DOCKET FILE COPY ORIGINAL

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

RECEIVED

MAY - 6 2002

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

In the Matter of	)	
	)	
Improving Public Safety Communications in the 800 MHz Band	)	WT Docket 02-55
	)	
Consolidating the 900 MHz Industrial/Land Transportation and Business Pool Channels	)	

COMMENTS OF THE PUBLIC SAFETY
IMPROVEMENT COALITION

The Cities of Cincinnati, District of Columbia, Philadelphia, Phoenix, San Diego, Scottsdale and Tucson, together with the Counties of Anne Arundel (Maryland), Fauquier (Virginia), Hamilton (Ohio), Osceola (Florida) and San Diego (California), and the Denver Greater Metro Telecommunications Consortium ("GMTC"),[1] hereafter Public Safety Improvement Coalition ("PSIC"), are pleased to respond to the Notice of Proposed Rulemaking ("Notice") in the captioned proceeding, FCC 02-81, released March 15, 2002. Each PSIC member is operating a public safety communications system at 800 MHz or is in the process of installing such a system. Typically, systems operational for any extended period have experienced significant interference from commercial mobile radio service ("CMRS") providers in their communities.[2]

---

[1] GMTC is a board of local government representatives comprised of 28 communities in the greater metropolitan Denver, Colorado area. Formed in 1992 to facilitate franchise agreements with local cable television companies, the GMTC has since realized bargaining strength and recognition in all areas of telecommunications expertise. A GMTC membership directory can be found at www.gmtc.org.

[2] System descriptions and notes on interference, compiled by PSIC members, are found at Exhibit A.

No. of Copies rec'd 0+4
List ABCDE

Introduction. PSIC has formed no consensus, at this time, on the relative merits of the three 800 MHz re-banding plans summarized in the Notice, put forward by (1) the National Association of Manufacturers ("NAM") and a frequency coordinator for manufacturers' radio services, MRFAC, Inc. ("MRFAC"); (2) Nextel Communications ("Nextel"); and (3) the FCC.[3] It may be that the varying circumstances and stages of 800 MHz deployment among PSIC members will not permit the development of a re-banding consensus.[4]

PSIC uniformly agrees, however, that more is needed than the *ad hoc*, community-by-community approach exemplified by the *Best Practices Guide* of December, 2000,[5] and we applaud NAM/MRFAC, Nextel and other associations and individuals who have called for a national solution to the serious -- indeed, dangerous -- problem of CMRS interference to public safety radio systems at 800 MHz. As the Notice (¶20) describes the difficulty:

> We tentatively conclude that there is a serious interference problem with public safety in the 800 MHz band that deserves resolution. One option for resolution of this problem is a restructuring of the 800 MHz land mobile band to stem the increasing incidents of interference to public safety systems. We believe one essential aspect of this restructuring is extracting public safety systems from the interleaved spectrum at 809.75-816 MHz and 854.75-861 MHz where public safety systems frequently operate on channels immediately adjacent to potentially interfering -- or actually interfering -- digital SMR, conventional SMR, Business or Industrial/Land Transportation stations.

---

[3] Block diagrams of the three plans are found at pages 14, 15 and 17 of the Notice, respectively. The FCC plan did not appear to be offered as a product of lengthy study but as one illustration of possible interference mitigation without the extensive relocation in the other two plans.

[4] More plans have been promised by parties intending to comment in this proceeding.

[5] The guide is available at www.apcointl.org. Funded by Nextel and Motorola, the best practices pamphlet was the product of a working group composed of the two funding entities, APCO, CTIA and the Public Safety Wireless Network.

We accept the Notice's suggestion that plans should be evaluated on (1) eliminating or ameliorating interference to public safety, (2) minimizing disruption to existing services and (3) providing sufficient public safety spectrum. (Notice, ¶26). In our view, however -- and we say this with due regard for the contributions made by business radio services -- minimizing disruption to public safety services must have first priority within that category of evaluation.

PSIC members also are united in their views that (a) if forced to relocate or retune, public safety systems should be fully compensated for the total costs, direct and indirect, of their prudently chosen modifications[6]; (b) choices among more interference-resistant receivers for public safety and increased signal levels for public safety systems, on the one hand, and reduced out-of-band emissions and diminished signal levels for commercial systems, on the other hand, should be fairly balanced. Public safety should not have to foot the lion's share of the bill by purchasing super-tough receivers or adding multiple antennas.

