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NEXTEL®

November 20, 2003

Via Electronic Mail Delivery

Marlene Dortch, Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: *Ex Parte* Submission, WT Docket 02-55

Dear Ms. Dortch:

Nextel Communications (Nextel") is pleased to submit the attached filing for the Federal Communications Commission's ("FCC") consideration in WT Docket 02-55, *Improving Public Safety Communications in the 800 MHz Band.*

Attached is a study by Dr. Gregory L. Rosston, Deputy Director of the Stanford Institute for Economic Policy Research at Stanford University. Dr. Rosston formerly served as Deputy Chief Economist of the Commission, as Acting Chief Economist of the Common Carrier Bureau, and as a senior economist in the Office of Plans and Policy. In these positions, Dr. Rosston had significant involvement with the FCC's spectrum policy and auction-related issues and has been the author or co-author of a number of articles relating to telecommunications competition policy and spectrum policy.

Dr. Rosston's study provides an economic evaluation of three proposals for resolving interference to public safety licensees in the 800 MHz band. Taking the FCC's Spectrum Policy Task Force Report ("Report") as the Commission's current vision of spectrum management, this paper looks at the mitigation and relocation proposals in each plan and evaluates how they fit into the overall spectrum management direction outlined by the Report. Dr. Rosston concludes that the Consensus Plan for 800 MHz Realignment, even though it was developed before the release of the Report, is more consistent with furthering the goals and methodologies outlined in the Report than either the Motorola Plan or the UTC/CTIA Proposal.

Nextel has forwarded a copy of this filing to the attached list of FCC personnel. Accordingly, pursuant to Section 1.1206 of the Commission's Rules, Nextel requests that a copy of this letter and Dr. Rosston's study be placed in the Commission's docket.

Respectfully submitted,

/s/

Lawrence R. Krevor
Vice President – Government Affairs

cc Bryan Tramont
Sheryl J. Wilkerson
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Using the Commission's Articulated Spectrum Policy to Evaluate the Alternatives for Mitigating 800 MHz Interference

Gregory L. Rosston

November 2003

My name is Gregory L. Rosston. I am Deputy Director of the Stanford Institute for Economic Policy Research at Stanford University. I am also a Lecturer in the Economics Department at Stanford University. I received my Ph.D. and M.A. in economics from Stanford University, and my A.B. with Honors in economics from the University of California, Berkeley. My specialties in economics are industrial organization and regulation with an emphasis on telecommunications. I served at the Federal Communications Commission for three and one-half years as the Deputy Chief Economist of the Commission, as Acting Chief Economist of the Common Carrier Bureau, and as a senior economist in the Office of Plans and Policy. In these positions, I had significant involvement with Commission's spectrum policy and auction-related issues. I have been the author or co-author of a number of articles relating to telecommunications competition policy and spectrum policy. My Ph. D. dissertation studied the effects of FCC policy on the land mobile radio industry. I have also co-edited two books on telecommunications. I have co-hosted two conferences on implementation of package bidding with Evan Kwerel of the Federal Communications Commission and am co-organizing a third package bidding conference that will occur later this month.

I have been asked by Nextel to provide an economic evaluation of three proposals for resolving interference to public safety licensees in the 800 MHz band. This analysis

looks at how the proposals align with sound spectrum management principles; it does not purport to provide an engineering evaluation of the claims made by any of the parties.

I. Introduction

This paper examines how three different plans currently under consideration for resolving the interference problems in the 800 MHz band align with the Commission's vision for effective and efficient spectrum management. Taking the FCC Spectrum Policy Task Force Report ("Report") as the Commission's current vision of spectrum management, this paper looks at the mitigation and relocation proposals in each plan and evaluates how they fit into the overall spectrum management direction outlined by the Report.[1] The bottom line is clear – the Consensus Plan, even though it was developed before the release of the Report, is more consistent with furthering the goals and methodologies outlined in the Report than either the Motorola Plan or the UTC/CTIA Proposal. Both the Motorola and UTC/CTIA plans ignore the direction and logic of the Report and revert to the "command and control" method of spectrum management the Report discourages.[2]

The current interference situation at 800 MHz is largely the result of a band plan and interference rules developed in an era where the Commission exercised a great deal of control over the operations of its licensees. At that time, the Commission had the luxury of relatively slow technological progress in the radio world and a low level of

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[1] FCC Spectrum Policy Task Force Report, ET Docket No. 02-135, November 15, 2002 ("Report").

[2] As noted below, the Report indicates that the use of "command and control" policies can be appropriate in regulating public safety spectrum use. But, as the Report also explains, it can often lead to substantial inefficiencies and loss in consumer welfare when it comes to regulating commercial uses of the spectrum.

demand for wireless services. Now, spectrum is extremely valuable and technology has advanced rapidly over the past two decades. These changes highlight the need for a spectrum policy that can respond rapidly to changing market conditions, provide certainty for investment, and provide assurances about the ability to operate a system with known or predictable levels of undesired noise from other operators.

