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]

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[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]

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[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] 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*

(Continued from previous page)
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 OOBE interference.[273] Some parties claim that most of the interference is of the intermodulation type; others contend that the division between intermodulation interference and OOBE 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 OOBE 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 OOBE. 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 relationship[276] 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: $P_{intermod.} = 2*F1-F2$ and $P_{intermod.} = 2*F2 - F1$. The fifth order, two frequency intermodulation products within the 800 MHz band are calculated by: $P_{intermod.} = 3*F1 - 2*F2$ and $P_{intermod.} = 3*F2 - 2*F1$. 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 $P_{intermod.} = F1+F2 - F3$ and $P_{intermod.} = F2-F1+F3$. 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 dBμV/m contour (VHF) or a 39 dBμV/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 then 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 carrier[289] 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

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[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

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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 OOBE 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 OOBE standards would add cost and complexity—but no benefit—to those cells in a system in which, because of their location, or otherwise, unacceptable OOBE 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 then -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

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[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 OOBE 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 Practices[338] 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

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[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 Practices[350]—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 OOBE 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 OOBE 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.

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[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* Cinergy 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).