery March 12 *Ex Parte*), Appendix A at A-2-3; 800 MHz User Coalition May 29 *Ex Parte*, Appendix A.

133. *Initial Notification.* We will require licensees operating cellular-architecture systems in or adjacent to the 800 MHz band (ESMR, Cellular A Band and Cellular B Band) to establish, within thirty days of the effective date of this *Report and Order*, a common electronic means of receiving initial notification of interference complaints from non-cellular 800 MHz licensees. Although we do not specify the means to be used, we do require that it be a single, common point (for example, a single, nationwide email address or web page) so that an affected entity need not provide multiple notices to different ESMR or cellular telephone licensees.³⁷⁰ We concur with the commenting parties who believe that, at a minimum, the initial interference complaint should include:

- the specific geographical location where the interference occurs, and the time or times at which the interference occurred or is occurring;
- a description of the scope and severity of the interference;
- the source of the interference if known;
- the relevant FCC licensing information of the party suffering the interference; and
- a single point of contact for the party suffering the interference.³⁷¹

134. The notification system shall be established on a strict “need-to-know” basis: the general public will not be able to access the system; only parties to a given interference complaint will have access to information concerning that complaint; and parties using the system will be required to agree to non-disclosure provisions. The Commission’s Enforcement Bureau, however, will have unrestricted access to all information in the system and will not be bound by any non-disclosure provisions.

135. The Consensus Parties, in their proposed “Policies and Procedures for Post-Realignment Interference Mitigation,”³⁷² recommended that we require any ESMR or cellular telephone licensee within a 5,000 foot radius of an interference site to respond to an interference complaint within a maximum of two days. Other parties recommended similar distances and response times.³⁷³ We believe the 5,000 foot radius is reasonable for purposes of identifying those parties that must respond to an interference complaint,³⁷⁴ but note that we will not absolve parties with cell sites outside that radius from the responsibility for eliminating unacceptable interference if it is demonstrated that they are the source

³⁷⁰ We note that Nextel currently has such a mechanism in place. Parties claiming that Nextel systems are causing interference to their systems can email public_safety@Nextel.com. See Attachment to Nextel October 22, 2003 *Ex Parte* at 3.

³⁷¹ See Comments of Cinergy to Supplemental Comments of Consensus Parties, Appendix A at A-2-3; Comments of Consumers Energy to Supplemental Comments of Consensus Parties, Appendix A at A-2-3; 800 MHz Users Coalition June 11, 2003 *Ex Parte* at 4.

³⁷² See Supplemental Comments of the Consensus Parties at Appendix F.

³⁷³ *Id.* at F 5-6; Comments of Alltel, *et. al* to Supplemental Comments of the Consensus Parties, Appendix A at A-2; McDermott, Will and Emery March 12 *Ex Parte*, Appendix A at A-2, item B.2; 800 MHz User Coalition May 29 *Ex Parte*, Appendix A at 5.

³⁷⁴ See *e.g.*, Motorola *ex parte* presentation dated October 30, 2002 (Using data taken in the Chicago area, Motorola demonstrates that—beyond 5,000 feet—the signal strength from ESMR base stations would be insufficient to cause intermodulation interference to a radio with 70 dB intermodulation rejection ninety-percent of the time).

thereof.

136. We are less sanguine about the recommendation that a response to an interference complaint could be delayed for up to two days.³⁷⁵ An unresolved incident of unacceptable interference impairs the ability of the affected public safety or CII licensee to respond to an emergency, large or small. Given the ease of communicating interference complaints electronically, and the fact that many, if not most, ESMR and cellular telephone licensees have technical staff available or on call on an around-the-clock basis in the normal course of business, we believe that a response must come in a matter of hours, not days. We thus conclude that it is not unduly burdensome to require a response to complaints from public safety or CII licensees with all possible speed, and under no circumstances, in more than twenty-four hours. In the case of other non-cellular 800 MHz licensees, (*i.e.*, B/ILT and non-cellular SMR licensees), the maximum response time shall be forty-eight hours, acknowledging that, for the most part, communications on these latter systems are not safety-related.

137. *Interference Analysis.* We will require licensees receiving an initial notification of interference to perform a timely analysis and identification of the interference, including, whenever necessary, an immediate on-site visit if they have cellular architecture equipment operating within 5,000 feet of the interference incident. Licensees must complete this analysis and initiate corrective action within forty-eight hours of the initial complaint if the licensee is a public safety or CII licensee. In the case of other non-cellular 800 MHz licensees, the time to complete the analysis and initiate corrective action shall be ninety-six hours. In both cases the time period may be extended if the affected licensee reasonably agrees, in writing (including e-mail or other electronic means which creates a record), to a longer period.