Currently, licensing in the 800 MHz band essentially gives the same rights to multiple licensees: CMRS operators, private radio licenses and public safety systems all have the right to transmit and receive on specific frequencies, but their operations can interfere with the ability of other licensees to exercise their rights even when all are operating within the technical parameters of their licenses. Each of the 800 MHz plans submitted to the Commission tries to set forth a solution to these conflicts. The UTC/CTIA plan essentially re-assigns rights from some CMRS operators to public safety and private licensees. The Motorola plan argues that technical solutions will eliminate the unwanted interference and allow all users to coexist. The Consensus approach re-aligns the rights holders within the band to try to eliminate the problem and restart the band with compatible rights. The plans will have differing success in dealing with the interference problem; at the same time all of the plans will also have costs.

Without discussing it in these terms, all of the proposed plans, to some extent, try to change the parties' rights. The method used to re-assign these rights and the costs of doing so are critical to the efficiency and effectiveness of the proposals. None of the solutions is perfect. As a result, the Commission will have to evaluate the tradeoffs in determining the best of the proposed solutions. This analysis will focus on the three

major proposals that parties have submitted: the Consensus Plan, the Motorola Plan, and the UTC/CTIA Proposal.[3]

The major benefit of each plan is the degree to which it limits interference and allows flexibility for spectrum users. The three plans have different ways that they manage the interference problem and maintain incentives for efficient spectrum use. Obviously, it would be trivial to eliminate interference if one did not have to worry about the ability to provide service. However, the service provided by all parties in the band is extremely valuable.

For example, more than 11 million customers were willing to pay $8.7 billion for Nextel service last year, a 24% increase over the year before. In addition, more than 70 million customers probably receive service on the two cellular bands.[4] In turn, this has led to these customers being willing to pay approximately $40 billion annually for the service on these bands. Other participants in the band such as the public safety providers and private radio operators also provide valuable services that need to be considered when evaluating interference solution alternatives. Although the value of public safety communications cannot be as easily quantified in terms of a monetary value as commercial services, the value of public safety communications can be evaluated in

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[3] As a more radical departure from existing practice, Appendix A provides a rough outline of a possible market-based approach and the complexities involved in setting up such a system. It may be unlikely for the Commission to adopt such a plan at this point in time; it is presented merely to show an alternative. Market-based alternatives may face substantial political, economic and regulatory hurdles as well as time delays that make them less useful than some of the current proposals.

[4] As of December 2002, there were more than 140 million CMRS subscribers. At the end of 1995, there were 34 million subscribers, nearly all of whom were on the two cellular bands. If subscribers on the two cellular bands had 20% (1/5th) each of the increase in subscribers from 1995 to the end of 2002, then the subscribers on the cellular bands would be 76 million. I am using 70 million to be more confident that the number is not overstated. Source: "CTIA's Semi-Annual Wireless Industry Survey Results," December 2002.

terms of the lives, property and peace of mind that the public safety community protects and provides in fulfilling their mission. Such an evaluation would lead to the conclusion that additional value can be obtained from the ability to use the spectrum more efficiently.

Plans that constrict the ability of participants to provide valuable services to their customers and/or constituents may not provide the maximum benefits because although the direct cost of the plan may be low, the reduction in the services – be they public safety services, private services, commercial services, or some combination of the three – must be considered when evaluating the total costs of alternative plans.

There are direct costs to all of the plans as well. Some of them may be short-term costs and others long-term costs. There may be solutions that reduce upfront costs, but result in greater longer-term costs. The direct costs in the three proposals effectively break down to equipment costs, relocation costs and negotiating costs. The indirect costs include use of sub-optimal equipment, foregone service, as well as contracting and negotiating costs. All categories of costs, both direct and indirect, should be considered in the analysis of the different plans.

The outline of this paper is as follows: Section II provides a brief description of the issues involved in the 800 MHz band and the related bands; Section III presents the three alternative plans proposed to alleviate the interference in the 800 MHz band; Section IV evaluates the proposals in the context of the Spectrum Policy Task Force Report; and Section V provides conclusions about the effectiveness of the plans in terms of the economics. This report does not purport to be a technical analysis of the plans in any way.

II. Issues in 800 MHz Transition

The 800 MHz band plan and associated rules have set up a situation where interference is occurring at certain points in time and where interference can be expected to increase. Interference between systems began to appear about five years ago and was unforeseen by the Commission. The interference is not due to anyone violating FCC rules; to the contrary, all parties are abiding by the terms of their FCC licenses and all parties agree that the other parties are doing the same. The Commission should strive to adopt a solution that deals with the current interference, future foreseeable interference and establishes a framework that will allow the parties to deal efficiently with unforeseeable future interference.

