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

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

COMMENTS OF THE
UNITED TELECOM COUNCIL

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Summary

UTC urges the FCC not to take action in the crucial 800 MHz frequency band that would disrupt the activities of critical infrastructure and other user groups, or prevent the use of this band for efficient, advanced technology by PLMR entities in the future. UTC notes that the 800 MHz band is home to a complex mix of licensees that cannot be separated without undue burden and cost. However, UTC concurs with the FCC that interference to traditional Public Safety licensees, critical infrastructure systems and others from low-site digital CMRS systems is unacceptable and must be resolved.

UTC recommends market-based solutions to solve interference problems while encouraging innovative developments. The Council opposes strongly the Nextel White Paper position, but cannot support any other proposal that includes mandatory re-location and re-division of this spectrum into discrete user pools. Besides being extremely burdensome and costly, re-banding proposals do not solve interference, making this a highly questionable solution. UTC also opposes strongly the FCC's suggestion of "refarming" this band into narrowband channels.

UTC urges the Commission to focus on technology, rather than licensee type, and provide strict technical rules that require interference resolution at the cost of the party causing it. Such rules should be coupled with regulatory flexibility among existing license holders to permit channel swapping and other measures to allow this complicated band to self-correct. As part of this flexibility, UTC supports PCIA's proposal to consolidate the Business and Industrial/Land Transportation frequency pools. Such a framework would also encourage migration to digital technology and shared systems among user groups, a trend already underway which should not be hindered.

Should the Commission decide that some form of re-banding is absolutely necessary, UTC offers a simple proposal involving the migration of "lower 80" EA-based SMR licenses to the NPSPAC frequencies, coupled with the movement of these Public Safety systems to the vacated lower 80 channels or to the existing Public Safety allocation at 700 MHz. UTC emphasizes that all such migration should be voluntary, and notes that this proposal, also, will not solve all instances of interference.

Finally, due to the long history and heavy use of the 800 MHz band, and recent allocations in other bands, UTC does not recommend that the FCC allocate more of this spectrum to Public Safety. Capacity needs, when experienced, can be met through more advanced technology and the shared systems that will help Public Safety make this move. Should the Commission decide to make a new 800 MHz allocation, it should adopt the "public safety radio services" definition found in Section 309(j)(2)(A) of the Act to determine eligibility.

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The United Telecom Council ("UTC") hereby submits its Comments on the Notice of Proposed Rulemaking in the above-captioned proceeding.[1]

I. INTRODUCTION

UTC is the national representative on communications matters for the nation's electric, gas, and water utilities, natural gas pipelines and other critical infrastructure industry ("CII") entities. Approximately 1,000 such entities are members of UTC, ranging in size from large combination electric-gas-water utilities that serve millions of customers, to smaller, rural electric cooperatives and water districts that serve only a few thousand customers each. Together

[1] Improving Public Safety Communications in the 800 MHz Band, *Notice of Proposed Rulemaking,* WT Docket No. 02-55, FCC 02-81 (released March 15, 2002) (the "Notice", "NPR").

with the Critical Infrastructure Communications Coalition ("CICC")[2], UTC represents the telecommunications and information technology interests of virtually every utility, pipeline, railroad and other CII entity in the country.

The members of UTC and its affiliates are directly affected by the proposals under consideration in this proceeding. Utilities and other critical infrastructure entities rely heavily on the 800 MHz band for mission-critical voice and data communications. It is the most intensely used exclusively licensed[3] frequency band of those available to CII entities, and these entities hold licenses for most of the largest non-commercial systems on the band.

CII entities also are among the 800 MHz licensees experiencing interference from Nextel's low-site, digital transmitter sites in several cities, and have considerable experience in resolving this interference. Any decision by the FCC to re-allocate or change significantly the rules governing this vital spectrum would have an immense impact on CII entities. As such, UTC is pleased to submit its comments on the many questions and the proposals outlined in the *Notice*.