800 MHz reassignments. As noted above, PSIC members are not of one mind about the three proposals put forward by NAM/MRFAC, Nextel and the FCC. We expect to have more to say when these can be compared with other plans forthcoming in this first round of comments. Some of the members have formed tentative views which we believe should be shared with other commenters at this point.

Phoenix warns that none of the proposals, as submitted, will come close to providing enough funding to cover the enormous cost of national implementation. Assuming commercial carriers will provide some of the funding, it is the responsibility of the FCC, Phoenix believes, to

---

[6] We recognize that in previous spectrum relocations, such as the clearing of PCS providers to move into fixed microwave spectrum at 2 GHz, payments of premiums above cost were permitted. We think that may be appropriate here, but not if public safety systems in less desirable locations are left to the mercies of the marketplace. At a minimum, public safety systems must fully recover the costs of moves or modifications -- and preferably up front.

obtain the balance of the money from the Congress. The Arizona city emphasizes the importance of strict enforcement against future commercial interference to public safety systems: The FCC must not continue to put two licensees in the position of both being "right" when one of them is a public safety system. When lives and property are at risk, correction or mitigation of interference after the fact of a failed communication will be too late. Having experienced significant interference to its mobile data terminal ("MDT") system (see Exhibit A), Phoenix asserts that the new spectrum at 700MHz is eagerly awaited by the public safety community. It is seen as a chance for the FCC to do a better job of band planning and management -- avoiding the mistakes FCC engineers made with the 800 MHz band -- and an opportunity to move away from that resulting interference, and to utilize wide-band data channels.

Phoenix also urges the Commission to remember that local government providers of public safety communications do not have the budgets and will not have the budgets to abandon and replace existing radios and perform other major upgrades and overhauls of their communications systems in order to fight the interference caused by commercial carriers. There is no "interference-proof" radio or system available to buy, at any price. At this point no one, not even Motorola, will guarantee that a state-of-the-art public safety communications system (such as the one being constructed in 2002 in the City of Phoenix) will be interference-free. Even if interference-free equipment is developed, it will cost even more, further burdening taxpayers.

Philadelphia, which is in the initial roll-out of the new 800 MHz system described at Exhibit A, is concerned that both the Nextel and NAM proposals would trade today's problems for a slightly different set of problems that still present difficult challenges for local

governments.[7] Intermodulation and receiver desensitization have been acknowledged in the Notice and in the APCO Project 39 interim report of December 24, 2001[8] as prime causes of CMRS interference to public safety systems. Strong intermodulation products would still occur if either the Nextel or NAM plans were implemented, but on different frequencies through different modes.[9] And RF noise can still be expected at high-density sites. Philadelphia agrees with Phoenix that the $500 million fund offered by Nextel cannot possibly cover all public safety relocation or retuning costs nationwide. Philadelphia estimates that its monetary costs for the relocation would likely exceed $1.5 million. This would be just for modifying the fixed network equipment and the radios, plus the unavoidable project management, engineering and other costs associated with taking all radios and equipment out of service to change frequencies. Jurisdictions which purchased their systems several years ago will have older technologies, less resistant to interference and less amenable to upgrades or "retuning." Such older systems are likely to require equipment replacement and will face much higher costs under any of the re-banding proposals.

Philadelphia further emphasizes that in addition to the direct costs for system modification, local governments will be forced to take on a huge administrative burden in order to carry out the relocation effort with minimal disruption to public safety communications. Philadelphia estimates that its own administrative effort for any of the relocation plans now proposed would consume personnel, consulting, and management resources nearly equal to those

---

[7] The longer analysis at Exhibit A was addressed to the Nextel proposal because only this plan was public at the time it was written. Philadelphia notes that the proposal of NAM/MRFAC also would move the newly assigned NPSPAC channels to the lower part of the 800 MHz Band, thus having the same logistic and cost impacts on existing public safety systems.

[8] See note 4, *supra*, for APCO web site, follow links to Project 39.

[9] Notice, ¶27.

required for implementation of the new system. Philadelphia also forecasts that under the best case – where all parties, government and private, cooperate fully, and the FCC puts teeth into re-banding requirements – a minimum of three to five years will be required to implement either the Nextel plan or the NAM plan, with interference continuing in the meantime. Recent experience with band relocation efforts suggests a much longer time frame may well be required.