The interference in the 800 MHz band essentially results from inefficiently specified rights for transmitters and receivers and an outdated band plan that permits the mixed, interleaved, and adjacent licensing of incompatible system designs. The interference comes from digital SMR operators, cellular operators, and a combination of the two, even when all parties are operating within the confines of the FCC rules. Part of this is due to the adjacency of the spectrum for different types of service, and part is due to the interleaving of channels for different types of services

While some argue that the number of public safety agencies affected is small relative to the total number of public safety agencies throughout the country, more than 155 agencies that provide public safety service in 27 states have been affected since January 2000.[5] This includes public safety agencies in 28 of the top 35 cities across the

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[5] See August 7, 2003 *ex parte submission* of the Consensus Parties at page 25, citing Nextel's *ex parte* submissions dated May 16, 2003 and July 1, 2003. (Unless otherwise specified, all references to comments and *ex parte* submissions are to filings in WT Docket No. 02-55.)

country.[6] Interference has affected counties with over 110 million people. Further, as more commercial cell sites are deployed, and wideband technologies are deployed, the trend of interference is likely to increase.[7] The CMRS-public safety interference problem is national in scope and, as the FCC recognized at the outset of his proceeding, the problem is getting worse.[8] When the interference first appeared, public safety users, equipment manufacturers, and CMRS licensees worked together in 2000 to develop a *Best Practices Guide* to try to alleviate the burgeoning interference problems.[9] The *Best Practices Guide* provides some suggestions and guidelines about operating behavior and technical parameters of systems and ways for parties to try to work together to eliminate harmful interference.

But the Guide ultimately does not provide a long-term solution to the problem since many of the tools are of limited effectiveness and not applicable in all situations. For example, having a CMRS provider change channels may be feasible when there are available channels, but when a system is using all of the channels in its network, such changes may be extremely costly, and could result in a ban on usage of those particular

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6 See Nextel's *ex parte* submission dated May 16, 2003 at page 5.

7 See August 7, 2003 *ex parte* submission of the Consensus Parties at pages 27-28.

8 See *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, Section III.D (paras. 14-17) (2002) . Based on the data reported by public safety and collected and reported by Nextel, 13 public safety agencies experienced interference in 2000, 46 were affected in 2001, 74 suffered interference in 2002 and 51 agencies have experienced interference just through April 30 of this year. Similarly, the locations of interference have steadily increased: 56 locations in 2000, 200 locations in 2001, 330 locations in 2002 and at 117 locations already through April 30, 2003. At least 55 more incidents were reported by public safety in May 2003. At these rates, interference will be reported at more than 400 new locations during 2003. See Nextel's ex parte submissions dated May 16, 2003 and July 1, 2003.

9 See "Avoiding Interference Between Public Safety Wireless Communications Systems and Commercial Wireless Communications Systems at 800 MHz – A Best Practices Guide" (Best Practices Guide), December, 2000, http://www.apco911.org/frequency/downloads/BPG.pdf.

channels. In other words, the *Best Practices Guide* generally provides short-term mitigation or interference management options that compromise spectrum rights for some or all of the parties; it does not correct the spectrum adjacencies and interleaving of different services that underlie this problem. Moreover, since the adoption of the *Best Practices Guide*, interference has continued to occur at an increasing rate, as discussed above.

In addition, it is important to note that implementing "Best Practices" is not free – there are real and significant costs to adapting equipment and changing transmission strength and/or channels to comply, not to mention negotiation and contracting costs as well. For example, Nextel is incurring real costs as it works with public safety agencies to minimize interference. In California, Nextel has reduced its effectively available channels from 350 channels down to 80 channels at certain sites to reduce the probability of interference with public safety communications – a 75% reduction in available spectrum.[10] To provide the same quality of service as before to its customers, Nextel must either acquire additional spectrum, or invest in cell-splitting and additional infrastructure. Either of these solutions requires the use of real resources – this is one of the costs of the interference mitigation. More importantly, public safety agencies themselves incur significant costs in attempting to identify and mitigate interference through Best Practices.[11]

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[10] See August 7, 2003 *ex parte* submission of the Consensus Parties at page 23.

[11] See Letter from Alan Tilles, Counsel to the City and County of Denver, to John Muleta, Chief, Wireless Telecommunication Bureau, FCC, WT Docket No. 02-55 (Nov. 7, 2003) (estimating that the City and County of Denver has expended approximately $130,000 in staff and engineering resources in seeking to mitigate 800 MHz interference); Anne Arundel County Application for Review, WT Docket No. 02-100, at 6 (Aug. 6, 2003) (estimating that Anne Arundel County has spent "hundreds of thousands of dollars of its own money and employee time" on interference mitigation efforts over the past several years); *Ex Parte*

One of the Spectrum Policy Task Force Report's recommendations for controlling interference is to develop a "Best Practices" handbook, that is, a compendium of available information broadly relating to interference management. This could include current industry guidelines for coordinating spectrum use, steps that could be taken to resolve interference problems, and discussions of how to use FCC databases and related tools. However, the Report also recognizes that interference management requires more than determining the ways in which to engineer around potential degradation to a radio signal. (Report at 25.) Ensuring adequate interference protection has been a key responsibility of the Commission since its inception and continues to be one of its core functions.

III. The Proposals to Alleviate or Eliminate the Interference

The current proposals can be roughly divided into some combination of technical solutions and relocation solutions. The technical solutions involve the imposition of technical standards and practices to minimize interference. Relocation solutions try to separate differing systems so that the resulting band plan helps ensure that licensees on nearby spectrum channels are "good neighbors" who do not cause the same level of harmful interference.