II. STATE OF THE 800 MHz BAND

A. This Important Frequency Band Is Home to A Mixture of Licensees Evolved Over Nearly 30 Years.

The 800 MHz band under consideration in this proceeding (806-824 MHz/851-869 MHz) has been in increasing use by the PLMR community since

[2] The CICC is composed of the following organizations: The American Gas Association, the American Petroleum Institute, the American Public Power Association, the American Water Works Association, the Association of American Railroads, the Edison Electric Institute, the Interstate Natural Gas Association of America, the National Association of Water Companies, the National Rural Electric Cooperative Association and UTC.

1974,[4] with the term encompassing both private, internal and commercial systems, as well as Public Safety. As outlined in Nextel's White Paper, [5] the Commission allocated this spectrum gradually, in block geographic licenses for cellular service and through site-specific licensing in the remainder of the band.

Due to the series of allocations in which the spectrum was made available, coupled with inter-category sharing rules, Public Safety, private and commercial systems often operated on the same frequencies, and outside the frequency pools set up for their use. This was especially true in the General Category (channels 1-150), which generally was licensed one frequency pair at a time, to any entity eligible in the entire band. In spite of this, private and commercial systems below the cellular block, whether operating in conventional or trunked mode, co-existed harmoniously for the first twenty years of the band's history.

In the early 1990s, some commercial Specialized Mobile Radio (SMR) operators began to aggregate spectrum to offer wider-area service, and the FCC launched a proceeding to examine possible rule changes that would accommodate these uses.[6] Through the mid-90s, the FCC gradually adopted geographic-area overlay licenses and competitive bidding for all areas of the

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[3] As opposed to shared spectrum such as the 150-470 MHz private land mobile (PLMR) bands, in which multiple systems can be licensed on the same frequency at the same location.

[4] *See,* An Inquiry into the Future Use of the Frequency Band 806-890 MHz, *Second Report and Order,* 46 FCC 2nd 752 (1974).

[5] "Promoting Public Safety Communications: Realigning the 800 MHz Land Mobile Radio Band to Rectify Commercial Mobile Radio—Public Safety Interference and Allocate Additional Spectrum to Meet Critical Public Safety Needs," Nextel Communications, Inc., submitted November 21, 2001 ("the White Paper").

[6] *See,* Amendment of part 90 of the Commission's rules to Facilitate Future Development of SMR Systems in the 800 MHz Frequency Band, PR Docket No. 93-144.

band in which commercial operators were eligible without inter-category sharing; the “upper 200” SMR frequencies from 861-866 MHz, the “lower 80” interleaved SMR frequencies in 855-860 MHz, and the entire General Category. Winners of licenses in the “upper 200” channels were permitted mandatory re-tuning of incumbent licensees to other portions of the band. Thus, licensing in this important band became even more mixed: the General Category, especially, is a mass of incumbent licenses, often of single channels, granted to Business, Industrial/Land Transportation, SMR and Public Safety licensees, with incumbent SMR and other licensees re-tuned from the upper 200 frequencies, overlaid with contiguous, geographic-based commercial systems. Add to the mix of licensees a wide variety of equipment in service, ranging widely in age, with incompatible protocols and both analog and digital emissions.

The thousands of licensees in this band rely heavily on their 800 MHz systems to meet a wide variety of communications needs that can help to save lives and property and/or add productivity to the Nation’s economy. They operate in a unique environment: there is no other band allocated for land mobile operations in which most of the equipment in operation here can be used, none other licensed in the same way, and none with such a large amount of mixed use by different kinds of eligible licensees. If ever there were a spectrum “omelet” that will defy unscrambling, this band is it.

B. The 800 MHz Band is in a State of Technological Transition.

One of the weaknesses of the White Paper is that its depiction of the technology used by CMRS and non-CMRS licensees shows the present as if it

were also the future. This is simply untrue. Nextel's wide-area digital CMRS system is far from the only "advanced" development underway in this band, and the FCC must not hinder these developments in its consideration of new rules. To do so would not only prevent large segments of the economy from improving productivity through enhanced communications capacity and features, but would in many cases block Public Safety agencies themselves from improving their systems, regardless of how much of the band they acquired.