The City of San Diego (Exhibit A) discusses the importance of interference-free interoperability channels along the nearby U.S.-Mexican border. In its view, 2006 is too far away -- referring to the current deadline for clearing TV operations in the 700 MHz band -- to begin upgrading for these border interoperability needs. Either additional 800 MHz spectrum should be allocated to public safety or incumbent 700 MHz TV station licensees should be relocated within the next two years. The former might be accomplished, suggests the City, by re-negotiation of the present treaty with Mexico.

San Diego also notes the disparity in cost between commercial and public safety handsets, the latter priced as much as $3000 each. The City ("Reallocation Proposal," Exhibit A) considers 2 GHz spectrum as well suited for the low-site cellular antennas now operating at 800 MHz. It suggests that bringing dual-band radios onstream (as has already occurred in PCS) would allow cellular systems to continue their higher-site and more rural activity at 800 MHz while metropolitan sites could transition to 2 GHz. The result San Diego would hope for, as 800 MHz cellular moves to 2 GHz, would be the clearing of the 800 band for public safety in spectrum usefully contiguous to the reserve at 700 MHz.

The District of Columbia has experienced regular interference as a result of service degradation from CMRS operators over the course of its system's operation. Interference has been severe in specific locations of the metropolitan service area. Thus, the Office of the Chief

Technology Officer ("OCTO") is grateful to the FCC, public safety advocates and associations, as well as to concerned CRMS carriers, for undertaking in the Notice to address greatly needed relief from operational interference and the requirement for additional channel allocation to public safety licensees in the 800 MHz band. OCTO generally supports any plan that will eliminate the current channel interleaving and general category band-sharing licensing in the 800 MHz spectrum, since the integration of dissimilar services is the primary source of public safety operational interference.

As this process could be lengthy, OCTO strongly encourages the FCC to expedite public safety access to 700 MHz spectrum and to regulate the broadcast industry to ensure near-term surrender of allocated 700 MHz spectrum without further delay. While it is not the intention of public safety to diminish competitive influences resulting from this Notice, or recommend band restructuring to the detriment of commercial operators, OCTO emphasizes that the focus of this proceeding is the mitigation of detrimental interference to public safety agencies responsible for safeguarding the life and property of the citizens of the United States. These agencies provide critical and valuable services to citizens and must have sufficient, interference free, radio channel capacity to ensure the success of their mission. OCTO believes it would be a grave mistake to not place the interests of these agencies at the forefront.

Pending its review of the comments of others, OCTO recommends that the FCC should (1) mandate the reduction of out of band emissions; (2) encourage (but not require) the public safety community to improve their public safety receivers; and (3) not require the increase of public safety coverage levels. These recommendations are further explained in Exhibit A.

San Diego County agrees with the City of San Diego on the importance of solving Mexican border issues, noting that the existing treaty halves the amount of spectrum available to

U.S. licensees distant from national borders. The County questions the MRFAC assumption that conventional SMR and ILT business licensees are more "compatible" with public safety use and less likely to cause interference. The FCC proposal, on the other hand, too readily relies on the capability of public safety systems to convert from 12.5 to 6.5 KHz channel spacing. The County believes that public safety spectrum needs will continue to grow, even if new technologies make spectrum use more efficient.

Conclusion. For the reasons discussed above, PSIC members believe that each of the three spectrum reassignment proposals in the Notice has drawbacks as well as potential benefits. We look forward to reviewing other plans which may emerge in the comments. Funding remains critical. The Nextel proposal is deficient in this regard, and the other two plans are silent. We continue to ask that the burdens of other remedies -- improved public safety receivers, reduced out of band carrier emissions, modified signal levels for public safety and commercial users -- be fairly apportioned. Many PSIC members believe that interference relief at 800 MHz must be accompanied by intelligent planning for public safety use of 700 MHz frequencies, perhaps going beyond the 24 MHz presently reserved.

Respectfully submitted,

PUBLIC SAFETY IMPROVEMENT COALITION

By James R. Hobson

James R. Hobson
Holly L. Saurer
Miller & Van Eaton, P.L.L.C.
1155 Connecticut Avenue, N.W., Suite 1000
Washington, D.C. 20036
(202) 785-0600

May 6, 2002

ITS ATTORNEYS

Exhibit A

System Descriptions and Interference Notes of PSIC Members

TABLE OF CONTENTS

City of Phoenix	Tab 1
City of Philadelphia	Tab 2
City of San Diego	Tab 3
District of Columbia	Tab 4
City of Cincinnati/Hamilton County	Tab 5
San Diego County	Tab 6

City of Phoenix

Information Technology Department
Telecommunications Division

(1) The features of current and new 800 MHz system(s) -- actual and proposed frequencies (for those systems under construction and not yet licensed); its square miles of coverage; nature of use (police, fire, EMD, etc.); number and types (mfr/model no.) of portables and number of mobiles currently on the system and/or planned to be on it when fully loaded; trunked and/or conventional operation; how long operating (or when you expect to start operation); and any other descriptive information you consider useful or important.