A. The Consensus Plan

The Commission recognized in launching its rule-making to address CMRS-public safety interference that the primary underlying cause of this interference is the

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Submission of the Consensus Parties, WT Docket No. 02-55, at 32-33 (Aug. 7, 2003) (describing how interference mitigation efforts impose unfunded burdens on public safety agencies).

spectrally-mixed licensing of incompatible system designs.[12] The Consensus Plan would address this central cause of CMRS - public safety interference by realigning the 800 MHz band, moving cellular and non-cellular systems into separate bands, and thereby eliminating the spectrally-mixed licensing of incompatible system designs and communications goals.[13] In addition, the Consensus Plan adopts a set of rights and responsibilities should future interference situations arise even after realignment is completed.[14] As a result, the Consensus Plan is a mixture of realignment solutions and technical solutions to the interference problem.

The Consensus Plan also provides another significant benefit – additional spectrum for public safety operators. Under the Consensus Plan, Nextel will vacate spectrum below 861 MHz as part of the realignment of the 800 MHz band. Any spectrum vacated by Nextel that is not used to relocate other incumbent public safety and private wireless licensees would be made available exclusively to public safety licensees for five years and then any non-cellular applicant.[15] Additional 800 MHz spectrum for public safety would be of obvious benefit to public safety and as a result, the public

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12 *NPRM* at para 15.

13 For a fuller description of the Consensus Plan, see Supplemental Comments of the Consensus Parties, WT Docket No. 02-55 (December 24, 2002) and Reply Comments of Nextel Communications, Inc. and Nextel Partners Inc., WT Docket No. 02-55 (February 25, 2003). Under the Consensus Plan, Nextel would provide $850 million in funding to accomplish the realignment of the 800 MHz band.

14 See *ex parte* submission of the Consensus Parties, WT Docket 02-55 (August 7, 2003).

15 In addition to the spectrum Nextel is vacating at 800 MHz, Nextel will contribute 4 MHz of 900 MHz spectrum, which will be designated for private wireless licensees that elect to relocate from the 800 MHz band. These licensees will have an incentive to do this because they will receive "2 for 1" replacement spectrum by relocating to 900 MHz. This will free up additional 800 MHz spectrum for public safety systems. Under the Consensus Plan public safety systems would also receive 4 MHz of spectrum in the 700 MHz Guard Band spectrum that Nextel would contribute under the Plan.

interest at large. Neither of the other two plans provides this benefit to the public safety community.

B. The Motorola Plan

Motorola asserts in some of its filings in the 800 MHz proceeding that it is possible to alleviate a majority of the interference being experienced through best practices and new technical solutions without requiring any relocation solutions. In particular, Motorola asserts that it is possible to resolve many of the instances of interference through advances in receiver technology and increased signal strength.[16] Motorola provides no indication, however, who will fund these advances or implement these changes to public safety infrastructure.

C. The UTC/CTIA Proposal

UTC, CTIA, and parties making up the 800 MHz User Coalition have an approach that relies on case-by-case, enhanced mitigation techniques that "go beyond" existing "Best Practices."[17] The UTC/CTIA Proposal would require interference causers to fix the interference; however, it does not specify how to identify the interference causer. It differs from the Motorola plan in that it would appear in most cases to place the mitigation burden on the shoulders of a subset of CMRS licensees, although in other cases it would also require public safety agencies to undertake remediation measures when the public safety receiver is deemed the cause of the interference. The UTC/CTIA

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[16] For a fuller description of the Motorola Plan see the letter from Motorola to Mr. Edmond Thomas, Office of Engineering and Technology, May 6, 2003, and the Motorola letter to Mr. James Schlichting, Office of Engineering and Technology, dated June 20, 2003.

[17] This description of the UTC/CTIA Proposal is based on "800 MHz User Coalition Balanced Approach," May 28, 2003.

Proposal does not set forth clear criteria for determining which party is responsible for remedying particular interference incidents. In the event of disputes over this issue and how best to solve an interference problem, the parties would file a complaint with the Commission which would have to investigate and adjudicate the matter – which obviously imposes costs on all parties.

IV. The Spectrum Policy Task Force Report as a Guideline.

A. Key Features of the Spectrum Policy Task Force Report

The FCC Spectrum Policy Task Force Report recommends that spectrum policy evolve towards more flexible and market-oriented regulatory models to increase opportunities for technologically and economically efficient spectrum use.[18] Recognizing that no single regulatory model is applicable to all spectrum, the Report recommends that the Commission pursue a balanced spectrum policy that includes both the granting of exclusive spectrum usage rights through market-based mechanisms and creating open access to spectrum "commons," with command-and-control regulation used only in limited circumstances. The Report recommends that, with only certain exceptions, existing spectrum that is subject to command-and-control regulation should be transitioned to the more flexible exclusive use and commons models.[19]

However, the Report recognizes some common elements of spectrum policy that cut across the different regulatory models it discusses and some of these are particularly

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[18] See Report at 3.