138. We disagree with those parties that suggest that the analysis or on-site visit could safely be delayed for up to five working days of the date of the original complaint.³⁷⁶ We assume that an ESMR or cellular telephone operator would not allow a failure in a critical element of its network to remain uncorrected for five working days, and thus believe that forty-eight hours (ninety-six hours in the case of other than public safety and CII systems) is a generous allowance for ESMR or cellular telephone carriers to determine (including making any necessary site visits), whether their operations are interfering with public safety, CII or other 800 MHz communications. In focusing on the obligations of ESMR and cellular telephone licensees we do not mean to imply that similar obligations do not attach to public safety, CII and other non-cellular 800 MHz licensees. They are bound by the good-faith obligation to exhibit the utmost cooperation with the ESMR and cellular telephone representatives, including, without limitation, the obligation to timely meet appointments and provide whatever technical assistance is appropriate under the circumstances.

139. *Mitigation Steps.* Although we leave the means whereby interference is abated to the discretion of the involved ESMR and cellular telephone licensees, we couple this discretion with an obligation on such licensees to provide all test equipment (and technical personnel skilled in the operation of such equipment) necessary to determine the most appropriate means of timely eliminating the interference. The record contains considerable guidance concerning techniques that parties can apply to the problem, including those described in the *Best Practices Guide*, the separately issued Motorola

³⁷⁵ See *e.g.*, Supplemental Comments of the Consensus Parties at Appendix F, § 3.2; 800 MHz User Coalition June 11, 2003 *Ex Parte* at 5.

³⁷⁶ See Supplemental Comments of the Consensus Parties at Appendix F at F 6; Comments of Alltel, *et. al.* to Supplemental Comments of the Consensus Parties, Appendix A at A-3; McDermott, Will and Emery March 12 *Ex Parte*, Appendix A at A-3, item 3; 800 MHz User Coalition May 29 *Ex Parte* presentation, Appendix A at 5.

Technical Appendix thereto,³⁷⁷ and the recently described measurement protocol for ascertaining the exact interference mechanisms involved in a given complaint.³⁷⁸ We expect parties to resolve interference in the shortest practicable time; however, should all short-term measures prove inadequate, we recognize that parties sometime cannot readily or rapidly implement other remedial measures—for example, “channel swaps” or the installation of new or modified base stations.³⁷⁹ In such cases, we believe a rule of reason should apply and that the licensee affected by interference, while not compromising safety, should make all necessary concessions to accepting the interference until the implementation of longer-term remedies.³⁸⁰ However, we will consider the failure to timely implement an interference abating remedy—whether it be near term or long term—as evidence of bad faith and will deal with it accordingly.

140. We also provide public safety licensees a “safety valve” for use when the continued presence of interference constitutes a clear and imminent danger to life or property.³⁸¹ Under such circumstances, we will require the interference source(s) to immediately discontinue operation, pending the identification and application of corrective measures. The request for this action: (a) must be made by affidavit or statement under penalty of perjury,³⁸² from an officer or executive of the affected public safety licensee; (b) shall completely describe the basis of the claim of clear and imminent danger; (c) must be stated to be on personal knowledge or on belief after due diligence; (d) may not be made by a contractor or other third party; and (e) will not be effective until approved by an official of the Commission’s Wireless Telecommunications Bureau or other authorized Commission official. The public safety party must serve the statement on the ESMR and/or cellular telephone licensee by hand-delivery or recorded fax and transmit a copy by fastest available means to the Washington, D.C., office of the Wireless Telecommunications Bureau.³⁸³ If the Wireless Telecommunications Bureau determines that the claim of imminent and present danger is valid, it will immediately refer the matter to the Enforcement Bureau for

³⁷⁷ See generally Appendix D *infra*.

³⁷⁸ See Motorola April 11, 2003, *ex parte* presentation to Federal Communications Commission Office of Engineering and Technology at 15-17.

³⁷⁹ In cases in which intractable interference problems have not yielded to other technical remedies, Nextel and public safety licensees have entered into agreements for “channel swaps,” whereby Nextel moves its 800 MHz ESMR operations to the public safety licensees’ channels and the public safety licensee relocates its operations to Nextel’s ESMR frequencies. Under these agreements, Nextel would pay all or most of the expense associated with equipment retuning or replacement. The Commission has granted several applications implementing channel swaps in Anne Arundel County, Maryland. See, e.g., Application for Modification of License of Station KNJU756, File No. 476003. The Commission is also reviewing another such agreements between Nextel and the City of Denver. We also have been informed that the city and county of San Diego, California are considering similar agreements. See generally, Denver SOW and San Diego *Ex Parte*. As yet, insufficient information exists on the results of channel swaps to allow us to assess their efficacy. However, we believe that the swaps will provide a test bed for band reconfiguration, to the extent they yield valuable information on process; *i.e.*, the time required to negotiate the agreements; the determination and apportionment of costs and responsibilities, the time required to make the necessary technical changes, and the disruption, if any, of public safety services.

