

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

In the Matter of)	
)	
Improving Public Safety Communications)	
in the 800 MHz Band)	
)	WT Docket No. 02-55
Consolidating the 900 MHz Industrial/ Land Transportation and Business Pool Channels)	

EX PARTE SUBMISSION OF THE CONSENSUS PARTIES

Aeronautical Radio, Inc. (“ARINC”)
The American Mobile Telecommunications Association (“AMTA”)
The American Petroleum Institute (“API”)
The Association of American Railroads (“AAR”)
The Association of Public-Safety Communications Officials-International, Inc.
 (“APCO”)
The Forest Industries Telecommunications (“FIT”)
The Industrial Telecommunications Association, Inc. (“ITA”)
International Association of Chiefs of Police (“IACP”)
The International Association of Fire Chiefs, Inc. (“IAFC”)
International Municipal Signal Association (“IMSA”)
The Major Cities Chiefs Association (“MCC”)
The Major County Sheriffs’ Association (“MCSA”)
The National Sheriffs’ Association (“NSA”)
National Stone, Sand and Gravel Association (“NSSGA”)
Nextel Communications, Inc. (“Nextel”)
PCIA – The Wireless Infrastructure Association (“PCIA”)
The Taxicab, Limousine and Paratransit Association (“TLPA”)

August 7, 2003

SUMMARY

In this *ex parte* presentation, the Consensus Parties provide additional information in support of the Consensus Plan for 800 MHz Realignment (the “Consensus Plan”). Specifically, the Consensus Parties demonstrate that the interference plan proposed by the United Telecom Council, the Cellular Telecommunications and Internet Association and other parties (the “UTC/CTIA proposal”) will not work and will lead inevitably to a morass of lengthy Federal Communications Commission (“Commission”) proceedings. We further demonstrate that the improved public safety receiver performance Motorola describes in its June 20 *ex parte* letter will not eliminate 800 MHz public safety interference, and that the interference countermeasures proposed in Motorola’s “technical toolbox” have already been tried and found wanting.

In contrast, the Consensus Plan is the only plan that provides public safety more communications capacity to protect, save and serve their fellow citizens. The Consensus Plan will prevent interference to first responders’ radios – a problem that is growing every day throughout the nation – and it does so without any federal, state or local taxpayer funding. Moreover, the Consensus Plan is the *only* plan before the Commission that has earned the support of the leading national public safety organizations and the leading national private wireless organizations.

As can be seen in the list of Consensus Plan proponents on page viii of this Summary, more than 75 entities have already indicated their support of the Consensus Plan. In particular, public safety organizations that have experienced and/or continue to experience interference almost every day believe that the Consensus Plan is the only plan before the Commission that corrects the underlying causes of this interference, instead of

merely applying a band-aid to the problem. For example, the Public Safety Communication Division of Orange County, Florida, states:

We have reviewed the various proposals for addressing this interference problem and concluded that . . . the proactive approach outlined in the consensus plan is the only one that *solves* the problem. The ‘wait until the problem surfaces’ approach offered by other plans continues to jeopardize the safety of first responders.¹

Anne Arundel County, Maryland, which has experienced harmful interference from commercial wireless (“CMRS”) providers for approximately five years, informs the Commission that, “[u]ntil the [800 MHz] spectrum is ‘de-interleaved’ and the disparate technologies used by CMRS carriers and public safety systems are separated, we cannot predict every possible ‘dead spot’ caused by our incompatible systems and our public safety personnel will be at risk.” Anne Arundel states that the Consensus Parties’ plan “presents a spectrum realignment proposal that attacks the heart of the interference problem.”²

The National Public Safety Telecommunications Council (“NPSTC”) has stated that UTC/CTIA’s so-called “Balanced Approach” is

neither balanced nor constitutes a plan to remedy the incompatibility between the ‘high-site’ systems operated by most Public Safety agencies and the ‘low-site’ systems operated by Nextel and other commercial providers. . . .

¹ Letter from Tom Sorley, Orange County, FL Public Safety Communications, to Marlene Dortch, FCC Secretary, WT Docket No. 02-55 (June 30, 2003) (filed July 31, 2003) (emphasis in original) (“Orange County Letter”). (Unless otherwise indicated, all comments and *ex parte* submissions referenced herein were filed in WT Docket No. 02-55.)

² Letter from Linda Schuett, Anne Arundel County, to Marlene Dortch, FCC Secretary, at 2-3 (July 29, 2003) (filed July 30, 2003).

....

In contrast to the underlying premises of the Consensus Plan to pro-actively address the circumstances which give rise to the interference, to maintain Public Safety communications systems while frequencies are being modified, and to finance the cost to Public Safety users to achieve the transition, the ‘Balanced Approach’ puts Public Safety communications officers and the public at continuing risk of harmful interference and imposes unfunded financial obligations on Public Safety.³

As the record in this proceeding demonstrates, the Consensus Plan has consistently evolved to embrace the concerns of as many affected parties as possible to achieve improved communications and full spectrum use for all 800 MHz licensees. Consistent therewith, the Consensus Parties propose herein certain revisions to the interference protection criteria proposed in Appendix F of the Consensus Plan. These revisions will provide enhanced post-realignment interference protection to all non-cellular channel block licensees. In particular, guard band licensees will enjoy enhanced interference protection from adjacent cellular channel block operations comparable to that of non-cellular block licensees in the 854 – 859 MHz channel block. Simply put, with these revisions, incumbents in the post-realignment guard band channels will receive the full interference protection benefits of the Consensus Plan.

These Appendix F revisions eliminate any legitimate concerns that the guard band would, post-realignment, be “second class” spectrum. All non-cellular channel block high-site operators – public safety and private wireless – will receive comparable protection from the interference that is a by-product of interleaved and adjacent low-site and high-site 800 MHz operations. As a result, the post-realignment reduction in the

³ Letter from Marilyn Ward, NPSTC, to Tara Shostek, Irwin, Campbell & Tannenwald, at 1-2 (June 11, 2003) (filed July 8, 2003) (“NPSTC June 11 Letter”).

probability of interference to the new NPSPAC band would be 99.8 percent, in the 854-859 MHz block interference would be reduced by over 95 percent and in the Guard Band by 83 percent. The slight remaining instances of interference that are not cured by realignment can be addressed through technical measures by CMRS providers, which in the post-realigned band, would be far easier to implement.

The Consensus Parties file this presentation nearly one month before the second anniversary of the unprecedented September 11 terrorist attacks on our country. September 11 has served to heighten the critical need for public safety communications. Yet the problems of 800 MHz interference and the shortage of public safety spectrum only continue. In the aftermath of September 11, the Commission initiated this rulemaking in March 2002 to improve 800 MHz public safety communications by eliminating CMRS – public safety interference. As Orange County, Florida, states, “The worst part of this interference is that we do not know we are being interfered with until a user complains.”⁴ This interference can prevent a police officer’s call for back-up from getting through, a fire fighter’s call for help from a burning building from being heard, or prevent a rescue worker from hearing the location of a heart attack victim during those critical minutes when every second counts. Yet, nearly 17 months after issuing its Notice in this proceeding, the Commission has not adopted a proactive solution to this pressing problem.

The Consensus Parties respectfully submit that the Commission’s recently adopted spectrum management guidelines and the objectives it established for this proceeding provide a beacon through the jungle of competing claims. In initiating this

⁴ Orange County Letter at 1.

rulemaking the Commission identified three objectives: (1) remedying interference to 800 MHz public safety systems; (2) minimizing disruption to existing licensees in remedying this interference; and (3) ensuring sufficient spectrum for critical public safety communications.

The Consensus Plan achieves each of these objectives: it will correct the interleaving of incompatible low-site and high-site systems in the Commission's 800 MHz spectrum allocation that is the fundamental cause of CMRS – public safety interference. No other plan even attempts to correct this fundamental problem, offering instead band-aid patches and reactive “after-the-fact” temporary fixes. The Consensus Plan leverages Nextel's presence throughout the band to create “green space” to make realignment possible, thereby leaving 70 percent of all private wireless licensees completely unaffected by realignment. The Plan provides the necessary equipment, funding and procedures to ensure that relocated public safety and private wireless licensees will experience minimal, if any, disruption, and that essential communications services remain constantly on the air. Equally important, only the Consensus Plan makes additional 800 MHz spectrum available for almost immediate public safety use – to provide the additional capacity needed to carry out increased homeland security responsibilities and protect the American people.

Applying the principles the Commission recently endorsed in its Spectrum Policy Task Force Report further illuminates that the Consensus Plan is the right solution to 800 MHz public safety interference. The Report recommends that: (1) technically compatible systems be grouped in the same frequencies; (2) that the Commission's regulations and policies provide licensees with maximum flexibility so that they can make the most

efficient use of scarce spectrum; and (3) that the Commission's rules clearly define the spectrum rights and responsibilities of affected licensees.

Of the proposals before the Commission, only the Consensus Plan *separates technically incompatible systems* in order to group *technically compatible operations together* as “good neighbors” in the same channel block. Second, as noted above, the essence of the Consensus Plan spectrum realignment is to enable all 800 MHz licensees – cellular, public safety, private wireless and others – to operate with minimal restrictions and be free to make the maximum efficient use of scarce spectrum resources.

In contrast, the UTC/CTIA plan would impose significant operating restrictions on Nextel, but not on the cellular carriers equally adjacent to the largest block of public safety spectrum, and it provides for more restrictions in response to reports of interference. The essence of the UTC/CTIA plan is to restrict efficient spectrum use. Similarly, Motorola's “technical toolbox” would impose a mix of reactive operating restrictions on CMRS operators to protect non-cellular operations without regard to system designs, spectrum efficiencies and receiver performance parameters. Moreover, these measures have been tried, and have failed to stem the rising incidence of public safety interference.

The Consensus Plan offers the Commission an unprecedented, detailed definition of the post-realignment spectrum rights and responsibilities of all affected licensees to prevent a reoccurrence of this problem in the future. The alternate plans have no comparable provisions; indeed UTC/CTIA's case-by-case, band-aid approach would spawn endless post-interference negotiations among licensees and would inevitably

require the Commission to resolve such issues through cumbersome, never-ending *ad hoc* complaint procedures.

The UTC/CTIA proposal and the Motorola technical toolbox are also inconsistent with the Commission's decision in the 700 MHz Guard Band proceeding. There, the Commission established Guard Bands to separate public safety and cellular systems, finding that adjacent channel cellular systems posed too great an interference threat to public safety operations. The record contains no explanation of how it can be possible, therefore, to maintain adjacent and interleaved public safety and cellular operations in the 800 MHz band, despite the well-documented evidence of extensive interference from cellular to 800 MHz public safety and private wireless systems.

Broad Support for the Consensus Plan

The signatories to the Consensus Plan represent more than **90 percent** of all affected licensees in the 800 MHz Land Mobile Radio band.

Consensus Parties

Public Safety

Association of Public Safety Communications Officials-
International
International Association of Chiefs of Police
International Association of Fire Chiefs, Inc.
International Municipal Signal Association
Major Cities Chiefs Association
Major County Sheriffs' Association
National Sheriffs' Association

Private Wireless & CMRS

Aeronautical Radio, Inc.
American Mobile Telecom. Assn.
American Petroleum Institute
Association of American Railroads
Forest Industries Telecommunications
Industrial Telecommunications Association
PCIA - The Wireless Infrastructure Assn.
Taxicab, Limousine and Paratransit Assn.
National Stone, Sand and Gravel Assn.
Nextel Communications

Other Supporters

Public Safety & Local Government

National Association of Counties
Nat'l Assn. of Telecom. Officers & Advisors
National League of Cities
U.S. Conference of Mayors
National Public Safety Telecommunications Council
Amer. Assn. of State Highway and Transp. Officials
Forestry Conservation Communications Association
International Association of Emergency Managers
National Association of State Foresters
Ogden City, Utah
City of Ft. Lauderdale, Florida
Orange County, Florida
City and County of Denver, Colorado
City of Salem, Oregon – Communications Division
King County Regional Communications Board

Private Wireless & Equipment Providers

Federal Express	Graybill Electronics	KLL Wireless
Northwest Airlines	Highland Wireless Services	New York Communications
United Airlines	Miller Communications	Company
IE Communications	Monroe Communications	North Sight Communications
Intel Corporation	Ohio Valley 2-Way Radio	Pete's Communications
Lucent Technologies	P&R Communications Service	SR Communications Associates
Motient Communications	Radio Service Company	Ragan Communications
RACOM Corp.	Sutter Buttes Communications	Skyline Communications
RA-Comm	Wells Communications Service	Smartlink Communications
Skitronics	Bell Interconnect	Blue Mountain Communications
Action Communications.	Commtronics of Virginia	Business Radio, Inc.
Apache Corporation	Communications and Industrial	G & P Communications
Battles Communications	Electronic Corporation	Business Communications Corp.
Telecommunications NA, BP	CNY, Inc.	Coastal Electronic
BearCom	JPJ Electronic Communications	
Columbia Communications	Ka-Comm	

Table of Contents

	Page No.
I. THE COMMISSION SHOULD BE GUIDED BY THE PRINCIPLES ESTABLISHED BY THE NPRM, THE RECORD IN THIS PROCEEDING, AND THE SPECTRUM POLICY TASK FORCE REPORT	3
II. UNLIKE THE CONSENSUS PLAN, THE UTC/CTIA AND MOTOROLA SUBMISSIONS FAIL TO PROVIDE ADDITIONAL SPECTRUM TO PUBLIC SAFETY SERVICES	6
III. NO OTHER PROPOSAL IN THIS PROCEEDING IS CONSISTENT WITH THE FCC’S FINDINGS IN THE SPECTRUM POLICY TASK FORCE REPORT AND THE 700 MHz GUARD BAND PROCEEDING	9
IV. THE UTC/CTIA PROPOSAL FAILS TO SATISFY THE FCC’S KEY PRINCIPLES IN THIS PROCEEDING AND SHOULD BE REJECTED	12
A. A Two-Step Approach That Relies on Continued Mitigation Practices and Yet Another Assessment of Their Ineffectiveness Would Only Delay Band Realignment	12
B. The Commission Has Already Found That Mitigation Techniques Do Not Alleviate Public Safety Interference in the 800 MHz Band and Impose Substantial Burdens	15
1. <i>UTC/CTIA Propose Mitigation Techniques That Are Virtually Identical to Those Contained in the Best Practices Guide</i>	15
2. <i>Best Practices Mitigation Techniques Are Inherently Reactive, Leaving First Responders at Risk</i>	18
3. <i>UTC/CTIA’s Proposed Mitigation Techniques Impose Substantial Burdens and Spectrum Inefficiencies</i>	21
4. <i>Best Practices Cannot Manage the Increasing Incidence of 800 MHz Interference</i>	24

5.	<i>NPSPAC Systems Will Suffer Severe Interference If They Remain Sandwiched Between CMRS Licensees Deploying Wideband Systems</i>	27
6.	<i>The UTC/CTIA Proposal Arbitrarily Exempts Cellular Carriers from Mitigation Obligations</i>	29
7.	<i>The Interference Provisions of the UTC/CTIA Proposal Are Either Impractical, Ineffectual, Unclear, or Pointless</i>	31
	<i>a. Private market agreements</i>	31
	<i>b. ERP limits for low-site base stations</i>	32
C.	The UTC/CTIA Proposal Would Impose Unfunded Burdens on Public Safety Operators and Embroil the Commission in Endless Interference Disputes	32
V.	MOTOROLA’S PROPOSED TECHNICAL TOOLBOX, AS CLARIFIED BY ITS JUNE 20 LETTER, FAILS TO SATISFY THE FCC’S KEY PRINCIPLES IN THIS PROCEEDING	34
A.	There is No Way to Predict Where and When Interference to Public Safety Communications Will Occur, a Reality That Makes Motorola’s “Technical Toolbox” Inherently Reactive	35
B.	Motorola’s Proposed Technical Toolbox Would Not Eliminate 800 MHz Interference Resulting from CMRS Out-of-Band Emissions	37
1.	<i>Use of External Filtering</i>	38
2.	<i>Reduced CMRS Transmitter Power</i>	40
3.	<i>Use of Directional Antennas to Minimize On-ground Radiation</i>	41
4.	<i>Increased CMRS Transmitter Height</i>	41
5.	<i>Ad Hoc, Localized Frequency Swapping</i>	42
6.	<i>Increased Public Safety Signal Strength</i>	43