[19] These exceptions include the dedication of spectrum in conformity with international harmonization considerations, spectrum set aside for public safety use, and broadcast spectrum.

applicable to the proposed solutions for the 800 MHz interference problem.[20] The Report highlights these items as:

- "Maximum feasible flexibility"
- "Clear and exhaustive definition of spectrum users' rights and responsibilities"
- "Incentives for efficient spectrum use"
- "Efficient and reliable enforcement mechanisms"

Overall, the Report recommends that the Commission evolve its spectrum policy toward more flexible and market-oriented spectrum policies that provide incentives for users to migrate to more technologically innovative and economically efficient uses of the spectrum consistent with interference parameters.[21]

The Report recognizes that any regulatory model must be based on clear definitions of the rights and responsibilities of all users, particularly with respect to interference and interference protection.[22] In addressing interference, the Report notes that interference management requires more than determining the ways in which to engineer around potential degradation to a radio signal.[23]

Effectively, what the Commission faces in the current proceeding is how to transition to a situation where there is less interference between CMRS and public safety users. The Report discusses transitions, although more from a command and control

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20 See Report at 4.

21 See Report at 15.

22 See Report at 3.

23 See Report at 25.

approach to a market-oriented approach. Despite that difference, the principles for a transition can be used for evaluation in the current context.

The types of services currently offered in the band and the potential impact of transitioning to an expanded flexible rights model can affect the choice of transition model. One model discussed in the Report is "Expanded rights 'overlay' licenses combined with mandatory relocation of incumbents."[24] Under this model, the Commission reallocates a particular band of spectrum to allow for more flexible uses, grants the expanded usage rights under new licenses and requires incumbent licensees and the services they provide to clear the band and either relocate to other bands or cease operating.

Consideration of this option depends on the availability of alternative spectrum that would be suitable for use by incumbent licenses required to relocate. Assuming spectrum is available, this option may be preferable in cases where band-clearing is likely to be critical because of the technical incompatibility between existing uses by incumbent and prospective users.[25]

In addition to the principles outlined above, the Report lists "Good Neighbor" incentives as an element of new spectrum policy to control interference and maximize spectrum efficiency. Regardless of the regulatory model used, one element of the model should encourage grouping of spectrum "neighbors" with technically compatible characteristics.[26] Such grouping can allow more flexibility for like systems, and reduce

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[24] See Report at 48.

[25] See Report at 50.

[26] See Report at 4.

some of the interference between systems. The Report states that spectrum currently set aside for public safety use should remain subject to the command-and-control model to ensure provision of essential life-and-safety services.

B. Evaluation of Consensus Plan in Light of the Report

The major benefits of the Consensus Plan are that it virtually eliminates the current and future likely interference, gives licensees flexibility to design their systems to serve customers and provides additional spectrum to public safety operators.[27] The major costs of the plan are the costs involved in relocating 800 MHz users due to the need to change frequencies and finding suitable replacement spectrum for these incumbent licensees, including the 700 MHz, 800 MHz and 900 MHz spectrum from Nextel and the 1.9 GHz spectrum. Under the Consensus Plan, Nextel has committed to pay up to $850 million to fund the relocations of the public safety and private wireless incumbents to its vacated spectrum below 861 MHz.

The underlying approach of the Consensus Plan follows the Report's guidance by encouraging the grouping of spectrum "neighbors" with technically compatible characteristics to minimize interference and maximize flexibility. The separation of the incompatible systems through realignment should eliminate almost all of the current and future interference in the Land Mobile Radio band.[28] As a backstop, the Consensus Plan also proposes the use of technical rules to resolve any remaining interference issues post-

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[27] See the August 7, 2003 *ex parte* submission of the Consensus Parties at pages 48-49.

[28] Apparently, separation of the transmissions makes filtering economically and technically viable that would not be feasible with interleaved transmissions. This filtering deals with the out-of-band emissions problems that account for about half of the interference concerns.

realignment. The relocation portion of the Consensus Plan effectively follows the discussion in the Report about how relocation should efficiently be done – with a fixed time period and well-delineated rights and requirements about moving. Essentially, under the Consensus Plan, the Commission would require certain incumbent licensees (including public safety operators and Nextel) to vacate their current spectrum channels and receive suitable replacement spectrum. Nextel is providing the money to relocate the incumbents to the new spectrum. Historically, the Commission also provided relocation spectrum for many of the microwave incumbents who were relocated to make way for the PCS service.

The Consensus Plan makes possible efficient spectrum use not possible under today's band plan. As the Report notes, system or device spectrum incompatibility can require additional constraints in the form of guard bands, consuming valuable spectrum, or expensive filtering systems to avoid adjacent band interference. By eliminating the interweaving and adjacency problems from incompatible system designs, the Consensus Plan allows for greater, more intensive utilization of the spectrum than currently exists. The Consensus Plan also provides additional spectrum for public safety usage. It also satisfies the Report's recommendation that the Commission give spectrum users maximum possible autonomy in the choice of technology that is most appropriate to the spectrum environment.

The Consensus Plan embodies the heart of the Report – that spectrum design should be set up to maximize efficiency. In the Consensus Plan, the Commission is solving the interference problem in a market-oriented way. It is both solving the 800 MHz interference problem and increasing the amount of high quality spectrum available

for public safety by using the 10 MHz of spectrum at 1.9 GHz. Nextel is contributing more than 10 MHz of spectrum below 1 GHz, $850 million, and the costs (both out-of-pocket and costs of disruption) of its own relocations as well as substantial technical support for all of the other relocations to help solve the problem as well.