Utilities and other critical infrastructure entities are among the many PLMR eligibles migrating to digital technology, albeit at a slower pace than commercial systems seeking maximum capacity to add more customers and with far better access to capital markets. The primary factors involved in these decisions are size of user base and cost: wide-area digital wireless technology is expensive, with an installed switch alone running well over $10 million in one protocol. At the same time, such equipment can accommodate the voice and data traffic of many thousands of end users and provide important new services. CII entities are already sharing systems with traditional Public Safety agencies, their natural partners, and such shared systems provide one logical means of providing efficient, advanced communications to all users at a lower cost (see discussion at Section II(A)(ii), *below*).[7]

[7] UTC itself is pursuing a goal of providing nationwide digital switching capability to CI entities and others, including Public Safety agencies, operating on frequencies in the 800 MHz band. Providing switching would enable licensees to maintain control of their frequencies and upgrade to digital technology faster and at a much lower cost than if they were required to buy an entire digital backbone, with far more capacity than they need, individually. Needless to say, these efforts, and other innovative developments under development, would be prevented entirely should the Commission adopt Nextel's proposal to move critical infrastructure to another frequency band.

The move to advanced technology is a major reason for the FCC *not* to consider "refarming" the 800 MHz band as it did the PLMR bands from 150-512 MHz.[8] Indeed, forcing licensees on this band – the only PLMR band for which advanced digital technology is readily available – to adopt narrowband equipment would be an unmitigated disaster. With all wireless moving to technology that divides wider frequencies internally to increase capacity, why would the Commission even consider a move that would relegate this band to outmoded technology? The lack of digital offerings in the 150-512 MHz bands; in fact, the lack of any truly new technology for decades, should convince the FCC that forced narrowbanding would move this vital frequency band in a direction completely opposite from the optimal. 800 MHz users want more advanced equipment, with features such as high-speed data transmission that could be used for applications from file downloads to electrical system control and monitoring. UTC stresses that such advances would be made impossible by imposition of a narrowband channel plan and urges the Commission *not* to consider such a step.

The migration to digital technology by broad categories of 800 MHz users will, over time, diminish current interference problems from by low-site digital emissions. The use of digital systems alone will not eliminate interference, since most is caused by Nextel's (and some Cellular Block A systems') low-site, cellular architecture – which utilities and others do not plan to implement. However, newer 800 MHz equipment is much more resistant to intermodulation, apparently the most pervasive form of interference in the band. Newer, more

[8] NPR at ¶ 28.

advanced equipment in the hands of more Public Safety, Business and industrial employees will contribute greatly to improving the technical situation at 800 MHz – and most are planning to have it.

C. The FCC's Decision in this Proceeding Must Include a Reliable Means of Eliminating Interference Between High- and Low-Site Transmissions.

It is generally accepted that interference to Public Safety and other 800 MHz systems, including those used by critical infrastructure for emergency communications, is caused by digital CMRS systems operating a "low-site" or cellularlzed architecture.[9] UTC disagrees with Nextel's statements that interference occurs in spite of the fact that "all licensees are in compliance with the Commission's Rules."[10] Section 90.173 of the Commission's Rules, for example, prohibits licensees from causing interference; this rule section should and must be enforced.

UTC has received many reports of interference to critical infrastructure systems, generally due to the expansion of Nextel's low-site system. In response to a member survey, particularly detailed information was provided by Consumer's Energy of Michigan, which has had extensive dealings with Nextel and is currently working to resolve interference at several locations. UTC attaches Consumer's data, as well as reports from other members, as **Appendix A** to these Comments, in response to the NPR's request for specific data

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[9] *See, e.g.,* White Paper at pp. 20-22.

[10] White Paper transmittal letter addressed to Thomas J. Sugrue from Robert S. Foosaner November 21, 2001, at 1.

concerning instances of interference, scope, frequency, root causes, etc.[11] Utilities and other CI entities such as Consumer's rely upon engineering solutions to solve interference, a method that has been successful, if somewhat inconvenient under current Rules due to the lack of specific requirements of a timeframe and reliable contact information to move the process forward.