<p>C. The Incorporation of Switchable Attenuators into Receivers, While Welcome, Will Not By Itself Eliminate CMRS – Public Safety Interference</p>	<p>44</p>
<p>VI. THE CONSENSUS PARTIES PROPOSE ADDITIONAL INTERFERENCE PROTECTIONS FOR POST-REALIGNMENT GUARD BAND LICENSEES AND NON-CELLULAR INCUMBENTS</p>	<p>45</p>
<p>VII. CLARIFICATION OF ELIGIBILITY FOR PAYMENT OF RETUNING EXPENSES</p>	<p>50</p>
<p>VIII. CONCLUSION</p>	<p>53</p>

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EX PARTE SUBMISSION OF THE CONSENSUS PARTIES

The nation’s leading public safety organizations, major private wireless trade associations, and Nextel (collectively, the “Consensus Parties”⁵) hereby file this written *ex parte* presentation to address several issues in this proceeding: *First*, the Consensus Parties respond to the recent *ex parte* letters filed by the United Telecom Council (“UTC”), the Cellular Telecommunications and Internet Association (“CTIA”), and other parties that propose the continued use of various mitigation techniques to address commercial mobile radio service (“CMRS”) – public safety interference in the 800 MHz

⁵ The Consensus Parties include the following entities: Aeronautical Radio, Inc. (“ARINC”), the American Mobile Telecommunications Association (“AMTA”), the American Petroleum Institute (“API”), the Association of American Railroads (“AAR”), the Association of Public Safety Communications Officials-International, Inc. (“APCO”), the Forest Industries Telecommunications (“FIT”), the Industrial Telecommunications Association, Inc. (“ITA”), the International Association of Chiefs of Police (“IACP”), the International Association of Fire Chiefs, Inc. (“IAFC”) and International Municipal Signal Association (“IMSA”), the Major Cities Chiefs Association (“MCC”), the Major County Sheriffs’ Association (“MCSA”), the National Sheriffs’ Association (“NSA”), National Stone, Sand and Gravel Association (“NSSGA”), Nextel, PCIA – The Wireless Infrastructure Association (“PCIA”), and the Taxicab, Limousine and Paratransit Association (“TLPA”).

band (the “UTC/CTIA Proposal”).⁶ *Second*, the Consensus Parties respond to a letter filed by Motorola, Inc. (“Motorola”) on June 26, 2003, elaborating on its recent efforts to improve the performance of its 800 MHz public safety radios.⁷ *Third*, the Consensus Parties modify certain aspects of Appendix F attached to the Supplemental Comments they filed in this proceeding on December 24, 2002. These modifications provide increased interference protection for licensees that will be located in the proposed non-cellular block post-realignment. In particular, these modifications provide interference protection to post-realignment Guard Band licensees (at 859–861 MHz) comparable to that accorded other non-cellular block licensees. *Fourth*, the Consensus Parties clarify certain key provisions of the Consensus Plan that have been mischaracterized in recent filings at the Commission, including those relating to (i) eligibility for payment of incumbent retuning expenses, and (ii) permissive cellularization by licensees operating below 816/861 MHz.

The Consensus Parties – including the nation’s seven leading public safety organizations – believe that the record in this proceeding, as supplemented by this filing, conclusively demonstrates that the Consensus Plan is the only practical, sustainable means of achieving the Commission’s public interest objectives consistent with its new spectrum management policy guidelines, the *NPRM*, and relevant precedent. We urge

⁶ 800 MHz User Coalition proposal, attached to Letter from Diane Cornell, CTIA, to Marlene Dortch, FCC Secretary (June 11, 2003) and Letter from Jill Lyon, UTC, to Marlene Dortch, FCC Secretary (May 29, 2003).

⁷ Letter from Steve Sharkey, Motorola, Inc., to James Schlichting, Office of Engineering and Technology, FCC (June 20, 2003) (filed June 26, 2003) (“Motorola June 20 Letter”).

the Commission to issue a Report and Order adopting the Consensus Plan as soon as possible.

I. THE COMMISSION SHOULD BE GUIDED BY THE PRINCIPLES ESTABLISHED BY THE *NPRM*, THE RECORD IN THIS PROCEEDING, AND THE SPECTRUM POLICY TASK FORCE REPORT

The Commission’s assessment of the recent UTC/CTIA and Motorola submissions, as well as any other proposal in this proceeding, should be guided by the objectives and principles that have been established by the *NPRM*, the record developed in response to the *NPRM*, and the Commission’s Spectrum Policy Task Force Report issued last year.

The NPRM and the Record. The Commission issued the Notice of Proposed Rulemaking (“*NPRM*”) in this proceeding in March 2002,⁸ and a voluminous record has been developed – over 700 submissions totaling more than 11,000 pages. The Commission articulated three objectives in the *NPRM*.⁹ These objectives, as refined by certain basic principles that have emerged from the record, should guide and inform the Commission’s decision:

- Remedy interference to 800 MHz public safety systems.
- Minimize disruption to existing licensees in addressing this interference problem.
- Ensure sufficient spectrum for critical public safety communications.

⁸ *Improving Public Safety Communications in the 800 MHz Band; Consolidating the 900 MHz Industrial/Land Transportation and Business Pool Channels*, Notice of Proposed Rulemaking, 17 FCC Rcd 4873 (2002) (“*NPRM*”).

⁹ *NPRM* ¶ 2.

As the Commission makes clear in the *NPRM*, the primary goal of this proceeding is eliminating the CMRS – public safety interference that threatens the safety of our Nation’s first responders and the public they serve.¹⁰ Achieving this outcome – which is of overriding importance to the nation’s public safety organizations – requires a comprehensive approach that proactively addresses all forms of CMRS – public safety interference, including intermodulation (“IM”) and out-of-band emissions (“OOBE”). *Reliance on after-the-fact interference mitigation is unacceptable*; as detailed in the record in this proceeding, action must be taken to prevent interference before it occurs and causes a tragedy. The Commission can accomplish this goal, provided it refuses to settle for partial or “band-aid” fixes that leave the underlying problem unresolved.

In keeping with the *NPRM*’s second principle, any solution to 800 MHz interference must be equitable and non-punitive. Nearly all commenters agree that no incumbent licensee should lose spectrum, and that any viable, realistic solution must include sufficient funding. The record in this proceeding demonstrates that public safety agencies in particular have severely limited budgets and cannot be expected to undertake significant financial burdens to remedy 800 MHz interference.

Finally, consistent with the third principle, the public safety community has demonstrated that it must obtain additional spectrum to facilitate interoperability and to meet its increased Homeland Security requirements. Therefore, alternatives that do not provide additional spectrum for public safety communications systems do not satisfy the Commission’s public interest objectives in this proceeding. Only the Consensus Plan meets this criterion, as discussed further below.

¹⁰ *Id.*

The Spectrum Policy Task Force Report. In November 2002, the Commission’s Spectrum Policy Task Force issued “recommendations to modernize the rules that guide how the nation’s spectrum is managed and utilized.”¹¹ The report included three spectrum management principles that are of particular importance in this proceeding:¹²

- Technically compatible systems should be grouped together in the same set of frequencies.
- The Commission’s rules should provide licensees with maximum flexibility to make the most efficient use of scarce spectrum resources.
- The Commission’s rules should provide a clear and exhaustive definition of the spectrum rights and responsibilities of affected licensees.

As described in the following sections, the UTC/CTIA Proposal and Motorola’s technical toolbox are inconsistent with these principles. UTC/CTIA would (i) leave incompatible systems intermixed, (ii) impose a simplistic and reactive “interferor fixes it” policy that will inevitably embroil the Commission in technically complex, extensive evidentiary proceedings to determine which licensee is responsible for interference in a particular incident, *i.e.*, determining spectrum rights and responsibilities left ambiguous by the UTC/CTIA plan, and (iii) impose a set of stringent operating restrictions on certain carriers that will preclude flexibility and efficient spectrum use.

Motorola’s technical toolbox, standing alone, suffers from the same deficiencies when tested against the Commission’s spectrum management guidelines. It fails to group technically compatible systems together; quite to the contrary, the technical toolbox

¹¹ FCC News Release, “Spectrum Policy Task Force Presents Recommendations for Spectrum Policy Reform,” ET Docket No. 02-135, at 1 (Nov. 7, 2002).

¹² Report of the Spectrum Policy Task Force, ET Docket No. 02-135, at 15-19, 22 (filed Nov. 15, 2002) (“*Spectrum Policy Task Force Report*”).

would maintain the current mishmash of technically incompatible systems on co-channel, interleaved, and adjacent channels, thereby perpetuating the conditions that give rise to CMRS – public safety interference. It also relies on case-by-case mitigation measures that would restrict the flexibility of both CMRS and public safety licensees to make the most efficient use of scarce spectrum resources; on the contrary, the technical toolbox would institutionalize the inefficient underutilization of 800 MHz spectrum, as detailed further herein.

II. UNLIKE THE CONSENSUS PLAN, THE UTC/CTIA AND MOTOROLA SUBMISSIONS FAIL TO PROVIDE ADDITIONAL SPECTRUM TO PUBLIC SAFETY SERVICES

One of the Commission’s objectives in this proceeding is to ensure sufficient spectrum for critical public safety communications.¹³ As commenters have demonstrated, there is an urgent need for additional public safety spectrum to promote interoperability and to meet other public safety needs. Neither the UTC/CTIA Proposal nor Motorola’s “technical toolbox,” however, even addresses this issue.

In contrast, the Consensus Plan will provide additional, urgently needed spectrum for public safety communications, and it will do so in the near term without requiring legislation or federal taxpayer funding.¹⁴ Following the Consensus Plan realignment, the remaining Nextel-vacated spectrum in the non-cellularized block at 809-814/854-859

¹³ See *supra* Section I; *NPRM* ¶ 2.

¹⁴ Post-realignment, the Consensus Plan frees up about 2.5 MHz of spectrum between 809/854 MHz and 814/859 MHz for public safety communications systems. This would increase public safety’s allocation in the 800 MHz band by 25 percent.

MHz will be available exclusively to public safety applicants for five years.¹⁵ By reallocating Nextel's 900 MHz Specialized Mobile Radio ("SMR") channels for Business/Land Transportation ("B/ILT") and traditional SMR use and by providing a 2:1 spectrum incentive for 800 MHz B/ILT and high-site SMR licensees to relocate voluntarily to the 900 MHz band, the Consensus Plan would clear as much as 2 MHz of additional 800 MHz spectrum for public safety use. In addition, the Consensus Plan includes the reallocation of Nextel's near-nationwide 4 MHz Guard Band licenses in the 700 MHz band for public safety use.¹⁶

Providing additional 700 and 800 MHz spectrum to the public safety community is particularly important. This spectrum will greatly benefit public safety agencies, since (i) the propagation characteristics of the 700 and 800 MHz bands are well-suited for the wide-area coverage requirements of public safety systems, and (ii) public safety services have already been allocated spectrum in both of these bands, resulting in improved interoperability and economies of scale in the design and production of new equipment for these public safety systems.¹⁷ Public safety licensees will be able to use this

¹⁵ After five years, any remaining unused spectrum will be available to both public safety and private wireless systems.

¹⁶ Even though operations in the 700 MHz Guard Band frequencies will be subject to certain technical constraints, various public safety needs can still be met with this spectrum. Public safety applications such as security details at federal and state courthouses, university campuses, shopping malls, and airports could be deployed on a low-power basis to ensure that they would be "good neighbors" to adjacent mission critical public safety and commercial systems. In addition, because such applications could be limited to in-building, campus locations, they should be less vulnerable to interference from potentially adjacent CMRS systems.

¹⁷ A number of state governments, including Florida, Michigan, and Ohio, are already investing hundreds of millions of dollars to deploy new systems in the 800 MHz band.

additional spectrum to expand public safety system capacity nationwide, and to foster interoperability among public safety communications systems within and across administrative, political, and geographic boundaries. The 800 MHz band has proven to be particularly effective for trunked, multi-jurisdictional public safety systems, which can provide inherent interoperability.¹⁸ As the task force on America's emergency response capability recently recognized, such interoperability is critical for first responders in the post-September 11th environment;¹⁹ the task force found that additional funds are needed "to foster interoperable communications systems for emergency responders across the country so that those on the front lines can communicate with each other while at the scene of an attack."²⁰ Now, with the submission of the Consensus Plan, the Commission has a unique opportunity to make this a reality by providing this much-needed interoperability spectrum.

¹⁸ For example, many county governments across the nation have built county-wide 800 MHz systems to accommodate nearly all police, fire, EMS and other public safety agencies within the county. When neighboring counties (or the state) also construct such systems, regional interoperability becomes a reality.

¹⁹ See Warren B. Rudman, Richard A. Clarke & Jamie F. Metz, *Emergency Responders: Drastically Underfunded, Dangerously Unprepared*, Report of an Independent Task Force Sponsored by the Council on Foreign Relations, at 2-3 (June 29, 2003) (available at: <http://www.cfr.org/pdf/Responders_TF.pdf> ("Report on Emergency Responders").

²⁰ *Report on Emergency Responders* at 3. Overall, the report found that "America will fall approximately \$98.4 billion short of meeting critical emergency responder needs over the next five years if current funding levels are maintained." *Id.* at 2.

III. NO OTHER PROPOSAL IN THIS PROCEEDING IS CONSISTENT WITH THE FCC'S FINDINGS IN THE SPECTRUM POLICY TASK FORCE REPORT AND THE 700 MHz GUARD BAND PROCEEDING

The UTC/CTIA Proposal would rely on a complex set of frequency coordination procedures, mitigation techniques, and technical rule changes to address CMRS – public safety interference. A similar approach would result if the Commission relied on Motorola's "technical toolbox" without realigning the band. As explained below, these proposals directly contradict several key principles set forth in the Spectrum Policy Task Force Report adopted last year.

First, these proposals would forego the opportunity offered by the Consensus Plan to realign the band to group technically compatible systems together – high-site public safety and private wireless systems below 816/861 MHz and low-site cellularized systems above 816/861 MHz. This result is contrary to the Spectrum Policy Task Force recommendation urging the Commission to make "spectrum policy decisions encouraging like systems or devices to be grouped in spectrum 'neighborhoods' with like systems."²¹

Second, contrary to another Spectrum Policy Task Force principle, the UTC/CTIA Proposal, as well as the Motorola approach in the absence of realignment, would greatly diminish the flexible, efficient use of 800 MHz spectrum. The UTC/CTIA Proposal would impose a patchwork of various notifications, certifications, pre-coordination requirements, and significant operational restrictions that would seriously restrict the ability of CMRS licensees to expand their networks. These CMRS licensees would lack the flexibility that is essential to maximizing spectrum efficiency and

²¹ See *Spectrum Policy Task Force Report* at 22.

responding to consumer demand. This flies in the face of the Spectrum Policy Task Force finding that the Commission should maximize flexible spectrum use.

Third, the UTC/CTIA and Motorola submissions fail to provide a set of clear spectrum rights and responsibilities for the 800 MHz band. Instead, they offer case-by-case, “band-aid” approaches that would often result in after-the-fact attempts to negotiate a solution to interference problems, and in many cases require the FCC to resolve the problem through a cumbersome, *ad hoc* complaint process. These approaches are a far cry from the “clear and exhaustive definition of spectrum rights and responsibilities” recommended by the Spectrum Policy Task Force.²² In contrast, the Consensus Plan contains unprecedented specificity as to the spectrum rights and responsibilities of all parties in the post-realignment environment.