The end result of the Consensus Plan is a revamped band plan that has the efficiency characteristics discussed in the Report – users will be protected from interference, have well-specified rights and responsibilities, and have appropriate incentives to adopt and implement new technology. In addition, the public safety community will have additional spectrum to use to protect the public and because the Consensus Plan for realignment is funded by Nextel, the public safety providers do not spend their own resources to solve the interference problem.

The costs to achieve these benefits are the dislocation costs to the users in the 800 MHz band and the opportunity cost of the 1.9 GHz spectrum. The public safety community using the NSPAC channels is one group that will be particularly affected by the disruption of relocating spectrum, yet public safety overwhelmingly supports the transition. This is one indication that the dislocation costs for them are not as great as the benefits. For other entities, the experience from the earlier retuning efforts associated with the band should be instructive in determining the costs.

The final cost is the opportunity cost of *not* auctioning the 1.9 GHz spectrum.[29] If the Commission were to use the 10 MHz of spectrum at 1.9 GHz to solve the interference

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[29] CTIA has submitted its estimates of the value of the spectrum that could be anticipated if auctioned. If the FCC is going to consider this, it should investigate the assumptions necessary for the validation of those calculations. For example, are the "pops" comparable? Also, the spectrum sold may be less encumbered than the spectrum at issue, which has BAS (broadcast auxiliary service) licensees that need to be relocated over time.

problems rather than auction this spectrum, it would forgo the net after tax amount that could be raised at the auction.[30] In a simple auction like this, it should be noted that the revenues would be treated like other current auction revenues and go into the Treasury and not be available for use in mitigating the 800 MHz interference problem. There should be no other cost: Kwerel and Strack of the FCC have shown that there is no difference in the ultimate competitiveness of the wireless marketplace whether licenses are auctioned or awarded in some other way.[31] For example, as they state, there is generally no systematic difference in the prices charged by cellular licensees who got their licenses for free from the FCC compared with those who paid for them in the secondary market or the PCS licensees who bought their licenses at auction (or Nextel who has a combination of licenses for which it paid and which it obtained directly from the FCC as well as in the secondary market).

Ultimately, in a market where the licensee faces the opportunity cost of the spectrum, the licensee will use the spectrum efficiently or sell it to someone else who will. This efficiency result holds regardless of the way in which the licensee obtained the license. The Consensus Plan leads to spectrum that is allocated so that licensees face the opportunity cost of the spectrum they use in accordance with the Report.

Ultimately, in evaluating the costs and benefits of the Consensus Plan, the Commission is faced with the recurring benefits from a long-run market oriented solution to the interference problem and additional spectrum for public safety users compared

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[30] Since the auction winners are able deduct the cost of the license acquisition cost from their federal income, the appropriate cost to the government would include the value of such a deduction.

[31] Kwerel, E. and W. Strack (2001) "Auctioning Spectrum Rights," available at http://wireless.fcc.gov/auctions/data/papersAndStudies/aucspec.pdf.

with the one-time costs of dislocation (paid for by Nextel, but also felt by users having to change frequencies) and the difference in the opportunity cost of the 1.9 GHz spectrum versus the 10 MHz of spectrum contributed by Nextel.

C. Evaluation of Motorola Plan in Light of Report

The Report recommends that spectrum users be allowed to choose the technology that is best suited to their proposed use or service.[32] In contrast, the Motorola Plan would set limits on technology. It would require users to adopt specific technologies that, while possibly addressing the problem of interference, may limit the ability of users to meet the needs of their customers.[33] The major costs of the Motorola Plan are the reduced service available to the public and the expense of government mandated technology choice. Both of these may be substantial under this plan, and there is no market mechanism to control such costs or to provide incentives for efficiency. Under the Motorola Plan public safety may need to expend significant financial resources on receiver enhancements, base station infrastructure and tower sites.

Motorola indicates that costs would be minimized through its approach because it would only require limited deployment of new improved handsets. While the Motorola Plan envisions that its "technological solution" to interference would only need to be adopted in areas experiencing interference, or predicted to experience interference, the effect may become more widespread. Public safety operators may feel political and legal pressure to deploy the newly available technology or risk liability for injury, etc. In

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[32] See Report at 17.

[33] The Consensus Plan limits users in the non-cellular block to use of non-cellular technology unless they obtain a waiver.

addition, the incidence of interference has increased and has the potential to increase faster. Interference is already occurring in relatively densely and heavily populated urban centers. The cellular industry's continued expansion as well as a transition to digital technologies from analog services will increase in heavily populated areas. Those areas have the largest number of mobile units for public safety agencies so they would require the most replacements of radios in the near term, under the Motorola Plan. The Motorola Plan is a technical description that asserts that technology can solve the interference problems in most current cases. But it does not analyze the overall effectiveness nor does it determine the cost of the solution. Motorola also does not address the question of funding for its solution.

Ultimately, the Motorola Plan is a continuation of the case-by-case approach to dealing with the interference problem. The Motorola Plan does not address the root cause of the interference problem: the Land Mobile Radio Band's adjacency to cellular systems and the mixed spectrum allocation for different communications services that have conflicting design principles and communications goals. Motorola recognizes this cause of the problem in its filings, but Motorola believes that technology can solve the problem. However, the Motorola Plan does not provide assurances that the adoption of "Best Practices" and new technologies will resolve the interference, it does not provide for alternative solutions, and does not provide a mechanism for determining the cost of its solution nor of providing a mechanism to ensure that parties have incentives to minimize costs.