As the cellularized architecture used by Nextel continues to spread, reports of interference to other licensees will continue to increase. This is unacceptable: vital Public Safety and critical infrastructure communications, indeed those of all licensed users of this band, must not be impacted negatively simply because one or more licensees chooses to implement a particular technology. Whatever solution the FCC adopts in this complex proceeding must be one designed to solve interference reliably in the field.

D. UTC Opposes Adamantly the Nextel White Paper Position as Ruinous to Critical Infrastructure Systems.

There is no question that the proposal advocated by Nextel in its White Paper would be extremely harmful to many of the Nation's critical infrastructure entities. As described above, many electrical and gas utilities, water systems and others rely upon the 800 MHz band for their critical communications and have invested heavily in this band for their communications futures. As regulated entities that must keep costs down while ensuring safe, reliable service to the public, municipal, investor-owned and cooperative utilities and water companies cannot afford the high costs and disruption envisioned by the Nextel proposal. The White Paper offers no compensation to these entities, while requiring forcible removal to bands without comparable equipment, sufficient spectrum availability

[11] NPR at ¶ 19.

or opportunities for interoperability now being developed in the 800 MHz band. Nextel's persistent efforts to purchase utility spectrum have been unsuccessful; UTC remains convinced that Nextel now seeks to achieve by regulatory fiat what it cannot accomplish through market forces. A solution to a mostly Nextel-generated interference problem that requires thousands of systems not experiencing or causing interference to move, while benefiting Nextel, simply is not a solution.

III. ALL "REBANDING" PROPOSALS WOULD BE EXTREMELY COSTLY AND BURDENSOME TO LICENSEES, AND REBANDING WOULD NOT ELIMINATE INTERFERENCE.

Along with, presumably, all other parties to this proceeding, UTC stresses that there is no perfect solution to the complex set of issues discussed in the NPR. UTC has been involved since the White Paper's submission last November in private wireless industry efforts to respond to the White Paper, prepare for the Notice, and now, respond to the issues raised therein. For the past six months, those impacted by interference from digital CMRS systems and those faced with losing their spectrum under Nextel's proposed solution have sought some sort of alternative bandplan: a proposal that would solve interference, cost as little as possible and maintain current amounts of spectrum for user groups, if not offer more spectrum for Public Safety use.

In particular, associations certified to coordinate 800/900 MHz PLMR frequencies have expended hundreds of hours and cooperated in literally dozens of meetings, seeking a solution to Public Safety interference concerns that would not necessitate the loss of this vital frequency band to the thousands of Business

and Industrial/Land Transportation licensees, including critical infrastructure entities, who also rely upon it. UTC takes this opportunity to commend the Private Wireless Coalition for its efforts.

However, UTC cannot join in supporting any proposal that would force licensees who are neither causing nor experiencing interference to move, regardless of how the sticky issue of hundreds of millions of dollars in compensation is decided. Nor does UTC believe that such drastic measures are needed. All meetings and discussions about alternative bandplan proposals over the past months have led to the same conclusions:

- No "reshuffling" of user pools will eliminate interference, especially intermodulation, meaning that technical solutions such as those included in the Best Practices Guide[12] will continue to be needed *after* such changes are implemented;
- Any bandplan adopted by the FCC will require a timeframe during which changes are carried out: to mitigate interference during that period, likely to be two years or more from adoption of a *Report and Order,* technical solutions will continue to be crucial;
- Mandatory re-tuning or re-location of systems to other bands will generate costs in the hundreds of millions, if not billions of dollars, with the source of compensation unclear;

[12] "Avoiding Interference Between Public Safety Wireless communications Systems and Commercial Wireless Communications Systems at 800 MHz – A Best Practices Guide," December 2000.

- Most, if not all, alternative bandplans would have a negative effect on systems in the Canadian and Mexican border regions, already subject to limitations on available frequencies;
- Uncertainty about the future of the band, coupled with a subsequent transition to new frequencies, will halt licensees' plans to upgrade technology and manufacturers' efforts to improve products for a period of years.

Given these facts, the necessity of adopting rules "to effect band restructuring"[13] must be questioned – if it isn't going to work, would cost a fortune, and would disrupt thousands of licensees and hundreds of thousands of end users while slowing migration to advanced technologies – why do it?