Response to Question (1):

The City of Phoenix has an existing Public Safety Mobile Data Terminal (MDT) System in the 800MHz NPSPAC band. This system was installed in 1994, and serves 1100 sq. mi. for Police, Fire and EMS. The extended coverage area accommodates the Phoenix Fire mutual aid footprint, not just the City of Phoenix. The system supports about one thousand Motorola mobile data terminals and thirty handheld data terminals. The MDT System transmit frequencies are on channels at 856, 866 and 867 MHz. Receive channels are at 811, 821, and 822 MHz.

The Phoenix Regional Wireless Network (PRWN) is a new system currently under construction. The PRWN is partnered with the City of Mesa's Trunked OPen AriZona network (TOPAZ) to provide a public safety and municipal radio network covering more than 20 municipalities, 2,000 square miles and supporting about 15,000 users (total). The system is currently under construction and will be on-line in Aug-Sep of 2003.

The following specifics are for the PRWN only:

PRWN will support Police, Fire and Municipal users for the City of Phoenix, and Fire services for an additional 17 jurisdictions. The system covers about 1700 square miles and will support 13,000 users initially. The system will be entirely digital and trunked with a small use of conventional channels. The system is based on the Project 25 Standard.

Proposed frequencies: NPSPAC Band, 96 channels (some reuse) ranging in frequency from tx: 866.9125 - 868.5375; rx: 821.9125 - 823.5375. The system also uses several non-NPSPAC frequencies, 5 channels ranging from, tx 856.9875 - 860.9875; rx: 811.9875 - 815.9875.

(2) If you have been experiencing commercial interference, whether this seems to be mostly attributable to proximity to commercial transmitters, intermodulation products, or other causes (please name these, if possible). If you are not yet operating, whether you have designed specially to combat commercial interference or have written into your construction contracts any contingencies related to this NPRM.

Response to Question (2):

The interference to the City's existing Public Safety Mobile Data Terminal (MDT) System in the 800MHz NPSPAC band has been proven to be Nextel-related.

Nextel has been unable to significantly mitigate the interference. Nextel has been open to a continuous dialogue with the City about interference, and in October 2001 initiated an engineering study of the problem in the Phoenix area.

Nextel released an interim report to the City of Phoenix on 3/15/02 with preliminary conclusions based on the local tests and findings of a third party engineering firm, LCC:

A) Nextel is a definite contributor to interference.

B) There is "involvement" by the local A-band carrier. Involvement by the B-band carrier has not been proven but is suspected.

C) The primary mechanisms of interference are IM product formation and spurious responses in the MDT receivers. The MDT receiver specifications are not typical of those required of current-generation receivers expected to operate in the 800 MHz spectrum now.

Interference varies with the area in which the MDT is located. Every major intersection with a Nextel transceiver creates a zone of silence for our patrol cars; an unacceptable situation, regardless of the various combinations of factors.

The PRWN system is not operational yet, but being well aware of the potential for interference from commercial carriers, we performed design testing of the system with the goal of minimizing the risk of interference as much as possible. However, field-testing completed since design has demonstrated that the interference due to Nextel transmissions has not been completely eliminated; it is simply more closely confined in proximity to the Nextel transmitter sites. While we do not have language in our construction contract that specifically addresses contingencies directly related to this NPRM, we have included language that will give the City reduced rates on equipment should we discover interference problems that require the addition of new sites or equipment.

(3) Your initial reactions (and tentative preferences, if you wish) as to the three proposals noted above; or some different set of characteristics you would like to see.

Response to Question (3):

The proposed plan would require complete reengineering and re-tuning of our brand new PRWN system comprising about 13,000 mobile and portable radios and the supporting infrastructure. All of our existing MDT infrastructure would become obsolete as well. The potential financial impact to the City is enormous. Local taxpayers must not be expected to "foot the bill" for a problem the City of Phoenix did not create.