Just as importantly, the UTC/CTIA and Motorola filings, despite their protests to the contrary, continue to support fundamentally *reactive* interference mitigation – in sharp contrast to the Consensus Plan’s *proactive* “fix-the-basic-cause” solution. The approach in the UTC/CTIA and Motorola “technical toolbox” submissions is akin to a failure to install a traffic light at a dangerous intersection until *after* the inevitable fatal accident. Public safety first-responders should not have to wait until after tragedy strikes to install the 800 MHz “traffic light.” The Consensus Plan remains the only proposal before the Commission that will prevent CMRS – public safety interference before it happens, rather than after-the-fact.

The UTC/CTIA Proposal (along with the Motorola submission if not accompanied by band realignment) would also be contrary to the Commission’s decision

²² *Id.* at 17.

in the 700 MHz Guard Band proceeding. In that proceeding, the Commission established Guard Bands to separate public safety and cellular systems, and prohibited cellular systems from operating in these Guard Bands. The Commission found that cellular systems posed too great an interference threat to public safety systems when operating on adjacent channels, even if the cellular systems were subject to frequency coordination, strict OOB limits, and power limits – the very same measures UTC/CTIA proposes to protect 800 MHz public safety licensees from interference. Citing comments filed by Motorola, the Commission stated that cellular systems

by design, produce large numbers of base stations within a relatively small geographic area – each with the capability of causing interference to the reception of signals to public safety mobiles and portables. Although coordinating frequencies for each and every one of these base stations with the various public safety systems operating in the area would not be impossible as a theoretical matter, as a practical matter it would be a complex, uncertain, and resource-intensive task for both commercial and public safety users. . . . The potential for interference to public safety receivers if such coordination were not successful is a risk the public safety community views as a significant threat, and is a burden we are unwilling to impose on them.²³

This reasoning applies with equal force to the 800 MHz band. It would be arbitrary and capricious for the Commission in this proceeding to adopt an approach it so firmly rejected in the 700 MHz Guard Band proceeding.

²³ *Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission's Rules*, Second Report and Order, 15 FCC Rcd 5299, ¶19 (2000) (footnote omitted) (“700 MHz Band Order”).

IV. THE UTC/CTIA PROPOSAL FAILS TO SATISFY THE FCC'S KEY PRINCIPLES IN THIS PROCEEDING AND SHOULD BE REJECTED

A. A Two-Step Approach That Relies on Continued Mitigation Practices and Yet Another Assessment of Their Ineffectiveness Would Only Delay Band Realignment

Under the UTC/CTIA Proposal, the Commission would initiate a review “to assess progress and effects of ... mitigation measures, and to evaluate longer-term measures that might prove necessary *if and only if* these mitigation techniques and rule changes do not adequately resolve interference.”²⁴ This approach ignores the events of the past several years. As discussed further below, 800 MHz licensees have already employed these mitigation measures, and during this time the amount of interference has *substantially increased*.

Moreover, there already has been exhaustive review and analysis of the 800 MHz interference problem and its potential remedies. In 2000, CTIA, Motorola, Nextel and the public safety community formed a working group to study 800 MHz interference, a process that in December of that year resulted in the “Best Practices Guide.”²⁵ Since that time, licensees in the band have gained further real-world knowledge in applying these practices. In addition, the instant proceeding has provided parties with a comprehensive opportunity to examine and debate these issues; since the March 2002 *NPRM*, the Commission has afforded parties *three* rounds of comments/reply comments and

²⁴ UTC/CTIA Proposal at 3. *See also* Presentation attached to Letter from Diane Cornell, CTIA, to Marlene Dortch, FCC Secretary, at 6 (June 24, 2003).

²⁵ *See* FCC News Release, “Wireless Telecommunications Bureau Announces *Best Practices Guide* for Avoiding Interference Between Public Safety and Commercial Wireless 800 MHz Communications Systems” (Feb. 9, 2001) and *Avoiding Interference Between Public Safety Wireless Communications Systems and Commercial Wireless Communications at 800 MHz: A Best Practices Guide* (“*Best Practices Guide*”), available at: <http://www.wow-com.com/pdf/best_practices_112700.pdf>.

numerous opportunities for *ex parte* presentations. As noted, there have been over 700 submissions in this rule making, amounting to over 11,000 pages. Accordingly, it is amazing, if not disingenuous, for the UTC/CTIA Proposal now to suggest a return to square one, with mandatory use of the same, ineffective mitigation techniques and yet further review of the 800 MHz interference problem. The nation's leading public safety organizations and the rest of the Consensus Parties oppose any decision in this proceeding that attempts to sidestep the necessity of acting now to separate incompatible high site public safety and private radio systems and low site CMRS systems at 800 MHz.

A two-step approach that relies on continued use of Best Practices and yet more review fails to address what the record in this proceeding has shown to be the underlying cause of CMRS – public safety interference: the 30-year old 800 MHz band plan that permits incompatible systems to operate on interleaved, mixed, and adjacent channels. It is essential that the Commission attack this root cause by segregating these incompatible systems into separate bands. In their extensive filings, the Consensus Parties have shown how band realignment will establish an RF environment in which CMRS – public safety interference can be virtually eliminated.²⁶ The Consensus Parties' detailed implementation plan will cover incumbent licensee relocation costs, avoid undue

²⁶ As described in recent *ex parte* filings from Nextel, the Consensus Plan will reduce the probability of interference to public safety licensees operating on the new NPSPAC channels by an average of 99 percent, and reduce interference to public safety (and private wireless) licensees operating at 809-814/854-859 MHz by an average of 88 percent. See Letter from Lawrence Krevor, Nextel Communications, Inc., to James Schlichting, FCC Office of Engineering and Technology, at 1-2 (July 1, 2003) (“Nextel Schlichting Letter”).

disruption to licensees in the band, and allocate additional spectrum to meet critical public safety needs.

Over 75 parties in this proceeding have expressed support for the Consensus Plan.²⁷ This includes the 17 signatories to the Consensus Plan, which include every major national public safety organization and the leading private wireless trade associations. Together, the Consensus Parties represent over 90% of 800 MHz Land Mobile Radio licensees. Various other parties – including the National Association of Manufacturers and MRFAC, Inc. – have supported band realignment at one time or another in this proceeding.²⁸ Motorola, the primary manufacturer of 800 MHz band equipment, has recognized the importance of creating spectral separation between CMRS and public safety systems to prevent interference, has submitted its own realignment plan

²⁷ In addition to the parties identified on page v of the Summary as Consensus Plan supporters, there are numerous other public safety entities that recognize the extraordinary benefits of the Consensus Plan but condition their support for 800 MHz rebanding on a variety of criteria, such as the availability of full and certain funding for public safety relocation. For instance, the State of California “recommends the Commission adopt [the Consensus Plan] and mandate its implementation in the shortest time possible,” but adds that the Consensus Plan “must include adequate funding to ensure that public safety entities are held harmless in its implementation.” Reply Comments of State of California, at 2, 5 (Oct. 24, 2002). *See also* Comments of the City of New York at 1-2 (Feb. 10, 2003) (“conditionally endor[ing] the Consensus Plan,” subject to “[a]dditional, contingency funding to cover public safety relocation costs”); Comments of San Francisco Bay Area Rapid Transit District at 1-2 (Sep. 25, 2002) (“concur[ring] with the Consensus Plan,” but arguing that “any action taken as a result of the Consensus Plan must include funding of the physical act of migration”). The Consensus Parties anticipate that the Consensus Plan will in fact cover *all* of the costs associated with incumbent retuning, and believe that the Plan will also reasonably satisfy any other condition identified by these public safety commenters.

²⁸ Like the Consensus Parties, NAM and MRFAC recognized the need to separate high-site and low-site systems into discrete, contiguous blocks of spectrum in order to eliminate CMRS – public safety interference. *See* Letter from Jerry J. Jasinowski, NAM, and Clyde F. Morrow, Sr., MRFAC, to Michael K. Powell, FCC Chairman, FCC (Dec. 21, 2001) (filed Mar. 19, 2002).

separating high-site and low-site systems in the band,²⁹ and has stated that “attempting to layer a cellular architecture with numerous and unpredictable points of interference on top of a fundamentally dissimilar public safety system that requires operational certainty would be *virtually impossible*.”³⁰

The Commission should reject UTC/CTIA’s effort to delay 800 MHz band realignment. Realignment provides the only practical, effective solution to interference in the band. Every day of delay leaves first responders at risk and the Commission faced with a tragedy waiting to happen.

B. The Commission Has Already Found That Mitigation Techniques Do Not Alleviate Public Safety Interference in the 800 MHz Band and Impose Substantial Burdens

1. *UTC/CTIA Propose Mitigation Techniques That Are Virtually Identical to Those Contained in the Best Practices Guide*

The UTC/CTIA Proposal would address 800 MHz interference by relying on “enhanced mitigation techniques” that would include various advance planning and frequency coordination procedures and technical rules changes. Although these parties claim that these techniques would “go beyond existing ‘best practices,’” their proposal offers even less interference protection than the status quo.³¹ Almost three years ago, CTIA, Motorola, Nextel, and the public safety community compiled the Best Practices Guide, which describes mitigation techniques virtually identical to those now proposed

²⁹ Reply Comments of Motorola at 9-14 (Aug. 7, 2002).

³⁰ Comments of Motorola, WT Docket No. 99-168, at 6 (Jan. 18, 2000) (emphasis added) (“Motorola 700 MHz Comments”).

³¹ UTC/CTIA Proposal at 1. As explained *infra* in Section IV.B.6, the UTC/CTIA Proposal would in fact be *worse* than the status quo in several important respects.

by UTC/CTIA as an alternative to the Consensus Plan. Like the UTC/CTIA Proposal, the Best Practices Guide calls for advance planning and frequency coordination between CMRS and public safety licensees so that the parties could attempt to “identify where the probability of interference is greatest and plan around it.”³² Like the UTC/CTIA Proposal, the Best Practices Guide offers various mitigation techniques, including retuning CMRS channels to prevent IM, modifying CMRS power levels and antennas, incorporating filters into CMRS transmission equipment, and improving public safety communications receivers and signal robustness.³³

Thus, the UTC/CTIA plan proposes nothing new to combat interference. Over the past three years, their preferred approach has proven ineffective in remedying the growing problem of 800 MHz interference. CMRS and public safety operators have aggressively pursued the mitigation techniques set forth in the Best Practices Guide and now repackaged by UTC/CTIA. These techniques can provide a measure of limited,

³² *Best Practices Guide* at 12.

³³ The UTC/CTIA Proposal, at 7-8, claims that potential improvements to public safety receiver designs, recently described by Motorola in its letter of May 6, 2003, could prevent interference as part of a Best Practices approach. As public safety parties have made clear, however, while these potential receiver improvements would provide a helpful adjunct to band realignment, receiver enhancements alone will not provide a “technological silver bullet” to remedy 800 MHz interference. *See* Statement of Association of Public-Safety Communications Officials-International (APCO), *et al.*, In Response to Motorola *Ex Parte* Letter (May 16, 2003). *See also* Letter of Robert S. Foosaner, Nextel, to Marlene Dortch, FCC Secretary (May 16, 2003) (“Nextel May 16 Letter”). Section V, *infra*, addresses an *ex parte* letter Motorola has recently filed in this proceeding regarding these issues.

temporary relief; the record indicates, however, that they are failing already and are not a permanent remedy.³⁴

The Commission itself recognized this in the *NPRM*, which stated that “[t]he Commission and the public safety community have attempted to address the interference problem within the confines of the existing public safety allocation structure in the 800 MHz band. *None of the remedial methods identified has proven entirely successful.*”³⁵ The *NPRM* consequently focused on band realignment, “tentatively conclud[ing] that a restructuring of the 800 MHz public safety band may be the *only* long term solution to the interference problem.”³⁶ This conclusion is confirmed by the extensive factual record developed herein – including the current average of two new interference reports per day,

³⁴ For example, cellular operators have been asked to mitigate interference in the Denver area for more than two years, and during that time have also been asked to undertake the same activity in Anne Arundel County, Maryland; Orange County, California; and the Phoenix, Arizona metropolitan area. Yet areas of interference persist in each of these cities. *See* Anne Arundel County July 29 Letter at 2 (“[D]espite the continuing efforts of the CMRS carriers [Cingular, Nextel and Verizon], interference is not being successfully mitigated at every site even though we have been working on some of these sites for years.”). Similarly, a recent report by the Communications Division of the Orange County (CA) Sheriff’s Department describes the ongoing and extensive interference caused by AT&T Wireless’ cellular A-band facilities to the Communications Division’s 800 MHz public safety radio system. According to the Division, “[h]andheld and mobile radio communications on the Orange County system suffer A-band degradation every day. . . . Relative to other providers, OCSD/ Communications receives minimal cooperation from AT&T Wireless, the local A-Band service.” *See* “Cellular A-Band Interference,” Report by the Communications Division of the Orange County (CA) Sheriff’s Department, attached to Letter from Robert Gurs, APCO, to Marlene Dortch, FCC Secretary, at 1-2 (July 30, 2003) (“Cellular A-Band Interference Report”).

³⁵ *NPRM* ¶ 88 (emphasis added).

³⁶ *Id.* (emphasis added).

recurrent interference in areas thought previously mitigated, degraded CMRS service, and an increasing number of interference cases that cannot be mitigated with Best Practices.³⁷

2. *Best Practices Mitigation Techniques Are Inherently Reactive, Leaving First Responders at Risk*

The UTC/CTIA Proposal states that the “[l]icensees in the 800 MHz band should take pro-active steps to ensure that potential interference solutions are identified and avoided, to the extent possible.”³⁸ Under such a “forward-looking” Best Practices approach, public safety and commercial mobile licensees would need to somehow predict where interference would occur, and would then coordinate their operations on the basis of those predictions in order to avoid interference.

UTC/CTIA’s approach is fundamentally flawed and would inevitably result in addressing CMRS – public safety interference *after the fact*, leaving first responders at risk. As Nextel and public safety licensees have learned in applying Best Practices over the past several years (and as the cellular carriers well know), it is impossible to predict the occurrence of CMRS – public safety interference with any precision or reliability. The conditions that lead to interference under the current band plan are highly variable, including the location of the public safety receiver in relation to both the public safety base station and the CMRS base station, the timing of the particular public safety and CMRS transmissions that give rise to the potential for interference, the type of radio and transmission equipment involved, the interaction of different CMRS signals with each other, and numerous other factors. CMRS operations are inherently dynamic, utilizing

³⁷ See, e.g., Nextel Schlichting Letter.

³⁸ UTC/CTIA Proposal at 2.

base stations that can transmit on thousands of different combinations of channels at any given moment. Cellular A and B block signals can mix with each other and with Nextel's transmissions, resulting in thousands of possible channel mixtures causing potential intermodulation interference where their facilities are co-located or virtually co-located. In addition, propagation is affected by seasonal foliage and other variable natural and man-made environmental features that further complicate predictive efforts.