A. UTC Priorities Stress Resolving Interference, Minimizing the Burden on Existing Licensees and Seeking a Solution That Will Maximize the Future Utility of this Frequency Band.

UTC concurs with the FCC's tentative conclusion that an interference problem exists in the 800 MHz band that deserves resolution,[14] although the Council stresses that the interference is from limited sources, has been experienced to date by a very small percentage of systems, and that nearly all instances have been resolved through engineering solutions. Nevertheless, UTC has spent the past several months examining alternatives to resolve the interference problem, at a minimum burden in cost and disruption to licensees. Beyond this effort, however, UTC has sought to use this proceeding as an opportunity to position the 800 MHz band for future use by *all* current user

[13] NPR at ¶ 20.

[14] Id.

groups. A short-term solution to resolve interference that limits this crucial frequency band's utility for the systems and technology of the future, will ill serve any user group, including Public Safety.

B. Member Companies Currently Operate Most of the Largest Non-commercial Systems in the 800 MHz Band and Are Planning Advanced, Innovative Uses for their Spectrum.

Energy-related critical infrastructure entities operate most of the largest non-commercial systems in the 800 MHz band, with licensed frequencies from 851-869 MHz. UTC conducted a survey of licensees in the 800 MHz database in preparation for the Notice: a manual count of energy-related and water system licensees alone amounted to approximately 31,300 frequencies at almost 3200 base station locations across the country. Some of these systems include more than a thousand frequencies in operation across multiple states. There is no question that utilities and other critical infrastructure entities would be among the most severely impacted by any requirement to retune or re-locate their systems. Cost data is extremely imprecise; however, UTC estimates that re-locating CII systems to another band would require compensation of nearly a half-billion dollars. Retuning within the 800 MHz band would be less expensive; however, either requirement would necessitate full duplicate systems running simultaneously to ensure continued reliable communications during the transition.

As discussed above (*see* Section I(B)), CII entities, along with other 800 MHz PLMR licensees, are migrating to more efficient, digital technologies. To justify the huge investment by entities not in the business of providing wireless services, and to make best use of new capabilities, licensees across the 800

MHz band are sharing systems. This is especially true among utilities and traditional Public Safety agencies. A member poll by UTC as part of our work in preparation for the Notice was nearly unanimous – all but one of the utilities responding already are, or are developing, shared systems that include Public Safety agencies. This includes both investor-owned and municipal utilities.

With extremely long buying cycles and tight resources, Public Safety agencies rely on critical infrastructure industries to help them move to upgraded technology. Shared systems also provide Public Safety with the depth in technical expertise needed to maintain critical communications systems: utilities often have larger radio-frequency (RF) engineering staffs than Public Safety agencies can afford.

Naturally, the close working relationship between CII and Public Safety reinforces the utility of shared systems between these users. As the FCC is aware, routine voice communications on both Public Safety and utility systems can turn into critical emergency response from one second to the next, with the life of the police officer, firefighter or field crew worker – not to mention members of the public they serve -- dependent on the reliability and quality of the signal transmitted and received.[15] Quite often, both respond to the same emergencies at roughly the same time. For example, news coverage of last week's tornado damage in La Plata, Maryland highlighted the long hours of work by both Public Safety entities responding to victims' needs and Southern Maryland Electrical Coop crews trying to restore power to stricken areas as soon as possible.

[15] In a widespread power outage, utilities work first to restore power to Public Safety facilities and communications, as their own systems are designed – understandably – to continue operation under such conditions.

CII entities use the same types of communications equipment as Public Safety; systems generally can be shared easily, and interoperability among agencies and companies is becoming increasingly important. However the Commission decides to amend the rules for the 800 MHz band, it must not take action, such as moving Business and Industrial/Land Transportation licensees to other bands or creating strict pools for specific eligibles, that would hamper these developments.