The responsibility for poorly designing and engineering the 800 MHz band plan belongs to the FCC. All users - public and private - are the victims of the result. The proposals as submitted will not even come close to providing enough funding to cover the enormous cost of national implementation. The FCC must perform the thorough, community-by-community assessment and detailed analysis necessary to fully quantify the scope of the selected proposal and calculate the ultimate cost to taxpayers. Considering any partial funding available from commercial carriers, it is the responsibility of the FCC to obtain the balance of the funding from Congress in order to implement the selected plan. It is critical for the FCC to recognize

that municipal governments and public safety communications providers will not be able to afford to change their systems at their own expense.

Nextel's proposal is also inherently unfair to the small SMR carriers: forcing them to move at a great expense relative to their size, while Nextel reaps the bulk of the spectrum benefits at a relatively smaller cost and with no competition.

(4) Your tentative views, if any, about the balancing of (a) handset interference resistance; (b) carrier out-of-band emission reduction; (c) increasing public safety signal strength; reducing commercial carrier signal strength; and (d) other considerations important to you.

The best solution will involve requiring better receivers, allowing more power for public safety users, less power for the commercial providers, tighter emission specifications and separating the two as widely as possible.

We need manufacturers to produce better, finer, stronger selectivity in handset and mobile transceivers. Of even greater importance is the need for the FCC to rewrite out-of-band-emission standards. The FCC has approved lax, industry-favored standards that satisfy commercial carriers at the expense of those who operate with site licenses (non-commercial). There is a critical need for specific federal regulations against interference with public safety communications and strict enforcement. The FCC must not put two licensees in the position of both being "right", when one of them is a public safety communications system. Public safety must take precedence. Incumbents, especially those providing public safety communications, deserve protection from the interference of new licensed services.

Nextel's "White Paper" proposal remains the best in technical terms. However, it is the least likely to be implemented in financial terms.

The PCIA's proposal contained unnecessary and insulting comments such as 'public safety channel users need to learn how to use their spectrum more wisely' while offering little in the way of a solution.

The UTC sees public safety channel users as privileged "competitors" to the channels they want. We find this particularly alarming. Their proposal seems to offer a kind of "compromise" proposal to Nextel's White Paper. The UTC made it quite clear that they are strongly opposed to Nextel's Proposal and intend to fight it any way they can. This may prove formidable, as they are one of the largest and most well financed lobbying groups in Washington.

Some proposals didn't seem to understand that Nextel interference impacts the NPSPAC band as well as the "interstitial" bands below it. Hence these proposals are worthless.

The new spectrum at 700MHz is eagerly awaited by the public safety community. It is seen as a chance for the FCC to do a better job of band planning and management - avoiding the mistakes FCC engineers made with the 800 MHz band; a chance to move away from that resulting interference, and to utilize wide-band data channels.

RCC Consultants, Inc.
100 Woodbridge Center Dr STE 201
Woodbridge NJ 07095
732 404 2400

(1) The features of your 800 MHz system -- its actual or proposed frequencies (for those systems under construction and not yet licensed); its square miles of coverage; nature of use (police, fire, EMD, etc.); number and types (mfr/model no.) of portables and number of mobiles currently on the system and/or planned to be on it when fully loaded; trunked and/or conventional operation; how long operating (or when you expect to start operation); and any other descriptive information you consider useful or important.

City of Philadelphia 800 MHz System

CONSTRUCTED & OPERATING

- 10-sites
- Simulcast
  - City/County-wide portable in-building coverage (Area: 135.1 square miles)
  - Mobile coverage to 3 mi beyond City/County boundaries
- 12.5 kHz ASTRO voice coding, APCO 25 common air interface
- 30-channels per site (channel listing attached)
- 12 mobile-only talk around channels
  - 3 FD talk around channels are 25kHz analog
- 2-zone SmartZone system
  - Zone A – Fire, Aviation (PHL) and Municipal Services
  - Zone B - Police
  - Zones can provide redundancy – each uses a set 15 channels
  - Designated Prime site for Zone A and Zone B are different
- Roughly 6,000 mobiles, portables and control stations/Consolettes.
  - Portables: Motorola XTS3000 Models I, II and III
  - Mobiles: Motorola ASTRO Spectra A5 & A9
  - Control stations/Consolettes: Motorola ASTRO W7 and W9

Proposed – in NPSPAC Regional Committee process

- 6 additional interstitial channels (channel listing attached)
  - To be added to 10-site simulcast system

(2) If you have been experiencing commercial interference, whether this seems to be mostly attributable to proximity to commercial transmitters, intermodulation products, or other causes (please name these, if possible). If you are not yet operating, whether you have designed

specially to combat commercial interference or have written into your construction contracts any contingencies related to this NPRM.