Of course, if the cost of technical solutions is sufficiently low, then technical solutions that worked would be superior to solutions that create other costs. However,

the Motorola technical solution creates costs for all users and in particular public safety users, does not create the incentives necessary for an efficient working of the band in line with the articulated tenets of the Report, and does not come up with a mechanism to fund the costs it creates. In addition, the root cause of the interference is not eliminated so that this plan does not provide any mechanism, other than future regulatory involvement, to deal with future interference issues.

The benefits from the Motorola plan are the potential for reduced interference. The costs are the direct and indirect costs – the expense of adopting new equipment for all users, and the reduction in the flexibility of technology choice and the reduction in the value of service provided to users. In addition, there is the cost of continued reliance on regulation for determining future technological change within the band.

D. Analysis of the UTC/CTIA Proposal in Light of the Report

Like the Motorola Plan, the UTC/CTIA Proposal does not address the root cause of the interference problem – adjacency and interleaving of different types of systems within the band. Because it, like the Motorola Plan, excludes realignment, it is likely to require substantial government involvement to continue to deal with the interference problem in both the long run *and* in the short run. As CMRS providers and public safety organizations build out their networks and increase utilization, there are increasing opportunities for interference. This will likely increase the number of case-by-case interference disputes to be resolved, and likely require increased intervention on the part of the Commission to resolve disputes. Essentially, this shows the command and control nature of this proposed solution for non-public safety communications systems, a very different system than that envisioned by the Report.

The parties to an interference dispute may not reach agreement because the UTC/CTIA Proposal places extensive operational and financial obligations on the CMRS providers. The UTC/CTIA Proposal seems to indicate that cellular A and B band carriers would be exempt from any of the provisions of the plan. This would clearly be unacceptable to public safety and to Nextel. Thus, for the purposes of this discussion, it is assumed that cellular A and B band carriers would be considered as potential responsible parties as well – any other interpretation or implementation of the plan would not be reasonable and, as a result, is ignored.[34] In many cases the plan would obligate CMRS providers to change frequencies, antenna heights and/or reduce power levels on a site-by-site basis to mitigate interference to public safety and private wireless systems. CMRS providers would be responsible, apparently in perpetuity, for paying costs of fixing public safety interference within the CMRS provider's service area, regardless of whether the CMRS provider is operating in compliance with the FCC's rules. It places stringent timelines on the mitigation process.

The UTC/CTIA Proposal's plan to incorporate new "Best Practices" into the FCC Rules may place CMRS providers in a position of having to continuously pay for public safety's receiver and system upgrades. This is because part of the mitigation process is to adopt best practices that include new receivers with increased attenuation that require increased public safety signal strength. The UTC/CTIA Proposal, however, does not provide for funding these public safety upgrades, and appears to place that burden on CMRS licensees as well as public safety agencies.

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[34] The proposed procedures for interference mitigation in the 806-824/851-869 MHz band focus on low-site operators in that band and do not discuss adjacent cellular carriers. (See "800 MHz User Coalition Balanced Approach," Appendix A, May 28, 2003.)

While the UTC/CTIA Proposal would in many cases impose Best Practices burdens on CMRS carriers, in other cases it would require public safety agencies to undertake expensive remediation measures. Under the Proposal, if "'receiver-generated' IM interference" is the cause of interference, the public safety agency owning such equipment would "be responsible for mitigating the interference."[35] Aside from this, public safety agencies would bear the ongoing burden of investigating interference incidents and negotiating interference solutions with CMRS carriers and filing complaints with the FCC when the parties cannot agree on a solution. UTC/CTIA offers no proposal to fund these public safety burdens.

The Best Practices Guide, while valuable, offers mostly reactive rather than proactive interference mitigation practices. Even a "rigorous" application of its principles cannot correct the fundamental incompatibility of noise-limited and interference-limited systems in interleaved and adjacent spectrum bands.

In many ways, the UTC/CTIA Proposal is similar to the Motorola plan – it does not provide a clear guide as to rights and responsibilities, does not correct the root cause of the interference problems, and commits to a long-standing command and control regulation of the 800 MHz band. If the costs of the mitigation techniques are sufficiently low and the techniques were effective, then it would make sense to use these approaches. But they lack the ultimate results of getting spectrum use determined by the market rather than by the Commission.

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[35] UTC/CTIA Proposal at 5.

V. Conclusions

The Commission's Spectrum Policy Task Force was very clear when it stated that to the extent possible, the Commission should rely on market forces to effectuate spectrum management decisions. Chairman Powell and other Commissioners have echoed those desires.[36] The choice between the three plans presented to the Commission to resolve the 800 MHz interference problem present very clear choices about the use of market forces. While the mandatory relocation of incumbents to other spectrum in the Consensus Plan may appear to be contrary to the market, essentially even this process will be market driven – the relocation rights will be well defined and clearly allocated so as to efficiently clear the band. The Consensus Plan also fits well with the "Good Neighbor" incentives envisioned in the Report. The Consensus Plan gets at the root cause of the interference problem in the Land Mobile Radio Band – mixed spectrum allocation for different communications services that have conflicting design principles and communications goals.