Under the UTC/CTIA approach, 800 MHz licensees would have to account somehow for all of these variable factors at the *tens of thousands* of CMRS transmitter sites located throughout the United States. Nextel has over 15,000 sites throughout the country, while cellular A and B block licensees operate at tens of thousands of additional base stations. In addition, more than 1500 public safety systems provide service to over two million mobile units within the same 800 MHz spectrum. As a result, it would be impractical, unreliable, and inefficient for CMRS providers and public safety agencies to conduct tests or otherwise initiate any comprehensive review of the interference probabilities at all of these sites. Neither CMRS nor public safety licensees in the 800 MHz band can perform the precise case-by-case modeling required for a forward-looking, predictive Best Practices regime. With respect to new sites, even a CMRS licensee that follows these procedures in good faith cannot guarantee that the site will not cause interference to public safety systems at some point in the future. Indeed, in an *ex parte* filing last year in another proceeding, Cingular criticized an Anne Arundel County, Maryland ("AAC") ordinance that "amount[ed] to a warranty that Cingular's systems

cannot, under any circumstance, interfere with the AAC public safety radio system.”³⁹ Cingular stated that it was “inconceivable that an independent consultant could make such a certification, particularly in light of AAC continued use of older public safety radio equipment and the non-existence of an ‘interference’ standard.”⁴⁰

As noted above, in the recent 700 MHz Guard Band proceeding, Motorola recognized the impossibility of successful interference prediction and management involving multi-site CMRS systems “overlaid” over traditional noise-limited, high-site public safety systems. Motorola stated that requiring such incompatible systems to operate on interleaved or adjacent channels without causing severe interference to public safety systems would be “virtually impossible.”⁴¹ Motorola also concluded:

Subscriber-based cellular architectures are inherently incompatible with public safety operations The operational and technical characteristics of subscriber-based cellular architectures are substantially different from public safety systems in ways that create a high probability of interference to public safety systems.⁴²

Nothing has occurred since the 700 MHz Guard Band proceeding to contradict this view, and the Consensus Parties believe that the same considerations and analysis must govern the Commission’s management of the 800 MHz band. UTC/CTIA’s proposed “enhanced mitigation techniques” are inherently reactive, inevitably responding to CMRS – public safety interference only after the fact. This approach is absolutely

³⁹ Presentation attached to Letter from Brian Fontes, Cingular Wireless, to Marlene Dortch, FCC Secretary, at 7 (Sep. 11, 2002).

⁴⁰ *Id.*

⁴¹ Motorola 700 MHz Comments at 6.

⁴² *Id.* at 4.

unacceptable to all major national public safety organizations. Police officers, fire fighters, and other emergency response personnel must have robust, interference-free communications to carry out their duties. Interference in the 800 MHz band disrupts their ability to carry out their mission, and reactive mitigation techniques impede a timely and efficient response to emergencies and jeopardize the safety and lives of first responders and the public they serve. For the police officer prevented from radioing for assistance in an emergency because of interference, the UTC/CTIA Proposal's after-the-fact remedy will offer little solace and could very well lead to tragedy.⁴³

3. *UTC/CTIA's Proposed Mitigation Techniques Impose Substantial Burdens and Spectrum Inefficiencies*

The case-by-case coordination and mitigation techniques proposed by UTC/CTIA and used for nearly three years under the Best Practices Guide impose substantial burdens on public safety and CMRS licensees. As the Commission found in the 700 MHz Guard Band proceeding, the coordination of incompatible systems operating on interleaved and adjacent channels “*as a practical matter . . . would be a complex, uncertain and resource-intensive task for both commercial and public safety users.*”⁴⁴ Even Southern LINC, a signatory to the UTC/CTIA Proposal, has recognized that requiring CMRS and public safety systems to engage in such frequency coordination “constitutes an undue burden on potential licensees.”⁴⁵

⁴³ See NPSTC June 11 Letter at 1 (stating that “[t]he [UTC/CTIA] approach . . . relies principally on mitigation after Public Safety has experienced interference. That interference can jeopardize the safety of lives of First Responders, as well as impede timely and efficient response to emergency situations.”) (emphasis in original).

⁴⁴ 700 MHz Band Order ¶19. See also *supra* Section III.

⁴⁵ Comments of Southern LINC, WT Docket No. 99-168, at 5 (Jan. 18, 2000).

With 800 MHz interference continuing to emerge in new locations around the country, the UTC/CTIA Proposal would require active management of thousands of RF sites nationwide, leading to chronic and draining expenditures of capital and personnel hours. Although the UTC/CTIA Proposal implicitly recognizes the magnitude of these coordination and mitigation burdens, *it exempts all cellular signatories from a number of its mitigation requirements*, despite the fact that these entities contribute to a significant amount of the interference being experienced by public safety licensees.⁴⁶ The absence of any “one size fits all” set of mitigation practices exacerbates these costs, since coordination and mitigation efforts must be tailored to the specific and often changing circumstances of each interference situation. Nextel and public safety licensees have already applied a Best Practices approach and understand that the UTC/CTIA Proposal is unworkable in the current 800 MHz band environment.

In addition, over time, continued coordination and case-by-case mitigation would severely constrain both commercial and public safety licensee operations in the 800 MHz band. Spectrum and operational restrictions, designed to manage interference, would compromise spectrum efficiency throughout the band. Significant amounts of 800 MHz spectrum would end up lying fallow or limited in their use, an outcome that flies in the face of the Commission’s avowed policy of fostering more efficient use of the spectrum, especially in the most congested bands below 3 GHz.⁴⁷

Case-by-case mitigation would be particularly difficult for commercial operators to sustain. Varied operational restrictions would prevent CMRS providers from

⁴⁶ See *infra* Section IV.B.6.

⁴⁷ See *supra* Section III.

optimizing their site configurations, and the resulting crazy-quilt patchwork of technical measures would threaten the seamless operation of nationwide networks. In particular, the UTC/CTIA approach would disrupt frequency reuse patterns and channel availability for all CMRS carriers. Such frequency use restrictions cannot be sustained without unacceptable losses in capacity, coverage, and service quality. Certainly, this result would directly conflict with the industry model of commercial mobile networks as nimbly responding to dynamic changes in traffic patterns and customer demand, on a daily and even hourly basis. The Commission must avoid this outcome, which would be harmful both to consumers and the commercial operators that have invested billions of dollars in the development of their systems.

For example, in one Western metropolitan area, Nextel has implemented case-by-case best practices mitigation measures to reduce CMRS – public safety interference. Specifically, to eliminate IM “hits” on public safety channels, Nextel is observing self-imposed use restrictions affecting up to 80 percent of its total channel availability at a number of base stations. Unsurprisingly, such severe restrictions are adversely affecting Nextel’s service to its customers and causing valuable spectrum to lie fallow in direct contravention of the Commission’s public interest mandate. Worse, it leaves Nextel unable to take any further mitigating actions, including those that may be required due to collocated cellular IM interference. This is illustrative of the unsatisfactory results for both commercial carriers and public safety licensees of excessive, long-term reliance on case-by-case mitigation measures.

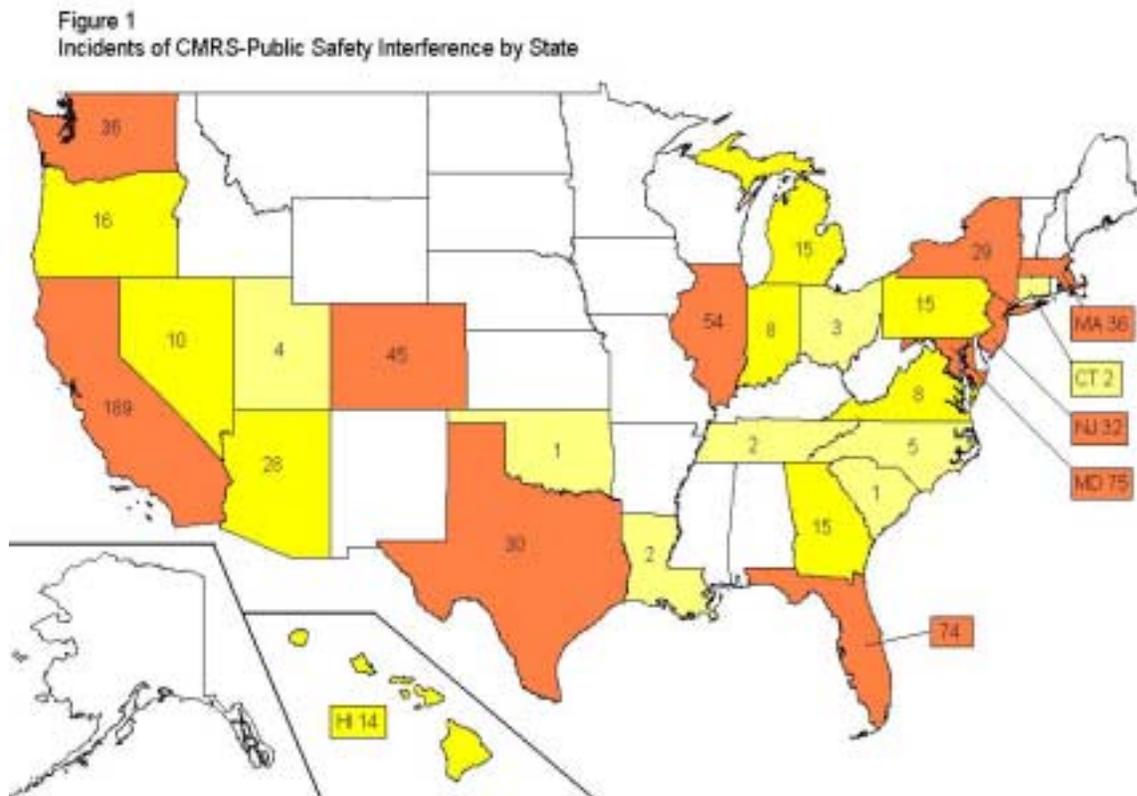
4. *Best Practices Cannot Manage the Increasing Incidence of 800 MHz Interference*

The UTC/CTIA Proposal argues that the Commission should focus on mitigation techniques rather than band realignment because “only 1% of Public Safety systems reported interference incidents last year.”⁴⁸ This claim seriously underestimates the extent of 800 MHz interference and demonstrates that the UTC/CTIA Proposal is based on a false premise. CMRS – public safety interference in the 800 MHz band is a widespread problem affecting public safety systems across the country. This problem is growing increasingly severe, and will only be eliminated once the 800 MHz band is realigned to separate public safety and other high-site, high-power systems from cellularized systems.

The Consensus Parties believe that well over 10 percent of public safety agencies in the 800 MHz band have in fact already experienced interference from CMRS systems, and that many others face a very real potential for such interference. In a recent filing at the Commission, Nextel documented the interference incidents that have come to its

⁴⁸ UTC/CTIA Proposal at 1. The UTC/CTIA Proposal cites the “APCO database” to support this 1% figure. This “database” is in fact merely a list of interference incidents that have been reported to APCO by public safety agencies that have taken the time to complete the online incident questionnaire maintained on APCO’s Project 39 website. As APCO itself has pointed out, this questionnaire is informal, and participation by member public agencies is voluntary. The purpose of the website was to gather information about the nature of the interference problem, not to ascertain the extent of the problem. A significant proportion of public safety agencies that have experienced interference have not responded to the questionnaire. Furthermore, the data submitted was on a system basis, and did not necessarily reflect the number of sites within each system subject to interference. As a result, this database does not provide a comprehensive source of data on the frequency of public safety interference. *See* Letter from Robert M. Gurs, Counsel for APCO, to Marlene Dortch, FCC Secretary (June 2, 2003).

attention through reports from the affected public safety operators.⁴⁹ Based on this data, at least 155 public safety systems (out of a total of 1,580) have reported interference to their systems since January 2000. Many of these 155 public safety systems have suffered multiple incidents of interference, and overall during this period these systems have experienced interference at nearly 800 different locations.⁵⁰ Figure 1 below displays the geographic distribution of these interference events throughout the United States.



Most likely, the actual amount of interference is significantly greater; not all public safety interference incidents are reported to Nextel. The cellular carriers, who contribute significantly to the 800 MHz interference problem, apparently either do not maintain

⁴⁹ Nextel May 16 Letter at Appendix C.

⁵⁰ See Nextel Schlichting Letter at 6 & Attachment B.

records of the interference or have chosen not to make this information publicly available.

This problem is growing worse by the year. According to the data submitted by Nextel, the number of public safety systems experiencing interference grew by almost 500 percent from 2000 to 2002. This alarming trend will continue as CMRS build-outs continue in major urban areas and expand to rural areas until an effective solution is implemented. The Commission recognized this in March 2002 when it issued the *NPRM*:

New public safety communications systems are being constructed in [the 800 MHz] band. . . . This growth in the implementation of 800 MHz public safety systems is being accompanied by growth in the number of potentially interfering 800 MHz and 900 MHz CMRS transmitters, particularly in urban areas. Documented existing interference problems taken in combination with these growth patterns underlie our tentative conclusion that, unless significant remedial action is taken immediately, increased harmful and potentially hazardous interference will be caused to 800 MHz public safety systems at a time when public safety agencies most need reliable communications capability.⁵¹

In January 2001, when the Best Practices Guide was submitted to the Commission, “the number of reported cases [was not] large relative to the number of public safety communications systems.”⁵² With the continued growth of 800 MHz interference, this is no longer the case. Best Practices – the very same mitigation techniques the UTC/CTIA Proposal now offers as a “solution” – have not stemmed and cannot stem this rising tide of interference.

⁵¹ *NPRM* ¶ 87.

⁵² *Best Practices Guide* at 9.

5. *NPSPAC Systems Will Suffer Severe Interference If They Remain Sandwiched Between CMRS Licensees Deploying Wideband Systems*

The NPSPAC channels are currently located in a spectrum block (821-824/866-869 MHz) that is directly adjacent to both the Cellular A Block and Nextel's Upper 200 SMR Channels. About half of the 700 individual interference incidents reported to Nextel involve public safety systems using NPSPAC channels; without realignment, this interference will greatly increase for a number of reasons. First, the NPSPAC channels were allocated for public safety use and placed into use more recently than the lower 800 MHz public safety channels. Many NPSPAC operations are just coming on line now as public safety systems expand their systems or replace worn-out 150 MHz and 450 MHz infrastructure with 800 MHz equipment. A substantial number of these new NPSPAC operations will undoubtedly experience interference without realignment of the 800 MHz band.

Second, the cellular A block carriers have typically located their legacy analog systems in the lower part of their band, *i.e.*, directly adjacent to the current NPSPAC block. These analog cellular systems may be phased out by early 2008 under recently adopted FCC rules.⁵³ Cellular carriers are converting these systems to digital modulation and are likely to use CDMA or other wideband digital technologies. Nextel may also convert its operations on the Upper 200 SMR Channels to wideband systems. The deployment of these wideband systems will cause substantially more interference to

⁵³ See *Year 2000 Biennial Regulatory Review – Amendment of Part 22 of the Commission's Rules to Modify or Eliminate Outdated Rules Affecting the Cellular Radiotelephone Service and Other Commercial Mobile Radio Services*, Report and Order, 17 FCC Rcd 18401 (2002); 47 C.F.R. § 22.901(b).

public safety systems, and will render significant portions of the NPSPAC channels unusable in many areas.⁵⁴ UTC/CTIA’s proposal has no effective remedy for this severe interference.

As discussed above, the UTC/CTIA plan violates the Spectrum Policy Task Force admonition that technically compatible systems be grouped together spectrally, and that the Commission’s rules provide licensees maximum flexibility to most efficiently use scarce spectrum resources. The UTC/CTIA plan would rely on private market spectrum swaps to alleviate difficult interference; however, it provides no explanation of how – much less why – cellular licensees would swap channels with NPSPAC public safety operators. The NPSPAC channel assignments in each of the 55 NPSPAC planning regions have been carefully developed over 15 years to provide efficient spectrum use through geographic separation of co-channel licensees; a basic tenet of the Consensus Plan is to preserve the planning and spectrum access embodied in these plans. Accordingly, channel swaps between NPSPAC licensees and cellular A or B block licensees – also holders of contiguous spectrum positions – are impractical and unworkable, as they disrupt NPSPAC licensing and fragment cellular allocations, thereby precluding cellular use of the efficient wideband technologies that require contiguous spectrum. Moreover, interleaving cellular channels among the NPSPAC allocation would only further exacerbate the potential for interference; the same is true for interleaving Nextel’s channel assignments among NPSPAC channels and *vice versa*.