³⁸⁰ Should disputes arise in connection with such matters, parties are encouraged to resolve them using arbitration, mediation or other alternative dispute mechanisms.

³⁸¹ We stress that we only provide this “safety valve” to public safety licensees.

³⁸² See 47 C.F.R. § 1.16.

³⁸³ The Washington, D.C. office of the Wireless Telecommunication Bureau is: 445 12th Street SW, Washington, D.C. 20554. Complaints should be addressed to the Public Safety and Critical Infrastructure Division.

appropriate action. Any party alleging intentional or negligent misrepresentation or omission in such an affidavit or statement made under penalty of perjury may submit documentation thereof to the Commission's Enforcement Bureau; whereupon the Enforcement Bureau may institute an enforcement action which could result in, without limitation, forfeitures and license revocation. Such Commission action would be in addition to, and not to the exclusion of, other remedies available under local, state or federal law.

141. Finally, we note that we will monitor interference complaint data on an ongoing basis to ensure the interference abatement objectives addressed in this proceeding will continue to be accomplished both before and after band reconfiguration. We emphasize that our responsibility to ensure that 800 MHz non-cellular licensees do not suffer from unacceptable interference from CMRS carriers will be complaint-driven, and we urge affected licensees to carefully monitor their systems and promptly report any incidents of unacceptable interference to the relevant CMRS carrier(s).³⁸⁴ To the extent that our experience reveals that the interference abatement procedures we adopt today require refinement to ensure high-quality 800 MHz public safety or CII service, we will do so as necessary.

C. Band Reconfiguration

142. As noted in the Introduction to this *Report & Order*, the root of the instant problem lies in fundamentally incompatible mix of two types of communications systems in the 800 MHz band: cellular-architecture multi-cell systems—used by cellular telephone and ESMR licensees—and high site systems—used by public safety, private wireless and non-cellular SMR licensees. For the reasons discussed below,³⁸⁵ we believe reconfiguring the 800 MHz band to separate these incompatible technologies, supplemented, when necessary with, Enhanced Best Practices provides the best long-term solution to the problem of interference in the 800 MHz band.³⁸⁶

1. Technical Issues Addressed by Band Reconfiguration

143. Segregating ESMR systems from non-cellular systems by placing them in opposite segments of the 800 MHz band will make it possible for ESMR and cellular telephone licensees to avoid some intermodulation interference. However, in some instances, consolidating ESMR channels into a single band segment may not—in and of itself—sufficiently reduce unacceptable intermodulation interference. The Radio Frequency (R.F.) carriers of systems in a consolidated ESMR band segment (and at least a portion of the R.F. carriers in cellular telephone systems), would still fall within the passband of all current public safety portable and mobile receivers. Thus, even in a reconfigured 800 MHz band, ESMR channels, or ESMR and cellular telephone channels could still, when combined in the receiver, generate intermodulation products. Therefore, as we discuss below, we believe that abatement of unacceptable intermodulation interference will require more than segregating cellular architecture systems from non-cellular systems.³⁸⁷ Thus, for example, ESMR licensees will have to make careful choice of channel selection such that two or more channels at a cell do not produce an intermodulation product falling on a public safety or CII channel.

³⁸⁴ We recommend, but do not require, that the affected parties keep records of interference complaints and the resolution thereof; and make such records available to the Commission on request.

³⁸⁵ See ¶¶ 143-146 *infra*.

³⁸⁶ We take these steps pursuant to our authority under Sections 316, 303, 301 and 154(i) of the Act. See ¶¶ 62-87 *supra* for our legal authority to address this issue.

³⁸⁷ See ¶ 144 *infra*.