The Commission will be a market participant by delineating the rules and contributing the 1.9 GHz spectrum to solve the problem. If the other solutions were workable, and were truly more cost effective, then the parties, especially the two that are bearing most of the costs in the Consensus Plan, the public safety community and Nextel, should be in favor of these solutions. It would solve the interference problems and cost

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[36] Michael K. Powell, "Broadband Migration III: New Directions In Wireless Policy" at the Silicon Flatirons Telecommunications Program University of Colorado at Boulder October 30, 2002. Kathleen Q. Abernathy, "The Importance of the Market. 3G Americas Board Briefing, Washington, D.C. – June 3, 2003. Joint Statement of Chairman Michael K. Powell and Commissioner Kevin J. Martin Re: Promoting Efficient Use of the Spectrum Through Elimination of Barriers to the Development of Secondary Markets; Report and Order and Further Notice of Proposed Rulemaking; WT Docket No. 00-230, May 15, 2003.

them less money. This support of the Consensus Plan evidences the view that the other proposals are neither workable nor cost effective.

The Consensus Plan is the only plan of the three that ultimately creates real marketplace incentives and a real long-term market solution to the 800 MHz interference problem. In addition, it is the only of the three plans that increases the amount of spectrum for public safety and provides a funding mechanism for the expenses necessary to complete the transition.

Appendix: A Market-Based Alternative

If the Commission determines that the proposed technical solutions are insufficient, and if the Commission determines that it does not want to compensate Nextel for the 10.5 MHz of spectrum and $850 million that Nextel has committed as a package in the Consensus Plan, it may be possible to develop another market-based alternative. However, implementation would be complex, time-consuming and might require rule changes. As a result, this appendix is not a recommendation that such an approach be used – the delay, complexity and uncertainty may be substantial compared with the speed and certainty of the Consensus Plan.

The discussion below uses estimated numbers that almost certainly are not precisely correct, but are intended to be illustrative and to give an idea of the magnitude of the dollars and spectrum at issue that would be involved in a market-based alternative.

Many parties wrongly claim that the exchange of spectrum, cash, and internal costs for alternative spectrum is a giveaway – it is an exchange of spectrum and services for other spectrum. The question for the Commission is whether this market transaction is worth it. If the Commission wanted to rely on the auction mechanism to create a market transaction as well, it would want to start with an auction for the 10 MHz of spectrum at 1.9 GHz. However, the Commission would have to raise enough money through this auction when, combined with technical mitigation techniques, would come up with at least the same benefits as the Consensus Plan. If legal constraints were relaxed, it would be possible to auction the 10 MHz and try to use the proceeds to pay for interference mitigation. But it is not clear that the revenues would be sufficient, nor that the solution would be workable in the short or long run.

The Commission should want more assurance that this path would lead to a better result than the "bird in the hand" that they already have with the Consensus Plan. This would entail a relatively complex combinatorial auction with substantial conditions.

First, there would have to be minimum bid conditions to raise money for the relocations. This minimum would not only be the $850 million that Nextel has agreed to pay as an estimate of the cost of relocating the incumbent public safety and B/ILT users, but also would have to cover the costs incurred to relocate Nextel's operations as well that are implicitly covered in the Nextel plan, which might be $150 million for technical modifications to its network plus the significant expenses it will incur for additional sites it will need to provide capacity on its network while it undergoes the transition to the new band plan. Direct relocation costs would therefore make the reserve price in the auction be at least the sum of the three different relocation costs, or possibly well over $1 billion.

But this would only be a start. The winner of the auction would also have to find spectrum onto which to relocate users. Under the Consensus Plan, Nextel is contributing spectrum back to the Commission to use for the relocation. If Nextel were not to get the 10 MHz of replacement spectrum, it is unlikely it would be willing to part with its spectrum at 800 MHz for anything close to the price paid at auction given the disruption to its valuable business and the incumbencies on the spectrum. While the Commission might have more than $1 billion or more to pay for relocation costs, it could not guarantee that it would be able to find or acquire spectrum onto which to relocate the licensees.

It might be possible to incorporate the need for relocation spectrum into a market-oriented solution. First, the Commission could adopt a form of the Kwerel-Williams

two-sided "Big Bang" auction. In that auction, all licensees in the 800 MHz band (and possibly 700 MHz and 900 MHz bands) would put their spectrum up for bid. That is, they could put a minimum price on their spectrum licenses in these bands to sell the spectrum. The winning bid for the 1.9 GHz license would not only have to be the more than $1 billion as the reserve price to cover relocation costs, but would have to include a commitment of sufficient spectrum in the 800 MHz band, possibly 6-10 MHz, to accommodate the relocations. The auction mechanism could be designed to incorporate bids that satisfied such conditions.

There would be a large number of details and legal issues to work out to make this auction work, including the ability to sell the rights to use public safety spectrum in the auction. Also, it would be critical to test the ability of the FCC systems to run such a large and complex two-sided auction with numerous different package possibilities.