Design Criteria

- The City's 800 MHz Radio System procurement was negotiated in 1998/1999 with detailed technical design criteria that is consistent with what have become industry best practices such as designing the system to provide in-building coverage.

Philadelphia Field Evaluation

- Prior to coverage testing of the City's system, Commercial Mobile Radio Service sites were sampled throughout the City geographically *(Noise Floor Testing)* so as to obtain a reasonable cross section of data based on variations due to topography, building density, and vehicular traffic.
- The Field Survey Team found that the portable radio's receiver was degraded when it was in the proximity of a site operated by Nextel Communications and/or Cingular Wireless, however, due to the City's stringent design criteria, there was enough signal for the City radio to operate.
- The success of the City's extensive *Coverage Test* – greater than the required 95% of 1600 locations throughout the City passed the portable-in-building test – demonstrated that the City's system is able to overcome the degradation from Nextel and Cingular AT THIS TIME (September/October 2001).

Expectations 2002 and beyond

- Carriers frequently modify their system designs and could potentially affect City Radio System coverage. The City is endeavoring to meet with the Carriers to plan methods to mitigate these interference problems before they occur.
- As part of the City's Help Desk functionality for City 800 MHz Radio System users, field notes of coverage changes and anomalies will be collected an analyzed. If or when Carrier "hot spots" become City "dead spots," the information will be shared with those whose life and safety depend on the City's Radio System and the involved Carriers will be contacted immediately to mitigate the interference.

City of Philadelphia Exiting Channels WPRW578 WPUI511

	Base Tx	Base Rx	
1	868.8375	823.8375	
2	868.8125	823.8125	
3	868.7875	823.7875	
4	868.5875	823.5875	
5	868.2875	823.2875	
6	868.0875	823.0875	
7	868.0625	823.0625	
8	867.8625	822.8625	
9	867.5875	822.5875	
10	867.5625	822.5625	
11	867.0875	822.0875	
12	867.0625	822.0625	
13	866.8375	821.8375	
14	866.3625	821.3625	
15	866.2875	821.2875	
16	868.5625	823.5625	
17	868.5375	823.5375	
18	868.3375	823.3375	
19	868.3125	823.3125	
20	867.9375	822.9375	
21	867.8375	822.8375	
22	867.8125	822.8125	
23	867.3500	822.3500	
24	867.1125	822.1125	
25	866.8125	821.8125	
26	866.7875	821.7875	
27	866.6875	821.6875	
28	866.5875	821.5875	
29	866.3375	821.3375	
30	866.1000	821.1000	
I-CALL	866.0125	821.0125	Mutual Aid - required of all licenses >5 channels
I-TAC 1	866.5125	821.5125	"
I-TAC 2	867.0125	822.0125	"
I-TAC 3	867.5125	822.5125	"
I-TAC 4	868.0125	823.0125	"

Mobile-only channels STA: WPSZ522

	Channel #	Base TX	Mode (D/A)
1	605	866.0750	Analog
2	643	866.5750	DIGITAL
3	654	866.7125	Analog
4	665	866.8500	DIGITAL
5	693	867.2250	Analog
6	708	867.4125	Analog
7	710	867.4375	Analog
8	741	867.8500	DIGITAL
9	757	868.0750	DIGITAL
10	773	868.2750	DIGITAL
11	797	868.5750	DIGITAL
12	829	868.9750	DIGITAL

DIGITAL	channels must be digital narrowband, as one or both adjacent channels are in use in the City of Philadelphia trunked radio system
Analog	Channels may be programmed as Digital or Analog by the City of Philadelphia

At this time, the City of Philadelphia is requesting 6 of the total 14 "tweener" channels that lie in-between existing channels licensed and operated by the City. (Three of the mobile only channels are also tweeners: 741, 757, 797)

All channels are anticipated to be implemented in the City's Motorola Astro digital narrowband system.

The City intends to deploy the tweener channels at the same sites as the presently licensed and constructed system.
It is most desirable that these channels have the same coverage characteristics as the existing system.

NPSPAC REGION 28 Window 7 Repeater Channel Requests ("Tweeners")

	Channel #	Base TX	Mode (D/A)
1	661	866.8000	DIGITAL
2	683	867.1000	DIGITAL
3	719	867.5750	DIGITAL
4	755	868.0500	DIGITAL
5	795	868.5500	DIGITAL

(3) Your initial reactions (and tentative preferences, if you wish) as to the three proposals noted above; or some different set of characteristics you would like to see.