⁵⁴ The *Best Practices Guide* (at 8) explains that CMRS – public interference in the 800 MHz band is in part the result the CMRS industry’s shift from using analog to digital technology, noting that “[d]igital transmission systems typically have greater sideband noise emissions than analog systems.”

Thus, one of the fundamental Best Practices mitigation measures relied upon by the UTC/CTIA plan not only violates the Commission's spectrum management guidelines, it further interleaves incompatible technologies and *increases* the probability of CMRS – public safety interference. In contrast, the Consensus Plan would virtually eliminate interference to NPSPAC channels, by moving those carefully planned channel assignments as a contiguous frequency block to the lower end of the 800 MHz band (806-809/851-854 MHz).

6. *The UTC/CTIA Proposal Arbitrarily Exempts Cellular Carriers from Mitigation Obligations*

Licensees in the cellular A and B blocks contribute significantly to CMRS – public safety interference.⁵⁵ The UTC/CTIA Proposal would do little or nothing, however, to prevent public safety interference from these cellular licensees. As explained above, the cellular A and B block spectrum is immediately adjacent to the NPSPAC band at 821-824/866-869 MHz, and, without realignment, this proximity ensures that cellular carriers will continue to contribute to this interference.

⁵⁵ The cellular contribution to CMRS – public safety interference has been confirmed by independent third-party experts. In Anne Arundel County, Maryland, Cingular's continuing involvement in causing interference to the County's 800 MHz public safety communications system is well documented, including through the investigation and analysis of RCC Consultants, Inc. In Phoenix, Arizona, LCC International, Inc. has produced a detailed report identifying – after comprehensive analysis – at least ten sites where either ALLTEL or Verizon Wireless are interfering with the Phoenix metropolitan public safety communications system. In addition, in Denver, Colorado, Pericle Communications Co., an RF consultant, recently completed a study for city officials that describes the contribution of AT&T Wireless's operations to CMRS – public safety interference. See Pericle Communications Co., "Cellular Radio Interference to Denver's 800 MHz Public Safety Network" (June 10, 2003), attached to Letter from Alan Tilles, Counsel to the City and County of Denver, to Marlene Dortch, FCC Secretary (June 11, 2003).

In fact, the UTC/CTIA Proposal actually takes a step backward from the current Best Practices approach by exempting cellular licensees from a number of interference mitigation obligations. It would impose future operating restrictions on only licensees in the “806-824/851-869 MHz band,” *i.e., not* cellular A and B block licensees, which operate at frequencies directly above this band. With no technical justification, record support, or any other legitimate rationale, the UTC/CTIA plan disingenuously exempts cellular licensees from:

- providing 30-days notice to co- and adjacent-channel licensees of a new cell site or certifying that the new site will not cause interference;
- limiting the ERP of base stations to mitigate interference;
- complying with a new rule regarding emissions limits; and
- calculating percentage degradation for land mobile systems by using TSB-88 algorithm.⁵⁶

The UTC/CTIA Proposal provides public safety licensees with no protection against interference from cellular operations. Without any basis, the proposal applies significant restrictions to Nextel but not to its cellular competitors, penalizing Nextel while absolving major causality entities that have signed on to it. The UTC/CTIA Proposal furthers the interests of cellular operators, but does nothing to further the public interest or reduce risks to first responders.⁵⁷

⁵⁶ UTC/CTIA Proposal at 4, 6.

⁵⁷ Under the UTC/CTIA Proposal, all incumbent licensees in the 800 MHz band are directed to be full partners with other stakeholders in identifying incidents of interference and evaluating and implementing solutions. The record demonstrates that while Nextel has worked repeatedly with public safety entities over the past two years to address interference, the cellular A and B block carriers have for the most part declined to participate in such efforts. *See Petition of Cingular Wireless L.L.C. for a Declaratory Ruling that Provisions of the Anne Arundel County Zoning Ordinance are Preempted as Impermissible Regulation of Radio Frequency Interference Reserved Exclusively to the Federal Communications Commission*, Memorandum Opinion and Order, WT Docket No. 02-100, 2003 FCC LEXIS 3738, at ¶ 5 (rel. July 7, 2003) (DA 03-2196) (citing

7. *The Interference Provisions of the UTC/CTIA Proposal Are Either Impractical, Ineffectual, Unclear, or Pointless*

a. *Private market agreements*

The UTC/CTIA Proposal states that “[t]he FCC should allow more flexibility in current user pool eligibility restrictions to allow private market agreements such as frequency swaps as a means of reducing and preventing interference.”⁵⁸ Private market agreements, however, are no substitute for mandatory realignment of the entire 800 MHz Land Mobile Radio band as proposed in the Consensus Plan. Although a private market agreement might help alleviate interference experienced by participants in the agreement, it could also result in a channel alignment that further exacerbates the interleaving of incompatible systems and thereby causes interference to other parties. In other words, a private agreement might resolve one problem by de-interleaving one entity, but create additional interleaving problems for other entities. Moreover, as explained above, private agreements would be completely unworkable for NPSPAC systems, which are currently part of a contiguous block of public safety spectrum. Introducing frequency swaps in NPSPAC would do little more than recreate the interleaved morass that now exists below 816/861 MHz.

statement from Anne Arundel County that Cingular “initially declined to provide interference assessment information and participate in interference testing”). In addition, according to the Communications Division of the Orange County Sheriff’s Department (“OCSD”), “[r]elative to other providers, [OCSD] receives minimal cooperation from AT&T Wireless, the local A-band service.” Cellular A-Band Interference Report at 2.

⁵⁸ UTC/CTIA Proposal at 2.

b. *ERP limits for low-site base stations*

The UTC/CTIA Proposal would require low-site licensees in the 800 MHz band to limit the ERP of base stations with antenna heights less than 30 meters to 100 watts/25 kHz channel.⁵⁹ It is not immediately clear whether the proposal relates to 100 watts output power, or ERP. However, virtually all base stations transmitting in the 800 MHz band already operate below this prescribed power level. Given this fact, this requirement is pointless and would have no effect on public safety interference in the 800 MHz band.

C. The UTC/CTIA Proposal Would Impose Unfunded Burdens on Public Safety Operators and Embroil the Commission in Endless Interference Disputes

The UTC/CTIA Proposal recommends that the Commission “clarify and codify a policy that entities creating interference [in the 800 MHz band] should be responsible for mitigating the reported interference.”⁶⁰ This statement begs the question of who – or what – is creating this interference. There is no “interference standard” at 800 MHz for anything other than co-channel interference.⁶¹ The UTC/CTIA Proposal seems to point the finger in all directions, stating that “[i]nterference may be caused by transmitter or receiver equipment.”⁶² The Proposal also offers little guidance on how to address situations in which there is more than one CMRS “contributor” to public safety interference.

⁵⁹ UTC/CTIA Proposal at 6.

⁶⁰ UTC/CTIA Proposal at 2.

⁶¹ *See generally* Part 90 of the Commission’s rules, 47 C.F.R. §§ 90.1 *et seq.*

⁶² UTC/CTIA Proposal at 2.

In some cases, it appears that the UTC/CTIA Proposal would require public safety licensees to fund mitigation efforts. For example, under the Proposal, if it is determined that “‘receiver-generated’ IM interference” is the cause of interference, a public safety operator owning such equipment would “be responsible for mitigating the interference.”⁶³ Even in cases where a CMRS operator were deemed responsible for such mitigation, public safety operators would be burdened with identifying interference on an ongoing basis, determining which cellular provider(s) may be causing the interference, working to resolve this interference, and possibly filing a complaint with the FCC. The UTC/CTIA Proposal offers no funding mechanism for public safety agencies, which already face severe budgetary constraints.⁶⁴ In contrast, the Consensus Plan’s realignment proposal provides sufficient funding for public safety as well as private wireless licensees, thereby satisfying a key priority for the nation’s leading public safety organizations.

Moreover, the uncertainty over who is responsible for undertaking mitigation measures would inevitably require the Commission to adjudicate interference disputes on a case-by-case basis. The UTC/CTIA Proposal in fact invites such adversarial proceedings, providing that “[i]f an agreement between the parties is not reached within 60 calendar days after receipt of the written notice of interference, any affected party may submit the matter to the FCC for resolution.”⁶⁵ This provision would create a quagmire of interference complaints at the Commission, delaying efforts to mitigate interference while putting public safety personnel at risk and burdening FCC staff.

⁶³ *Id.* at 5.

⁶⁴ *Report on Emergency Responders* at 2.

⁶⁵ UTC/CTIA Proposal at 5.

V. MOTOROLA’S PROPOSED TECHNICAL TOOLBOX, AS CLARIFIED BY ITS JUNE 20 LETTER, FAILS TO SATISFY THE FCC’S KEY PRINCIPLES IN THIS PROCEEDING

The Motorola June 20 Letter provides additional information on its suggested “technical toolbox” of mitigation techniques, including advancements in receiver technology. Motorola first described these technical measures in a letter filed with the Commission on May 6, 2003.⁶⁶ According to Motorola, these technical measures would help alleviate interference to public safety communications in the 800 MHz band.

In its June 20 letter, Motorola expresses great appreciation for the work of the Consensus Parties, stating that they have “contributed significantly to identifying interference and to developing the solutions for addressing the interference.”⁶⁷ Motorola also recognizes the benefits that Consensus Plan realignment would bring to the 800 MHz band environment. It says that implementation of the Consensus Plan “would create a friendlier interference environment” and “would significantly reduce interference in the 800 MHz band by consolidating public safety use and eliminating the interleaving of CMRS channels with public safety.”⁶⁸

The Consensus Parties welcome Motorola’s recognition of the prospective benefits of realignment. Similarly, the leading national public safety organizations and the other Consensus Parties appreciate Motorola’s efforts to improve public safety

⁶⁶ Letter from Steve Sharkey, Motorola, to Edmond Thomas, Chief, FCC Office of Engineering and Technology (May 6, 2003). In the Nextel May 16 Letter, Nextel pointed out many of the shortcomings of an approach that relies solely on these technical measures.

⁶⁷ Motorola June 20 Letter at 2.

⁶⁸ *Id.*

receiver performance. These public safety receiver enhancements could serve as an important *complement* to Consensus Plan realignment of the 800 MHz band, helping to eliminate virtually all post-realignment interference. In fact, the Consensus Plan specifically calls for improved public safety receivers, in order to take advantage of the technical opportunities created by the post-realignment separation of high-site public safety systems from cellular operations.

At the same time, the Consensus Parties strongly disagree with any suggestion that Motorola’s proposed “technical toolbox” can substantially reduce 800 MHz public safety interference *in the absence of band realignment*. The Commission cannot rely exclusively on these technical measures to address the problems resulting from the interleaved, mixed, and adjacent-channel spectrum environment in the 800 MHz band. Just like the UTC/CTIA Proposal, stand-alone application of Motorola’s “technical toolbox” would fail to satisfy the Commission’s key principles in this proceeding. It would not provide a proactive solution to CMRS – public safety interference. It would impose substantial burdens and disruption on public safety and CMRS licensees in the 800 MHz band. And it would result in less flexible, less efficient use of the spectrum, contrary to the recommendations in the Spectrum Policy Task Force Report.

A. There is No Way to Predict Where and When Interference to Public Safety Communications Will Occur, a Reality That Makes Motorola’s “Technical Toolbox” Inherently Reactive

In its June 20 letter, Motorola reiterates that there is a “need for proactive methods to attempt to identify areas of potential interference before they occur so that appropriate preventative actions can be taken.”⁶⁹ Motorola adds that effective mitigation

⁶⁹ *Id.* at 1.

of public safety interference now requires that licensees “apply the technical toolbox more aggressively and proactively than best practices have been in the past.”⁷⁰ Thus, Motorola concedes that in order for its stand-alone technical toolbox to be effective, 800 MHz licensees must be able to anticipate the occurrence of public safety interference.

Unfortunately, as described above in the context of the UTC/CTIA Proposal, it is difficult, if not impossible, to predict where and when interference to public safety communications will occur. In the vicinity of each CMRS transmitter site, there are a multiplicity of highly variable conditions that determine the location and timing of such interference. Moreover, there are tens of thousands of such sites throughout the U.S. that could give rise to such interference. This level of complexity precludes the type of precise modeling necessary for accurate predictive analysis. Without realignment, 800 MHz licensees will not be able to implement Motorola’s suggested technical measures “proactively” to prevent public safety interference before it occurs.

Relying on Motorola’s technical toolbox alone is an inherently reactive approach to CMRS – public safety interference. Such technical measures consequently suffer from the same fatal flaw as the UTC/CTIA Proposal and are unacceptable to public safety communicators. Fire fighters, police officers, and other first responders need robust, interference-free communications; the availability of an after-the-fact remedy provides little consolation to emergency personnel whose missions are disrupted and lives are jeopardized by 800 MHz interference.

⁷⁰ *Id.* at 8.

B. Motorola’s Proposed Technical Toolbox Would Not Eliminate 800 MHz Interference Resulting from CMRS Out-of-Band Emissions

In its May 6 letter, Motorola asserted that its suggested technical measures would reduce public safety interference caused by CMRS intermodulation (“IM”) products. In that filing, Motorola did not address public safety interference resulting from CMRS out-of-band emissions (“OOBE”). This omission was significant, given the fact that OOBE-related interference currently represents nearly 50 percent of all public safety interference in the 800 MHz band.⁷¹ In its June 20 letter, however, Motorola claims that its suggested “technical toolbox,” standing alone, can also alleviate OOBE-related public safety interference.⁷²

The Consensus Parties disagree that, absent realignment, Motorola’s technical toolbox would alleviate OOBE-related public safety interference in the 800 MHz band. The technical measures identified by Motorola have been aggressively applied by Nextel and public safety licensees over the past several years under the Best Practices regime, and these measures have overall proven ineffective, even as an after-the-fact response to this growing source of interference. By themselves, these measures are impractical, imprecise, or otherwise incapable of overcoming the problems presented by the current 800 MHz band plan. The individual and collective inability of these toolbox measures to resolve OOBE-related interference leaves Motorola’s stand-alone “toolbox” half-empty at best. Below, the Consensus Parties describe the problems associated with each of these toolbox elements.

⁷¹ Nextel Schlichting Letter at 2, n.4.

⁷² Motorola June 20 Letter at 3-4.

1. *Use of External Filtering*

Motorola states that “[e]xternal filtering is often added to transmitters to reduce OOB signal levels.”⁷³ In the context of the 800 MHz band, the Consensus Parties assume that Motorola is referring to the potential use of cavity-type bandpass filters (either manually or automatically tuned), which are designed to pass only the desired CMRS channel and to attenuate OOB at frequencies removed from the desired CMRS channel. Such filtering is being used today in mitigating OOB interference with limited success. There are two difficulties with cavity-type bandpass filters:

- A minimum channel-to-channel spacing must be maintained when using these filters in a multi-transmitter installation. This loss of flexibility in frequency selection makes it much more likely that retuning transmitters to avoid IM-related interference (another tool in Motorola’s toolbox) will be impossible in many situations.
- The cavity-type bandpass filter provides limited ultimate noise attenuation and provides almost no attenuation for frequencies close to the desired CMRS frequency. *It is therefore of very limited usefulness in an interleaved environment.*

The Consensus parties agree that bandpass filtering of CMRS transmitters is useful for dealing with OOB interference. This has always been central to the Consensus Plan; however, the Consensus Parties *disagree* that *cavity-type* bandpass filters are desirable for the reasons stated above. The Consensus parties have proposed instead, as part of the Consensus Plan, use of fixed-tuned, multi-section bandpass filters that provide much greater attenuation of OOB in the entire non-CMRS segment than a cavity filter can provide. The Consensus Plan frequency realignment enables far more

⁷³ *Id.* at 3.

effective and rigorous filtering of OOB than is technically possible in the current interleaved spectrum alignment.