144. Consolidating ESMR systems into one continuous segment in the upper portion of the 800 MHz band will provide ESMR licensees with greater flexibility in selecting channel pairs. The spacing between ESMR channels determines where intermodulation products will fall in the band. With closely spaced ESMR channels, the intermodulation products fall into—or just below—the upper portion of the ESMR segment of the reconfigured band. As the cell channel spacing increases, the intermodulation products become further removed from the ESMR band segment, extending further down into the non-cellular channels—including channels used by public safety systems. In the reconfigured band, a careful ESMR channel choice could reduce the potential for intermodulation interference generated between the ESMR channels in a given cell. Given careful coordination among licensees, it will also be possible, in some instances, to avoid intermodulation products formed by a combination of ESMR channels and cellular telephone channels. However, considerably more care is required when two licensees are involved. Close-spacing of channels is often not an option in that circumstance;³⁸⁸ however, it still may be possible to avoid channel combinations that result in intermodulation products falling on specific frequencies used by public safety/CII systems. This latter solution may be more difficult to implement when cellular telephone systems use dynamic channel allocation whereby the channels in a given cell can change frequently, e.g., on an hourly basis, in response to traffic loads. Moreover, some cellular telephone systems may make more use of technology, such as CDMA, in which wider bandwidth carriers produce IM products with a wider bandwidth thus potentially affecting more frequencies.

145. We believe that a reconfigured 800 MHz band will permit future public safety radios to be more interference resistant. Because there currently are public safety channels scattered throughout the 800 MHz band, from the bottom of the General Category band segment at 806 MHz/851 MHz to the top of the NPS/PAC channels at 824 MHz/869 MHz, the device called, variously, the “preselector” or “input filter” of the public safety radio must be sufficiently wide to cover the complete 851-869 MHz range, including the current ESMR channels which fall at 861-866 MHz. Narrowing the range of Public Safety frequencies allows equipment manufacturers to utilize narrower filters that will attenuate potentially interfering signals higher in the band.³⁸⁹

146. In sum, while band reconfiguration, in conjunction with careful engineering of cell sites, will reduce intermodulation interference between ESMR channels *inter sese*, it is apparent that particular care will have to be exercised when both ESMR and cellular telephone channels are implicated. In the long term, however, band reconfiguration will result in a net reduction in both unacceptable OOB and intermodulation interference for the following reasons:

- Nextel will completely relinquish rights to all of the interleaved channels, relieving OOB interference to licensees operating non-cellular systems on the interleaved portion of the band.³⁹⁰

³⁸⁸ For example, the Consensus Parties propose relocating all ESMR channels to the 862-869 MHz band segment while all cellular telephone channels would remain in the adjacent 869-894 MHz band segment. Thus ESMR and cellular telephone channels could be closely spaced only in the upper portion of the ESMR band segment, which corresponds to the lower portion of the cellular telephone band segment.

³⁸⁹ In a sense, the preselector or input filter is the “front door” of the radio which currently must be open wide enough that potentially interfering ESMR signals can enter unimpeded. However, when the 800 MHz band is reconfigured, the “front door” need be opened only widely enough to admit signals from 851-862 MHz. With the door not open as wide, signals above 862 MHz—including ESMR and cellular telephone signals—would have a difficult time squeezing through and causing interference.

³⁹⁰ See Supplemental Comments of the Consensus Parties at 14.

- Nextel will relocate its systems operating on General Category channels to the upper portion of the 800 MHz band, therefore relieving OOB interference that these systems currently can cause to non-cellular systems operating on channels immediately above the General Category channels.³⁹¹
- Reconfiguring the 800 MHz band to separate cellular systems from non-cellular systems will substantially reduce interference to public safety created by OOB by allowing ESMR licensees to replace current base station transmitter duplexers with new duplexers that will “roll-off” RF energy immediately below 862 MHz.³⁹²
- Consolidation of Nextel channels in the upper portion of the band will give ESMR operators and cellular telephone licensees greater flexibility to make a judicious choice of channel selection and channel spacing, thereby either confining potential ESMR intermodulation interference to a smaller portion of the non-cellular segment of the band, or limiting intermodulation products that fall on given CII or public safety channels.³⁹³
- We anticipate that, after band reconfiguration, equipment manufacturers will design public safety radios to cover only the portion of the 800 MHz band below 817/862 MHz because no public safety system will be operating in the ESMR spectrum above 817 MHz/862 MHz.³⁹⁴ Thus, with public safety radios no longer required to cover the entire 800 MHz band, the first R.F. amplifier (“preselector”) of the public safety radio can be designed to attenuate the potentially interfering ESMR and cellular telephone signals originating from systems that operate above 817 MHz/862 MHz.

147. Although reconfiguration of the 800 MHz band will eliminate the interference-prone interleaving of ESMR and public safety systems in the 800 MHz band, it will require changing the operating frequencies of many 800 MHz public safety, CII and other non-cellular licensees. This will be done incrementally in the fifty-five Regional Planning areas in the United States. In general, more modern 800 MHz systems can be changed in frequency with only minor changes, most of which can be implemented in software.³⁹⁵ Older systems may require part changes, and, in some instances, replacement of entire transmitters and receivers. The overall band reconfiguration process will also require spectrum

³⁹¹ *Id.*

³⁹² *Id.* at Appendix F, F-8 § 4.1.2.