Problem Statement:

There is currently a growing concern regarding the interference between Public Safety and Commercial Mobile Radio Systems (CMRS) operating in the 800 MHz band. Several cases of interference have been reported to the FCC. As a result, Nextel, the primary CMRS operator in the 800 MHz band submitted a proposal to realign the 800MHz spectrum in order to address the issue.

Nextel's Proposal – will it work?

The CMRS – Public Safety band segregation proposed by Nextel would trade today's interference problems for a slightly different set of problems. Intermodulation and receiver desensitization are the main causes of interference from Nextel and Cellular providers today. Strong intermodulation products will still be produced (just on different frequencies through different modes) and RF noise will still be present at high-density sites.

Intermodulation is caused by the sheer number of Nextel and/or Cellular channels that are co-located and in the continuous transmit mode. In relocating CMRS and Public Safety users to separate bands, the Nextel plan changes the specific mathematics behind the intermodulation, but intermodulation products will still be present, causing interference. Existing Public safety receivers will not be able to reject the new intermodulation products any better than they are the existing intermodulation products.

An increase in the radio frequency noise and receiver desensitization also result from a concentration of transmitters. To increase frequency reuse, the CMRS designs use lower antenna heights and downtilt antennas. This results in a strong composite RF signal in the immediate vicinity of the site. Economics and local zoning encourage high-density sites. These co-located sites are often located at roadway right-of-ways. The increased noise and interference problems occur exactly where the Public Safety user is most in need of his radio for communications. Different receiver designs using low pass filtering could be deployed in future public safety receivers to take advantage of the band segregation and lessen the impact of potential RF overload.

The Impact of Nextel's Proposal:

This City of Philadelphia's new $52,000,000 radio system consists of 30 repeater channels and 12 direct mobile only channels within the spectrum that Nextel proposes to relocate. Furthermore, the City is in the process of licensing an additional seven repeater channels in the impacted spectrum. The relocation effort required by the City would be nearly equal to the effort expended to initially implement the system.

For all the effort required to relocate, under this plan interference is just as likely to occur. Furthermore, as the choices for Public Safety radio system technology increases, the likelihood of new interference within the new Public Safety Band is not addressed by Nextel. New Public Safety applications are borrowing and expanding the technology used by today's CMRS carriers. Interleaving these new Public Safety systems with existing technologies will create some level of "the Nextel" problem among Public Safety users. Any movement by the FCC involving Public Safety spectrum allocation must not only address today's known problems but also plan spectrum allocation in an attempt to prevent tomorrow's problems.

Conclusion/Recommendations:

While it is true that the contiguous frequency band resulting from the Nextel plan will lead to a more efficient frequency allocation and may make the interference a bit easier to deal with, interference problems will not be fully resolved and relocating from one frequency band to another cannot be done cheaply, or quickly. Nextel has pledged to spend up to $500 million in support of its proposal. In all likelihood, it is not enough to cover all the costs incurred by the Public Safety Agencies nationwide. The City of Philadelphia, as well as the other systems affected, would need to include monies for the relocation in its budget planning.

The Nextel proposal is a long-term effort solving only part of the problem; an effort that requires careful planning, budgeting and collaboration among the concerned parties, both commercial service providers and public safety users. Unfortunately, Nextel does not have the support of these "concerned parties." At present, only this one proposal has been submitted. It would be better to give the other parties a chance to present potential solutions and then evaluate the relative merits of solutions offered.

Meanwhile, since Nextel is the primary identified source of interference, it would seem appropriate for Nextel to address the problems individually as they occur; that is, to mitigate any interference that it causes.

Relocation Overview:

This is an overview of the impact and efforts that would result from the adoption of Nextel's plan.

INFRASTRUCTURE AND FLEET MODIFICATION

An inventory of the existing network, equipment, accessories and peripherals would be necessary to determine how much of the existing infrastructure would support the move from the upper part of the 800 MHz band to the lower part. This would identify which equipment will be usable in the new frequency allotment and determine modifications that may be required. Following the inventory, equipment would be classified into the following categories:

Category	Description
Compatible	These will need only retuning of existing equipment to the new freq
Semi-Compatible	These will require refurbishing of old equipment to make them compatible with the new system
Incompatible	These will require replacement of unusable equipment

A quick review of the product specification sheets in the 800 MHz procurement shows the following forecast of compatibility.