Some parties have discussed the use of notch filters as a potential solution to the OOB problem. Notch filters are designed to suppress emissions across a narrow band of channels (ideally a single channel), with comparatively little effect on surrounding frequencies.

Notch filtering is neither an effective nor feasible means of reducing OOB-related public safety interference for two reasons:

- A typical notch filter suppresses energy not only on the single 25-kHz channel it is tuned to (the channel for which protection is desired) but suppresses energy on a wide range of channels around that channel. It is not possible with current technology to make a more selective notch filter. Inserting this device in the CMRS antenna system to protect a desired channel renders useless a wide swath of spectrum around that channel. Given the interleaved nature of the spectrum, this would render large amounts of spectrum useless to the CMRS operator.
- A notch filter is not designed to protect multiple frequencies that are spectrally separated. Given the wide frequency spacing between many public safety spectrum assignments, multiple notch filters connected in series would be required to protect all of the public safety channels in a given jurisdiction; dozens of filters would be required at a typical CMRS site. Space considerations, power consumption, and operational complexities make this approach impractical in an interleaved environment.⁷⁴ Given the inability of the filter to

⁷⁴ As an example, consider a typical sectorized CMRS site with 3 total sectors. Each sector has at least two transmitting antennas, for a total of 6 at the site. Assume that this site is operating in an area where there is a single 20-channel public safety trunked radio system operating. To protect the public safety frequencies using notch filters would require installing 20 notch filters (one per public safety channel) between each transmitting antenna at the CMRS site and its associated transmitter(s), for a total of 120 notch filters. If the CMRS site has three transmitting antennas per sector (not uncommon) then 180 notch filters would be required in this example.

Each notch filter would add at least between 0.5 and 1.0 dB additional loss between the CMRS transmitters and antennas; each CMRS transmitter would have to be raised in power by between 10 and 20 dB to continue operations without adverse effects

adequately protect a single frequency without adversely affecting the spectrum around the frequency in question, filtering in this fashion would suppress carriers' in-band signals, requiring transmitter RF power increases to compensate that are both unrealizable in the available space and economically unsustainable. The alternative would be unacceptable degradation of carriers' service to their commercial customers.

As noted above, by separating public safety and CMRS operations into different bands, the Consensus Plan will enable CMRS operators to use fixed-tuned, multi-section bandpass filters to achieve dramatic roll-off of OOB in the non-cellularized band below 816/861 MHz, and the Consensus Plan will virtually eliminate OOB-based public safety interference in the realigned 800 MHz band.

2. *Reduced CMRS Transmitter Power*

In its June 20 letter, Motorola states that reduced CMRS transmitter power would significantly lessen public safety interference from CMRS OOB.⁷⁵ While reductions in CMRS power can play a limited role in short-term mitigation, this approach can severely diminish the quality of commercial mobile networks. The type of power reduction required to decrease OOB-related interference – likely 10-20 dB – would substantially reduce signal coverage and frequently leave operators unable to meet customers' traffic

on existing subscribers. This in turn would require the installation of (a) larger transmitters, (b) larger power plants to run the transmitters, (c) additional electric service, and (d) additional HVAC to cool the equipment. The capital and operating cost increases would make it economically impossible to operate the site. While no accurate measurement on increase in required space can be constructed without detailed design, there would be significant additional hardware required in the site that would require significant additional space. Constructing additional sites to compensate for the loss of coverage is equally unreasonable because (a) it creates even more locations where interference might be experienced and (b) it is highly unlikely that the additional zoning could be obtained.

⁷⁵ Motorola June 20 Letter at 3.

demands in those areas. To restore service quality, Nextel and other carriers would be forced to construct additional base station sites (likely at lower heights), actions that would in turn yield new interference to public safety systems. The Commission should work to avoid this counterproductive cycle.

3. *Use of Directional Antennas to Minimize On-ground Radiation*

Motorola suggests that CMRS providers could use directional antennas to reduce their signal strength at ground level, thereby decreasing interference from OOBE.⁷⁶ This technique also has limited usefulness. Nextel and other carriers have already deployed these antennas at many locations, yet they have provided only limited relief in a small percentage of situations. Moreover, the use of such antennas can impose significant operational burdens; sometimes CMRS providers experience increased co-channel interference from other systems or develop “holes” in their signal coverage. In such cases, CMRS operators must ultimately construct additional fill-in sites to resolve those issues, and those new facilities can in turn cause new interference to public safety systems.

Additionally, these types of directional antennas are often significantly larger than the four-foot panel antennas deployed at the majority of CMRS sites. Communications towers often cannot support these antennas due to wind-loading issues, particularly in multi-carrier-tower environments. In addition, the use of these larger antennas is often precluded by local zoning restrictions.

4. *Increased CMRS Transmitter Height*

Motorola identifies increased CMRS antenna height as another technique for

⁷⁶ *Id.* at 3.

reducing OOB-related interference.⁷⁷ This suggestion is directly at odds with the operational reality facing commercial mobile carriers. With wireless traffic and customer demand continually rising, CMRS providers have great incentive to increase the efficiency of their spectrum reuse. Spectrum efficiency and network capacity are enhanced by lowering CMRS antennas, not by raising them. In addition, local zoning restrictions often prohibit carriers from increasing antenna height.⁷⁸

5. *Ad Hoc, Localized Frequency Swapping*

In its June 20 letter, Motorola states that OOB-related public safety interference could be reduced by maximizing the frequency separation between weak public safety signals and stronger commercial mobile transmissions.⁷⁹ In particular, Motorola suggests that such frequency separation could be achieved through localized frequency swapping by public safety and CMRS licensees.

⁷⁷ *Id.*

⁷⁸ See Zoning Ordinance of the City of Phoenix, Arizona, Section 621(B)(1)(1)(3): "The maximum height of a wireless communication monopole including the base and platform, but excluding attached antennae, shall not exceed sixty-five feet above the finished grade of the site at the base of the monopole"; See City of Chandler, Arizona Ordinance No. 3436 § 35-2209 (3)(a)(1): "A wireless communication facility may use a tower as the support structure for its antenna provided that: The height of the facility shall not exceed one hundred (100) feet in total height, including tower, antenna and attachments, as measured from finished grade of the site."; See also Douglas County, Colorado Zoning Resolution, Section 27A (Personal Wireless Communication Facility Design Standards). In Agricultural One, Large Rural Residential and Rural Residential zone districts, support towers "shall be allowed when the structure does not exceed 35 feet in height." See § 2706A.01.7. In Light Industrial and General Industrial zone districts, support towers are permitted "when the structure does not exceed 60 feet in height." See § 2709A.01.6.

⁷⁹ Motorola June 20 Letter at 4.

These contentions would appear to recognize that band realignment is necessary to address 800 MHz interference, which, of course, is precisely what the Consensus Plan recommends. But the Motorola June 20 Letter suggests that the Commission need not mandate nationwide realignment throughout the band, but can instead rely on *ad hoc*, localized channel swapping. As explained in Section IV.B.5.a above, such half measures are not an effective method of addressing 800 MHz interference. Moreover, the potential benefits of localized 800 MHz channel swaps are limited by the inadequacy of current filtering technology. As stated above, existing filters require several hundred kilohertz to achieve 20 dB of signal roll-off; in the interleaved 800 MHz environment, however, it is essentially impossible to achieve more than 500 kHz frequency spacing between CMRS and public safety systems. *Ad hoc* frequency swaps cannot achieve the structural frequency separation necessary to eliminate OOB-related interference.

6. *Increased Public Safety Signal Strength*

Motorola also suggests that OOB-related public safety interference could be reduced by increasing public safety signal strength.⁸⁰ As the Consensus Parties have previously explained, however, this “toolbox” feature is completely impractical given the costs it would impose on public safety licensees, which, as noted above, already face very limited budgets. Most public safety systems are already operating at or close to maximum transmitter power, and increasing that signal strength would require many public safety licensees to construct additional transmitter sites, resulting in significant additional capital costs. The addition of new sites might also require a complete re-design of a public safety licensee’s entire radio network. Motorola has offered no plan

⁸⁰ *Id.*

for funding the substantial costs these steps would entail. It also fails to address the real possibility that increasing public safety signal strength would itself potentially cause new 800 MHz interference, most likely to co-channel operators in the band.

C. The Incorporation of Switchable Attenuators into Receivers, While Welcome, Will Not By Itself Eliminate CMRS – Public Safety Interference

Motorola claims that its development of switched attenuators will significantly mitigate IM-related public safety interference in the 800 MHz band.⁸¹ Motorola claims that most public safety operators will not have to increase signal strength or make other significant technical modifications in order to realize the interference protection made possible by this new technology.⁸²

The Commission cannot rely on switched attenuators alone to resolve IM-related public safety interference. First, in some cases, existing “noise-limited” public safety systems have signal strengths below the –98 dBm to –95 dBm range and will have to increase their signal strength significantly in order to take advantage of Motorola’s attenuator technology.⁸³ To do so, public safety licensees would likely have to deploy additional transmitter sites. As discussed above, and as Motorola has itself described, a

⁸¹ *Id.* at 7-8. Switchable attenuators will have no effect on OOB-related interference.

⁸² *Id.* at 7.

⁸³ As Nextel has pointed out and as Motorola acknowledges, switched attenuators will have little effect on IM-related interference in areas where the public safety signal is relatively weak, *i.e.*, below –95 dBm. Nextel May 16 Letter at 9; Motorola June 20 Letter at 7. This is because switched attenuators reduce not only any undesired signals reaching the receiver, but also the desired signal. Nextel May 16 Letter at 9, n.25. As a result, in weak signal areas, switched attenuators can reduce the desired signal to a level where communications are no longer possible.

public safety shift to infrastructure-intensive networks would be an extraordinarily complex and costly undertaking, one clearly ill suited to agencies' limited budgets. Not surprisingly, neither Motorola nor any other party has proposed a funding mechanism for such a public safety build-out. In the absence of such funding, the Commission should not consider the stand-alone use of switched attenuators as a potential solution to IM-related interference in the 800 MHz band.

VI. THE CONSENSUS PARTIES PROPOSE ADDITIONAL INTERFERENCE PROTECTIONS FOR POST-REALIGNMENT GUARD BAND LICENSEES AND NON-CELLULAR INCUMBENTS

The Consensus Plan for 800 MHz Realignment will virtually eliminate the current incidence of CMRS - public safety interference in the 800 MHz band. As described in the Consensus Parties comments and Nextel's July 1 *ex parte* letter, the Consensus Plan, as currently proposed, will reduce the probability of current CMRS - public safety interference (both intermodulation and OOB) by an average of 99 percent for current NPSPAC licensees relocated to the new NPSPAC band, and by an average of 88 percent for public safety licensees in the non-cellular block remaining closest to the new cellular channel block (854-859 MHz).⁸⁴ Additionally, in the area immediately adjacent to the cellularized band, the 859-861 MHz Guard Band channels, private wireless licensees will see the probability of post-realignment interference reduced on average by 65 percent.⁸⁵

The Consensus Parties' December 24, 2002 filing included a Technical Appendix F, which was designed to address the limited instances of CMRS-public safety

⁸⁴ Nextel Schlichting Letter at 1-3. Realignment of the 800 MHz band pursuant to the Consensus Plan and filtering measures by CMRS carriers in the cellularized band will virtually eliminate OOB interference outside of the new 800 MHz Guard Band.

⁸⁵ Nextel Schlichting Letter at 3.

interference which could not be addressed purely by realignment of the 800 MHz band. As the above describes, the probability of interference reduction as a result of realignment is very significant. Appendix F was designed to provide a clear and comprehensive definition of the interference rights and responsibilities of non-cellular (public safety and private wireless) licensees and CMRS licensees in a realigned 800 MHz band. Among other things, Appendix F provided that incumbent non-cellular licenses experiencing interference must have a minimum signal strength in the area of interference of at least -98 dBm for existing systems, and -95 dBm for new systems, in order for the CMRS carrier to be responsible for mitigating the interference (assuming the interference is a byproduct of its otherwise authorized operations). Appendix F provided a sliding scale of increased minimum signal strength for Guard Band licensees to qualify for mandatory CMRS interference mitigation, given their closer proximity to the cellular channel block.

Although Appendix F for the first time proposed specific adjacent channel interference protections not contained in current Commission Rules, a number of non-cellular operators have expressed concern that the interference mitigation thresholds set forth in Appendix F may not provide sufficient protection to public safety and private wireless systems designed to operate at somewhat less robust signal thresholds. Additionally, prospective Guard Band operators expressed concern that they would be subject to a higher probability of interference in that spectrum, rendering it “second class” as compared with the 851 – 859 MHz channels even though they would no longer be interleaved with Nextel’s operations and, as described above, the likelihood of

interference to a Guard Band operator post-realignment would be reduced by at least 65 percent.

In consideration of these concerns, the Consensus Parties propose herein certain revisions to Appendix F.⁸⁶ First, Appendix F now treats *all* licensees in the non-cellularized band equally; *i.e., all licensees between 851-861 MHz will be entitled to the same levels of interference protection.* In other words, licensees in the 859 – 861 MHz Guard Band channels will be subject to the same interference mitigation thresholds as those in the 851 – 859 channel block; the interference mitigation threshold sliding scale for Guard Band operators is eliminated. Appendix F requires CMRS carriers in the cellularized band (above 861 MHz) to take such actions as are necessary to ensure that Guard Band licensees have the same level of protection from OOBE and intermodulation as, for example, the NPSPAC licensee that will be relocated to the 806-809-/851-854 MHz block.⁸⁷

Second, the Consensus Parties also herein revise Appendix F to simplify and relax the minimum signal level thresholds required for public safety and private wireless operators to demonstrate that their systems can reliably operate in the absence of a CMRS-interfering carrier. Revised Appendix F provides that *all* licensees in the non-cellularized band (851-861 MHz) shall be protected from CMRS – public safety interference to a measured desired signal level of –101 dBm for portable (handheld) mobile units and –104 dBm for mobile (vehicular-based) units in the area of

⁸⁶ A revised Appendix F is attached hereto at Attachment 1.

⁸⁷ CMRS licensees can accomplish this through operating restrictions on low-site deployment in the immediately adjacent channels or such other measures as achieves this result.

interference.⁸⁸ These revisions also eliminate the former differentiated interference mitigation thresholds for “new” (-95 dBm) and “existing” (-98 dBm) non-cellular block systems. Instead, the signal strength threshold for mandatory CMRS interference mitigation – assuming the interference is occurring as a byproduct of otherwise authorized CMRS operations – is now the same for new and existing systems, while extending protection to somewhat less robust operations and recognizing the somewhat lower signal levels at which vehicular-based receivers are designed to operate. The Consensus Parties propose that these revised interference mitigation signal strength thresholds be the same for all non-cellular block operators, as set forth above.

Third, Section 5.0 of Appendix F now provides a detailed measurement technique for determining whether a non-cellular channel block operator’s signal strength in the area of interference meets the interference mitigation thresholds set forth above and thereby qualifies for interference protection per Section 2.1.1. These provisions propose a measurement area of no less than 300’ x 300’. A route would be defined through the area to be measured that identifies data collection points with a relatively uniform distribution across the area being tested using a constant velocity to prevent over-sampling in any given location. This measurement technique was developed by the TIA TR-8 committee at APCO’s request.