³⁹³ See Attachment to Letter, dated September 17, 2002 [sic], filed September 22, 2003 from Alan S. Tilles, Esq. Counsel to the City and County of Denver to Marlene H. Dortch, Secretary, Federal Communications Commission at 7.

³⁹⁴ We expect that most public safety systems will operate below 814/859 MHz, but public safety systems will have the option of operating in the Expansion Band or Guard Band segments between 814-817/859-862 MHz should they elect to do so.

³⁹⁵ On July 30, 2003, the Consensus Parties conducted a live demonstration of base station and portable retuning using both Motorola and Kenwood equipment. The retuning was accomplished within a brief period without the need to change any system components. The “down-time” of the equipment was minimal. In one instance, the technicians demonstrated use of a portable base station that was substituted, temporarily, for the equipment being retuned. In the latter demonstration, the only “down-time” was the few seconds required to disconnect and reconnect the system antennas. The Consensus Parties do not claim, nor do we believe, that all systems could be retuned with equal facility; however the demonstration suggests that retuning time need not be a concern when modern equipment is involved.

“green space;” for example, Nextel systems in the General Category band segment would be moved temporarily into Nextel spectrum at 900 MHz, thereby “clearing” the General Category band segment. Next, the current NPSPAC channels would be moved into the cleared space at 806-809 MHz/851-854 MHz. Nextel has accomplished band reconfiguration before, albeit on a smaller scale, when it cleared the Upper 200 channels of incumbent users. Based on data derived from inspection of sixteen public safety systems of varying complexity, Nextel has estimated the total cost of band reconfiguration at \$850 million and has pledged to pay up to that amount. There is some disagreement over Nextel’s estimates; but no real basis of choosing among competing band reconfiguration proposals on the basis of price: Nextel is the only party to this proceeding that has made a firm commitment to absorb the cost of band reconfiguration, including reconfiguration of its own systems, a factor not included in the \$850 million estimate.³⁹⁶

148. We are sensitive to the concerns of those parties, including some public safety agencies whose systems do not now receive interference from ESMR and cellular telephone cells, who assert that reconfiguring the 800 MHz band could unnecessarily disrupt their communications while their operating frequencies are changed, or that their new channels would not be comparable to their original channels.³⁹⁷ We are committed to ensuring that band reconfiguration will not result in degradation of existing service. We believe the rules we adopt today will ensure both continuity of service and “comparable facilities.” With respect to the latter, we note that the rules we adopt today track rules the Commission has successfully used to accomplish previous band reconfigurations.³⁹⁸

2. New 800 MHz Band Plan

a. Band Plan Overview

149. In evaluating the various band reconfiguration plans submitted in this proceeding, we sought to identify, in each plan, five principal components that we deemed essential to the final “Commission Band Plan”:

- The extent to which a plan would abate unacceptable interference to non-cellular systems operating in the 800 MHz band.
- The extent to which incumbents would be treated most fairly, including the degree of disruption associated with channel changes, the ability to provide relocated incumbents with truly comparable spectrum and minimum interruption of critical public safety and CII communications. These factors weighed heavily in our rejection of proposed band plans that contemplated using the Upper 700 MHz spectrum for public safety systems.³⁹⁹

³⁹⁶ The Consensus Plan envisions that Nextel would fund the reconfiguration of its own systems separately. See Attachment to Letter, dated March 14, 2004, from Regina M. Keeney, Esq., Counsel to Nextel to Marlene H. Dortch, Secretary Federal Communications Commission.

³⁹⁷ Some such concerns were directed to the Nextel *White Paper* proposal in which B/ILT and non-cellular SMR facilities all were to be relocated to the 700 MHz Guard Band and the 900 MHz land mobile band. That proposal was superseded by the band plan proposed by the Consensus Parties, which retains incumbents in the 800 MHz band, excepting those electing a “2 for 1” proposal whereby they would obtain double their existing spectrum if they relocated from 800 MHz to 900 MHz. See Supplemental Comments of the Consensus Parties at 13.

³⁹⁸ See, e.g., 47 C.F.R. § 90.699(d).

³⁹⁹ The proposal to use the Upper 700 MHz band for public safety was advanced by, among others, AT&T Wireless, Cingular, Alltel, Southern LINC and CTIA. See AT&T Wireless Comments at 7-14; Cingular and Alltel Comments at 16-19; CTIA Comments at 9-10; Alltel, *et al.* Reply Comments at 15-18; CTIA Reply Comments at 4- (continued....)