Product	*Compatibility*	**Approximate Quantity**
Astro Spectra (vehicular mobiles and dispatch back-up)	Believed Compatible	1000

Product	Compatibility		Approximate Quantity
Astro XTS 3000	Believed Compatible		5600
Quantar Base Stations	Believed Compatible		305
TX-RX combiners	Semi compatible to incompatible	Depending on set of new channels, combiner configuration could necessitate additional antennas per site.	40
Antennas	Most are incompatible	Antennas are tuned to frequency band	30-40
Transmission Line	Compatible		5000+ ft

RELOCATION PROJECT MANAGEMENT

The success of a relocation project depends on the manpower assigned to perform the various tasks involved. This section outlines the resources needed and responsibilities for a transition project team.

1. Steering Committee would need to be created to ensure smooth and orderly transition from the current frequency allocation to the new frequency allocation.

Much like the existing implementation project team, this relocation team would need participation from:

- Management- responsible for the legal and political issues
- Technical Committee – responsible for technical issues
- End Users – will need to work with team for orderly return of radios for reprogramming.

Members of this committee can all be from the full-time City staff. However, they would be diverted from their current assignments. The City would need to consider additional staff, e.g. consultants, to augment the relocation project team or to provide coverage of existing duties for the staff assigned to the relocation project.

2. Technical Committee would have responsibility for the following:

- Inventory of existing equipment
- System engineering
- Retuning of existing equipment *(This includes coordinated reprogramming of 300 base stations and all 6000 user radios)*
- Ensuring that the "new" system will provide the same (or better) coverage as the "old" system.
- Ensuring that all units will still be able to communicate with each other during transition.
- Installation, testing and commissioning of the "new" system

As today, members of the technical committee can be pooled out of the City's full-time technical staff, or a consulting company or a combination of both.

REGULATORY LICENSING

Nextel's proposal will impact the City in two ways:

a. New frequencies will require filing for new licenses and submission of corresponding supplemental data.
b. There will be cost involved associated with the regulatory requirements and possibly frequency coordination. These costs should be diverted to Nextel.

BUDGET

The impact on the City's budget is in three areas:

a. Cost associated with the equipment
b. Cost associated with regulatory requirements
c. Cost associated with additional staffing to support the project.

Nextel has pledged to spend up to $500 million in support of its proposal. How much of this amount will be allocated to the City of Philadelphia? Could it be enough? In all likelihood, it is not enough and the City would need to include monies for the relocation in its budget planning.

TIME FRAME

The first step in Nextel's plan requires the relocation of SMR's currently occupying the lower part of the band. These commercial entities will face similar issues in their relocation as the City does in this discussion. With an aggressive schedule it would be difficult for the SMR's to relocate in as little as 3-5 years

Background:

There is currently a growing concern regarding the interference between Public Safety and Commercial Mobile Radio Systems (CMRS) operating in the 800 MHz band. Several cases of interference have been reported to the FCC. As a result, the FCC is soliciting comments on how to remedy interference to public safety systems in the 800 MHz band. The Commission adopted a notice of proposed rulemaking (NPRM), which considers realigning the band to alleviate the interference problems.

The NPRM seeks comments on proposals submitted by Nextel Communications, Inc., and the National Association of Manufacturers (NAM) and MRFAC, Inc., a frequency coordinator. It also seeks comments on whether it should adopt technical rules to address the interference issue, such as minimum technical standards for public safety receivers to make them more resistant to interference and more stringent out-of-band emissions limits on commercial transmitters.

RCC previously forwarded a review of the Nextel plan and its impacts to the City of Philadelphia[1].

This document offers a comparison of the NAM plan and the Nextel Plan.

Verifying the Issue: Additional Reports of Interference and a Report of Potential Interference in the City of Philadelphia

APCO's Project 39 *(Project 39, Interference to Public Safety 800 MHz Systems, Interim Report to the FCC, December 24, 2001)* provided detailed information on interference reports. It identified Nextel as the primary source of interference with some sporadic interference caused by Cellular A/B, and none coming from Business/Industrial Land Transportation. Several cases of interference in the 821-824 MHz band (NPSPAC) were documented as well: Memphis, TN; Ft Lauderdale, Stuart and Miami Counties in Florida; Lakewood and Littleton in Colorado; Dallas, TX; and Aurora, IL, to name a few.

[1] *RCC Review on 800 MHz Radio-Nextel Relocation Plan, Impact to the City of Philadelphia, 3/15/2002*