Taken together, the above-described modifications of Appendix F reduce even further the probability of interference from CMRS operations to non-cellular block licensees. Attachment 2 depicts the probability of interference to the new NPSPAC

⁸⁸ The term “mobile” refers to a subscriber unit specifically designed to be installed in a vehicle. Portable units operated with vehicular adapters would be treated the same as any portable unit, with the protections cited herein.

channels, the 854 – 859 non-cellular channel block, and the 859 – 861 channel block. As shown in Attachment 2, the most significant improvement occurs for the Guard Band channels.⁸⁹ Whereas the original Consensus Plan for Realignment would result in a 65 percent reduction in the probability of interference for a Guard Band licensee – that amount would increase further to an 83 percent reduction under the enhanced Appendix F.⁹⁰

Combining Motorola’s switchable attenuator technology with the Consensus Plan’s realigned 800 MHz band achieves even greater probabilities of interference reduction. As shown in Figure 2 of Attachment 2, replacing (or retro-fitting) 25 percent of public safety and private wireless receivers with the switchable attenuator technology described by Motorola will, post realignment, reduce the probability of interference in the Guard Band by another 3 percent to 86 percent overall.⁹¹ Replacing 100 percent of public safety and private wireless receivers will result in an overall 99.9% reduction in interference probability in the new NPSPAC band, 98.8 percent reduction in the 854-859 MHz band, and 95.5 percent reduction in the Guard Band. No other proposal can match

⁸⁹ The methodology used to determine these probabilities is the same as the methodology used to calculate interference probabilities presented in the Nextel Schlichting Letter.

⁹⁰ As Figure 1 of Attachment 2 shows, the enhancements of Appendix F further reduce the probability of interference in the 854-859 MHz band from 88 percent to 95 percent.

⁹¹ Standing alone (i.e., without realignment), implementation of Motorola’s switchable attenuator technology would yield a mere 10 percent reduction the probability of CMRS-public safety interference if 25 percent of public safety and private wireless radios were replaced, and a 36.6 percent overall reduction in the probability of interference if *all* of the Nation’s public safety and private wireless radios were replaced or retro-fitted. Motorola has not indicated, however, how public safety and private wireless users would pay for these improved receivers.

the overwhelming reduction in the probability of interference that the Consensus Plan provides.

VII. CLARIFICATION OF ELIGIBILITY FOR PAYMENT OF RETUNING EXPENSES

The Consensus Parties have provided the Commission with considerable detail regarding the proposed 800 MHz rebanding process and post-realignment technical rules. In light of recent *ex parte* filings and discussions with industry representatives, however, the Consensus Parties believe that some interested parties in this proceeding currently lack a full understanding of key elements of the Consensus Plan. In particular, the Consensus Parties believe it is important to clarify provisions of the Consensus Plan relating to eligibility for payment of incumbent retuning expenses.

Some parties in this proceeding appear confused regarding the scope of Consensus Plan funding for incumbent retuning. For example, on June 25, 2003, counsel to James A. Kay filed an *ex parte* presentation that stated that, under the Consensus Plan, “Nextel would compensate commercial 800 MHz licensees for only a portion of their within-band relocation costs.”⁹² Similarly, LCC International (“LCC”) recently stated in an *ex parte* presentation that the Consensus Plan “[r]equires B/ILT to pay their own relocation costs or accept secondary status.”⁹³

⁹² See Lee Selwyn and Helen Golding, Economics and Technology, Inc., “Market-based Solutions for Realignment Spectrum Use in the 800 MHz Band,” at 9 (Jun. 24-25, 2003), attached to Letter from Robert Keller, Counsel to James Kay, Jr., to Marlene Dortch, FCC Secretary (Jun. 25, 2003) (“Kay *Ex Parte*”).

⁹³ See LCC International, “Frequency Issues Facing the FCC – Technical Discussion” at 8 (July 17, 2003), attached to Letter from James Dunstan, Counsel to LCC International, to Marlene Dortch, FCC Secretary (July 22, 2003) (“LCC *Ex Parte*”).

In fact, under the Consensus Plan, no licensee (public safety or private wireless) will be required to retune without having a negotiated contractual commitment in place and funds available to cover its retuning expenses. The Consensus Parties believe that, in this way, the 800 MHz relocation process will be similar to the retuning of the Upper 200 Channels, which was governed by Section 90.699⁹⁴ of the Commission's rules, as well as the microwave/PCS relocation. Specifically, under the Consensus Plan, Nextel will be required to:

- (1) Guarantee payment of relocation costs, including all engineering, equipment, site and FCC fees, as well as any legitimate and prudent transaction expenses incurred by the incumbent licensee that are directly attributable to an involuntary relocation, subject to a cap of two percent of the hard costs involved. Hard costs are defined as the actual costs associated with providing a replacement system, such as equipment and engineering expenses;
- (2) Complete all activities necessary for implementing the replacement facilities, including engineering and cost analysis of the relocation procedure and, if radio facilities are used, identifying and obtaining, on the incumbents' behalf, new frequencies and frequency coordination; and
- (3) Build the replacement system and test it for comparability with the existing 800 MHz system.⁹⁵

The *Kay Ex Parte* claims that the Consensus Plan “require[es] the mandatory relocation of virtually every commercial and industrial licensee in the 800 MHz band.”⁹⁶ As the Consensus Parties have repeatedly made clear, however, the Consensus Plan was designed to minimize the number of commercial and industrial licensees that have to

⁹⁴ 47 C.F.R. § 90.699.

⁹⁵ See 47 C.F.R. § 90.699(c).

⁹⁶ *Kay Ex Parte* at 7.

relocate, and will obligate only 30% of non-public safety licensees in the 800 MHz band to retune.

Finally, LCC stated in its recent *ex parte* filing that, if the Consensus Plan is implemented, “[s]ome [Business and Special Industrial/Land Transportation] users will receive fewer channels.”⁹⁷ In response, the Consensus Parties again emphasize that no 800 MHz licensee, public or non-public safety, will be left with less spectrum as a result of Consensus Plan realignment. To ensure this outcome, the Consensus Parties recommend that the Commission apply Section 90.699(d) of the Commission’s rules, utilized for the Upper 200 Channel relocation process, to the 800 MHz band realignment. Section 90.699(d)(2) provides, in part, that incumbent licensees must receive “comparable facilities” in exchange for their existing spectrum.⁹⁸ In terms of system capacity, this means the following:

To meet the comparable facilities requirement, an EA licensee must relocate the incumbent to facilities that provide equivalent channel capacity. We define channel capacity as the same number of channels with the same bandwidth that is currently available to the end user. For example, if an incumbent's system consists of five 50 kHz (two 25 kHz paired frequencies) channels, the replacement system must also have five 50 kHz channels. If a different channel configuration is used, it must have the same overall capacity as the original configuration. Comparable channel capacity requires equivalent signaling capability, baud rate, and access time. In addition, the geographic coverage of the channels must be coextensive with that of the original system.⁹⁹

Thus, other than the fact that licensees will be operating on different frequencies within the 800 MHz band, their systems will remain the same.

⁹⁷ LCC *Ex Parte* at 10.

⁹⁸ 47 C.F.R. § 90.699(d)(2).

⁹⁹ *Id.*

VIII. CONCLUSION

The Commission should reject the UTC/CTIA Proposal. Its proposed mitigation techniques have already been used by 800 MHz licensees, and, as the Commission itself recognized in the *NPRM*, they are insufficient to remedy the increasing levels of CMRS – public safety interference at 800 MHz. For similar reasons, although Motorola’s enhanced receiver performance would provide a helpful adjunct to band realignment, the Commission cannot rely on its technical toolbox alone to address 800 MHz interference. The Consensus Plan remains the only practical and effective means of remedying this serious interference problem, and will also provide much needed additional spectrum for public safety communications. The Commission should consequently adopt the Consensus Plan as soon as possible.

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ATTACHMENT 1

**ENHANCED APPENDIX F –
POLICIES AND PROCEDURES
FOR
POST-REALIGNMENT INTERFERENCE MITIGATION**

POLICIES AND PROCEDURES FOR POST-REALIGNMENT INTERFERENCE MITIGATION

1. Introduction.

a. Consensus Plan Interference Mitigation. The Consensus Plan for 800 MHz Realignment would virtually eliminate the current incidence of CMRS – public safety interference in the 800 MHz band. As described in the attached August 7, 2003 comments, the Consensus Plan will reduce the probability of current CMRS – public safety interference (both intermodulation and out-of-band emissions (“OOBE”)) by 99.8 percent for current NPSPAC licensees relocated to the new NPSPAC band, by 95.4 percent for public safety and private wireless licensees in the non-cellular block at 854-859 MHz, and by 82.8 percent in the non-cellular channel block closest to the cellularized block at 859-861 MHz.

b. Post-Realignment Rules. The Consensus Parties propose, therefore, that the Commission adopt the following policies and procedures to address the limited remaining incidents of CMRS – public safety interference upon completion of the Consensus Plan realignment in a NPSPAC Region.¹⁰⁰ For purposes of these provisions, realignment will be considered complete when all public safety, B/ILT, and high-site SMR licensees in a Region are relocated as required by the Consensus Plan and Nextel is licensed for the 816-824/861-869 MHz block in that Region.

1.1 Interference Mitigation During Realignment: During the period from the adoption of the First Report and Order until realignment is completed, all affected parties shall conform to the procedures and actions set forth in the Best Practices Guide to mitigate CMRS – public safety interference. All licensees in the 800 MHz band operating low-site cellular systems are equally obligated to participate in responding to interference complaints and for mitigating their contribution to actual interference. Any licensee that does not receive the cooperation of CMRS licensees with sites within 5000 feet of the alleged area of interference are encouraged to use the FCC’s informal complaint process to compel cooperation.

1.2 Definition of interference. Upon completion of 800 MHz realignment in a Region, CMRS – public safety interference will be defined as a reduction in the ratio of the desired signal to undesired signals and noise below a minimum recommended value.

1.2.1 Voice Systems. For voice systems, the minimum recommended C/I+N value for defining interference will be a C/I+N of 20 dB.

1.2.2 Non-Voice Systems. For non-voice public safety communications systems, the equipment manufacturer will supply the information value.

¹⁰⁰ These policies and procedures would also apply to interference between non-public safety noise limited systems in the non-cellular block and CMRS systems.

1.3 CMRS - Public Safety Interference Mechanisms. The two primary mechanisms creating interference from 800 MHz CMRS operations to noise-limited systems (“NLS”) in the 851-861 MHz range are as follows:

- a. An increase in the noise floor in end-user receiver equipment in a NLS due to OOB from nearby CMRS transmitters. Post-realignment, the Consensus Plan requires that CMRS sites be designed in such a manner as to minimize emissions below 861 MHz. This should virtually eliminate CMRS – public safety interference resulting from OOB.
- b. The formation of intermodulation products in NLS receivers originating from relatively strong off-frequency signals from nearby CMRS transmitters. Intermodulation products may result from insufficient receiver attenuation of the off-frequency CMRS signal, high individual or composite CMRS signal strength in the immediate area of interference (aggregate on-street CMRS signals above approximately –40 dBm are more likely to cause intermodulation products in 800 MHz public safety receivers), or various combination of these factors.

2. Rights and responsibilities. These policies and procedures will clarify the rights and responsibilities of various entities that will be operating in the 800 MHz spectrum after realignment is completed. The 800 MHz spectrum, for the purposes of this discussion, covers all users operating base stations transmitting in the range 851-895 MHz.

2.1 Rights. Upon the completion of realignment in a Region, all operators of base station transmitters in the range 851-861 MHz will have the following interference protections:

2.1.1. System Transmitting in the Range 851-861 MHz. Operators of base station transmitters in the range 851-861 MHz will be entitled to operate free from measurable interference, as defined in Section 1.2, caused by CMRS operations above 861 MHz.

- a. Protection thresholds. Public safety communications systems and other non-cellular block licensees shall be protected from CMRS – public safety interference to a measured desired signal level of –101 dBm for portable radios and –104 dBm for mobile radios in the area of interference. The techniques for determining eligibility are included in 5.0 below.
- b. If, as a result of analysis conducted per Section 3.0, it is established that the system being interfered with does not meet the required minimum desired signal levels, as defined in Section 2.1.1(a), for systems operating below 861 MHz, CMRS operators are not required to make any adjustments or modifications to their communications systems to mitigate the complained-of interference.
- c. Although CMRS licensees are not required to modify their systems if the NLS does not meet the required signal levels established herein, the Consensus Parties encourage CMRS operators to assist public safety licensees in providing reliable life safety communications services to the extent that such

assistance does not degrade CMRS service capacity or quality, is of a temporary or interim nature, or is otherwise acceptable to the CMRS licensee.

2.1.2. CMRS Operator's Response Obligation. In the event a public safety or other non-cellular communications operator reasonably believes, based on generally accepted engineering analysis, that it is experiencing CMRS – public safety interference at a specific location or locations, all potentially interfering CMRS licensees within 5,000 feet of the interference area shall cooperate fully with the public safety operator to respond to, test, analyze and determine the cause of the reported interference. Specific response requirements are detailed further in Section 3, herein.

2.1.3 System Transmitting in the Range 861-895 MHz. Upon an allegation that the licensee is causing, in whole or in part, CMRS – public safety interference at 800 MHz, the licensee of an interference-limited system in the range 861-895 MHz will be entitled to a timely determination of responsibility for interference contribution utilizing a standardized, repeatable analysis with calibrated test equipment and based on the definition of interference in Section 1.2, as measured at the location of interference.

2.2 800 MHz Licensee Responsibilities. All parties operating base station transmitters in the range 851-895 MHz have the following responsibilities as part of the continued granting of their licenses, and the continued granting of type acceptance for equipment manufacturers.

2.2.1 Protection of data. All parties to any interference analysis or mitigation shall treat any and all data exchanged as part of an interference analysis or mitigation action as covered by a non-disclosure agreement, regardless of whether a non-disclosure agreement has been signed by the parties.

2.2.2 Systems Transmitting in the Range 851-861 MHz. All licensees/operators of noise-limited systems shall, as a condition of the continued authorization of their licenses, comply with the following responsibilities:

a. If a licensee initiates a CMRS – public safety interference complaint, the licensee shall participate in the analysis of the complaint and shall provide to the other entities information about the system being interfered with, in accordance with the response times and procedures established in Section 3.0, below.

b. The complaining licensee shall ensure that its system that is being interfered with is current with regard to maintenance and service bulletins from the equipment manufacturer that affect the RF performance of the infrastructure or subscriber units. This does not mean that the equipment must be the latest generation available from the manufacturer OR that service and maintenance bulletins having no bearing on interference (e.g. administrative database software releases for infrastructure) have been complied with. A system is deemed to be current if the RF-related portions of the system and its components are up-to-date per manufacturer service or maintenance bulletins.

- c. NLS licensees shall design new system and/or replacement or upgraded systems for the range 851-861 MHz using the thresholds in Section 2.1.1.

2.2.3 Operators transmitting in the range 861-895 MHz. As a condition of the continued authorization of their licenses, all operators transmitting in the range 861-895 MHz shall have the following responsibilities:

- a. The operator shall maintain an organization to respond to interference complaints according to response times and procedures in Section 3.0. This organization shall maintain (1) staff, (2) equipment, (3) budget, and (4) authority to (a) respond to complaints, (b) carry out analysis in conjunction with complainants and other entities, and (c) mitigate interference where the analysis indicates that the operator is a contributor. The operator shall certify to the FCC that this organization is in place and shall specify how the operator can be notified of an interference complaint within 60 days of the effective date of the Report and Order.
- b. If the operator is identified as a potential contributor to an interference complaint, respond to the complaint according to response times and procedures in Section 3.0.
- c. To the extent that mitigation of interference requires reduction in on-street power by more than one operator, all involved operators shall reduce power equally.

2.2.4 Equipment manufacturers. Within nine months of the effective date of the Report and Order herein, each 800 MHz equipment manufacturer shall establish (either by themselves or in conjunction with a recognized standards body such as TIA) a standard, repeatable method for assessing interference to existing non-voice equipment developed by them and designed for use in the 851-861 MHz range. Manufacturers shall include in all new system designs, and provide to the licensee, the necessary processes and measurements to analyze the performance of the system as it is affected by potential interferers.

3.0 Resolving Interference.

a. Revised Best Practices Guide. The Consensus Parties recommend that the Commission direct the formation of a working group composed of representatives of all affected CMRS carriers, public safety licensees, private wireless and H-SMR licensees, equipment manufacturers, 800 MHz system designers and 800 MHz frequency coordinators. The Commission would charge the working group with responsibility for developing, publishing and submitting to the Commission, within one year of its initiation, a revised Best Practices Guide for mitigating CMRS – public safety interference at 800 MHz. The working group would operate through consensus procedures. The Revised Best Practices Guide should establish procedures for

notification, analysis, and mitigation of interference by entities operating below 861 MHz after realignment is completed. These procedures should address, at a minimum the: (a) steps to be followed and the timelines to be supported, (b) requirements for equipment calibration, (c) requirements for documentation, (d) obligations of all parties to participate in good faith, (e) obligations of all contributors to an interference problem to contribute both time and resources to the solution and to provide the specific data necessary to conclusive analysis and interference mitigation, and (f) provisions to prohibit frivolous complaints and complaints made in bad faith.

3.1 Initial notification. A licensee in the 851-861 MHz range seeking the participation of licensees in the 861-895 MHz range in evaluating an alleged interference occurrence shall post a standard interference complaint to an e-mail box operated jointly by the operators above 861 MHz. This complaint shall contain (a) the specific geographical location where the interference is occurring in terms of latitude and longitude, (b) the FCC license information for the offended party, and (c) the offended party's point of contact ("POC") for technical information.

3.2 Initial response. All operators in the range 861-895 MHz shall respond to the complaint within two business days and shall indicate whether they have equipment operating within 5000 feet of the location of the alleged interference. This equipment may be either cell site equipment or repeaters.

3.3 On-site analysis. The complaining entity's technical POC shall contact the potential contributors and arrange for an on-site analysis to take place within five business days (or later, at the discretion of the complaining entity). All potential contributors to the interference shall support the analysis effort. On the agreed-on day the complaining entity's technical POC and the POCs from the potential contributors shall conduct the analysis according to the previously-defined procedures as established in the Revised Best Practices Guide.

3.5 Mitigation steps. When the analysis results show that (a) the system being interfered with meets the minimum signal level requirements of Section 2.1.1 and (b) the potential contributors are interfering with the system in question, the contributors to the interference shall correct the interference per industry-standard mitigation techniques. The Revised Best Practices Guide will reflect the current state of industry knowledge. If the analysis shows that a suspected contributor is not part of an interference problem, the suspected contributor will be relieved of responsibility for correcting interference at that site. If the analysis shows that a suspected contributor is causing interference, that entity shall contribute to resolving the interference. The resolution of the interference shall be documented and copies provided to each contributor and the complaining agency.

3.6 Division of responsibility for mitigation. Contributors shall divide responsibility for mitigating interference according to procedures developed in the Revised Best Practices Guide.

3.7 Active management. If mitigation of interference at a site requires that contributors make changes which are easily reversed (*e.g.*, changing of transmitter frequencies to avoid intermodulation (“IM”) product formation on a particular frequency, or a reduction in on-street power) then the contributor making the change shall coordinate both with the other contributors and the complaining entity before making further changes to the site.

3.8 Interference from equipment not belonging to CMRS providers. If the interference is found to be caused by something other than the equipment belonging to a CMRS provider (*e.g.* a bi-directional amplifier [“BDA”] installed by a 3rd party), the owner of the equipment shall be responsible for mitigating the interference.

4.0 Equipment and System Standards. For long-term interference mitigation, the Consensus Parties propose that the Commission adopt the following testing and receiver quality standards:

4.1 Receiver Testing Standards. Specifications for, and evaluations of, public safety land mobile receivers are currently based on TIA standards. These standards are designed to evaluate the receiver at signal levels very close to the receiver noise floor. These standards were adequate where receivers would not be exposed in normal operation to any signals that rose far above the noise floor. The RF environment has changed, however. As the Commission stated in its Notice of Proposed Rulemaking,¹⁰¹ on-street signal levels from CMRS and other operators can approach or even exceed –30 dBm, both in the spectrum allocation for which the receiver was designed *and* in adjacent allocations.

To account for this change in the RF environment, receiver testing standards shall be expanded to address at least the following:

- a. Standardized, precise, repeatable definition of receiver overload, and a test to determine the composite RF level where this takes place.
- b. Change in characterization of all interference rejection specifications to address adjacent-channel interferers having (a) discrete constant-amplitude sidebands, (b) essentially constant-amplitude spectral energy distribution across the adjacent channel, rather than discrete sidebands, (c) discrete sidebands with amplitude variations of no less than 10 dB, and (d) constant spectral energy distribution across the adjacent channel with an amplitude variation of no less than 10 dB.
- c. Characterization of 3rd-order IM product growth as contributor signals rise to at least –25 dBm per contributor in 5 dB steps.
- d. Characterization of 5th-order IM product growth as contributor signals rise to at least –25 dBm per contributor in 5 dB steps

¹⁰¹ *NPRM* at para. 77

e. Characterization of front-end filter responses to signals in adjacent allocations. This characterization should be a curve rather than a single number. For 800 MHz receivers, the characterization should extend upward from the top of the public-safety allocation to no less than 940 MHz. For 700 MHz receivers, the characterization should extend downward by a similar amount. If the characterization changes with temperature, curves should be provided for no less than 3 equally-spaced points across the temperature spectrum for which the radio is rated.

The Consensus Parties recommend that the Commission's amend its Rules to establish the dates by which (a) manufacturers shall be required to satisfy these characterization standards, and (b) the penalties to be imposed on manufacturers for failing to provide this information

4.1.1 Receiver quality standards. For long-term interference mitigation, the Consensus Parties propose that the Commission adopt the following receiver quality standards:

a. Receivers that meet the existing TIA Class A receiver specifications will receive full protection down to a desired signal level as outlined in Section 2.1.1

b. Any receiver, whether existing or new, whose specifications fail to meet the Class A receiver specifications will be protected to a higher desired signal level than that outlined in Section 2.1.1. The amount of increase above the level indicated in Sections 2.1.1 will vary depending on the interference mechanism in question and will be determined by the amount of desired signal increase necessary to restore the receiver in question to the same C/I+N ratio as a Class A receiver in the same interference environment.

c. Since the post-rebanding environment, unlike the current environment, sets the stage for receivers serving users in the 851-861 MHz range to be designed to filter out signals in adjacent allocations, and since such filtering will greatly lessen the likelihood that public safety receivers will experience interference from stronger signals in adjacent allocations, the Consensus Parties recommend that the FCC establish through regulation a requirement for rejection of signals in adjacent allocations with numerical targets and schedules for implementation. This regulatory target and schedule should be established after consultation with manufacturers *and industry experts*, but should set the expectation that (a) the rejection provided by current 800 MHz-only receivers is insufficient and will not be acceptable and (b) any receiver whose measured rejection of adjacent-allocation signals is worse than that provided by 800 MHz-only receivers will receive less consideration for interference protection than that provided herein, with specifics determined on a case-by-case basis by the difference in performance between the receiver in question and current 800 MHz-only receivers.

4.1.2 Out-of-band emissions (OOBE) for base station transmitters in the 861-895 MHz band. The Consensus Parties recommend that the Commission amend its rules to require (a) all base station transmitters and associated combining equipment operating between 861-895 MHz suppress OOBE noise by no less than $43 + 10 \log (P)$ dBc, where P is average transmitter power in watts, at the edges of the spectrum allocation for the transmitter in question and (b) the OOBE noise allowed in (a) be further reduced by (1) no less than 15 dB at 860.0 MHz, (2) no less than 30 dB at 859.5 MHz, and (3) no less than 45 dB on all frequencies between 851 and 859 MHz. The FCC should also clarify the measurement bandwidth for the OOBE measurement. Finally, the FCC should stipulate that conformance to these OOBE limits does NOT relieve a CMRS operator or operators from mitigating interference as stipulated in this appendix provided that the complaining non-CMRS operator meets the threshold test outlined in 2.1.1.

4.1.3 Requirement to consider current RF environment. The Consensus Parties recommend that the Commission amend its rules to require that (a) new RF communications hardware systems and system designs using licensed spectrum in the 851-861 MHz range must account for the existence of wireless communications systems in adjacent allocations that may use interference-limited network architectures with relatively strong composite on-street signal strengths expected for such deployments, and that systems to be operated in the 851-861 MHz range shall be designed to operate successfully in the presence of such deployments. The Consensus Parties further recommend that the Commission, as part of this regulation activity, and in conjunction with the receiver quality changes in 4.1.1c, solicit comment from equipment manufacturers, system designers, and system operators on methods, transition schedules, and necessary rule changes (e.g., modifying the 40 dBu contour limit) to achieve this regulatory requirement, bearing in mind that the changes made must be the minimum necessary to achieve the regulatory goal, without forcing existing operators in the 851-861 MHz allocation to implement interference-limited designs themselves. The intent of this recommendation is to require equipment manufacturers, system designers, and system operators to take full advantage of the potential for enhancing interference rejection afforded by the removal of the interleaving between noise-limited and interference-limited operations in the 851-861 MHz range while not requiring operators in that range to switch to interference-limited designs themselves.

- a. Bi-Directional Amplifiers (“BDAs”). The Commission should modify Section 90.219 of its Rules to permit additional flexibility in the use of BDAs to solve localized coverage problems in light of the deinterleaving of the 851 – 861 MHz spectrum.

5.0 Measurement technique. The Consensus Parties recommend that the following measurement technique be used to determine whether or not an operator in the 851-861 MHz range qualifies for interference protection per 2.1.1.

5.1 Area to be measured. The area of measurement shall be no less than 300’ x 300’. 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 should be selected

which is (a) large enough to be consistent with coverage predictions and FCC, dBu, contours limitations.

5.2 Data collection. A measurement route should be defined through the area to be measured that distributes data collection points to be relatively uniformly distributed across the area being tested. A constant velocity along the route should be maintained to prevent over- sampling in any given location. The sampling rate should be high enough to ensure multiple samples per wavelength.

5.3 Use of filters. A lowpass or bandpass filter should 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 should be included in all calibrations.

5.4 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 5.1 using the data-collection requirements in 5.2. 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.

5.5 First test threshold. If the median (C+I+N) is greater than 2 dB than the median target value and the receiver was unmuted, then the first threshold test is passed and the public safety system is eligible for interference mitigation. If the median (C+I+N) is **not** greater than 2 dB than the median target value, conduct the second test procedure in 5.6 to establish eligibility for interference mitigation.

5.6 Second eligibility test. Repeat 5.4 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 AFC, 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).¹⁰² If OOBE noise is present it will be captured in this data as I.

5.7 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 5.6 to ensure that (I+N) has not changed.

¹⁰² The assumption is that the OOBE noise contribution has been sufficiently suppressed due to the realignment and additional high pass filtering on CMRS emitters possible due to the realignment plan so as to not be greater than the test receivers internal thermal noise.

5.8 Example calculation. An example calculation to determine the median value of C from the alternative testing is shown below.

$$\begin{aligned}\text{Median (C+I+N)} &= -98 \text{ dBm [2.815E-09]} \\ \text{Median (I+N)} &= -110 \text{ dBm [7.071E-10]} \\ \text{N is constant} &= -124 \text{ dBm [1.411E-10]}\end{aligned}$$

From this data, the value of I can be calculated:

$$\text{I+N} = -110 \text{ dBm (7.071E-10)}$$

$$\text{N} = \mathbf{-124 \text{ dBm (1.411E-10)}}$$

$\text{I} = 7.071\text{E-10} - 1.411\text{E-10} = 5.660\text{E-10}$ (-110.18 dBm). This step isn't really necessary, but may add additional information about the interfering emitter(s).

$$\text{C} = 2.815\text{E-09} - 7.071\text{E-10} = 2.108\text{E-09} = -98.28 \text{ dBm}$$

ATTACHMENT 2

Figure 1.
The Enhanced Consensus Plan Virtually Eliminates CMRS-Public Safety Interference

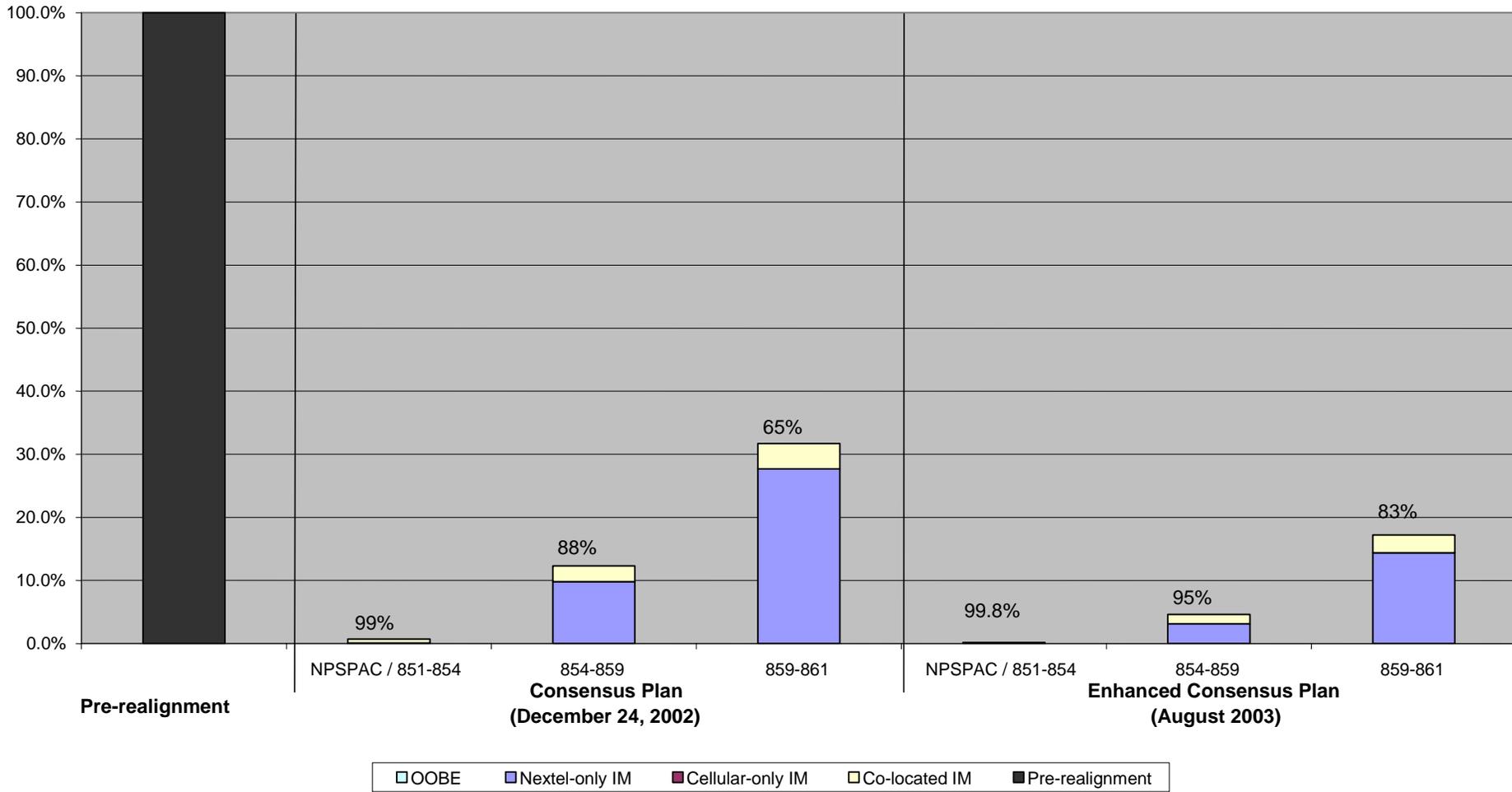


Figure 2.
The Enhanced Consensus Plan Combined with Motorola's Switchable Attenuator Results in
Even Greater Reductions to CMRS-Public Safety Interference