IV. UTC URGES MARKET-BASED SOLUTIONS FOR THE 800 MHz BAND, USING A COMBINATION OF CHANGES TO THE TECHNICAL RULES AND REGULATORY FLEXIBILITY

Unlike many parties in this proceeding, UTC is *not* advocating a new bandplan to resolve the interference problems of the 800 MHz band. While superficially creating difficulties, UTC sees the mix of businesses and industries using this band as a potential strength, providing several sources for innovative, efficient uses of the frequency band that is so critical to them. UTC recommends strongly that the FCC cease basing regulation of the band on licensee *type*, and instead focus on technology. We already know that low-site digital systems cause interference to other systems; we also know that the band is in a state of transition whose outcome is unknown. UTC argues herein that a minimum of rules is needed to eliminate interference at a lower cost than mandatory re-banding, while fostering upgraded technology that will improve the utility of the band to its users in years to come.

A. The FCC Should Strengthen Its Technical Rules to Absolutely Require the Party Causing Interference to Correct It.

Before the FCC considers any drastic changes to the 800 MHz band, it should look for solutions within its existing rules and modify those rules to the extent necessary to mitigate potential interference to public safety and other systems from digital cellular CMRS systems. In fact, the Commission's rules *do* currently address the interference problem in the 800 MHz band. Section 90.173 requires all applicants and licensees to

> cooperate in the selection and use of frequencies in order to reduce interferences and make the most effective use of the authorized facilities. Licensees of stations suffering or causing harmful interference are expected to cooperate and resolve this problem by mutually satisfactory arrangements. If the licensees are unable to do so, the Commission may impose restrictions including specifying the transmitter power, antenna height, or area or hours of operation of the stations concerned. Further the use of any frequency at a given geographical location may be denied when, in the judgment of the Commission, its use in that location is not in the public interest; the use of any frequency may be restricted as to specified geographical areas.[16]

However, the Commission should clarify that this general rule specifically applies to the situation in the 800 MHz band, by *requiring* the party causing the interference to correct it and pay for the remedial measures. The non-interference rule should supersede specific technical standards for equipment used in the band.

Nextel has in the past generally been cooperative towards resolving interference to UTC's members' 800 MHz systems. UTC's members report that they have had difficulties contacting the appropriate personnel at Nextel to report instances of interference, but that Nextel has been responsive once the right

person was contacted.[17] While many of these cases remain pending, in those cases that have been resolved, Nextel has either retuned its system or has installed equipment that mitigates the interference (*see* response of Consumer's Energy concerning instances of interference, attached to these Comments as Appendix A). Nextel has paid the cost of these remedial measures, as it should.

UTC is concerned that the White Paper may signal unwillingness by Nextel to meet its obligations under Section 90.173. As such, the FCC should take the opportunity in this proceeding to clarify further that parties causing interference are not only required to cooperate with affected licensees, but are solely and directly responsible for the cost of correcting the interference.

This requirement would be reasonable and consistent with the Commission's rules. For example, the Commission's *Emerging Technology* Rules require that licensees that would cause interference to incumbents in re-allocated bands pay the cost of re-locating the incumbent to comparable facilities in terms of throughput, reliability and cost of operation.[18] The Commission has affirmed that principle again and again, despite repeated protests from interfering parties about the cost of compliance with this requirement.[19]

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[16] 47 C.F.R. § 90.173.

[17] American Electric Power reported that it took two days of continuous calls to reach the appropriate person at Nextel to address interference affecting the utility's sites. It also reported that Nextel does not post contact information concerning interference complaints, that general customer service contacts at Nextel were unhelpful because they were not Nextel customers, and that the contacts listed on FCC applications were inaccurate.

[18] *See* 47 C.F.R. § 101.69.

[19] Amendment to the Commission's Rules Regarding a Plan for Sharing the Costs of Microwave Relocation, WT Docket No. 95-157, RM-8643, *First Report and Order and Further Notice of Proposed Rulemaking*, 11 FCC Rcd 8825 (1996), *Second Report and Order*, 12 FCC Rcd 2705 (1997), and

In the present context, the imperative is even greater that the Commission bring certainty to resolving the interference problem in the 800 MHz band, for utilities as well as public safety rely on these systems to protect life, health and property. Utilities and other CII have migrated to the 800 MHz band because they could not tolerate the interference and congestion that forced them out of the bands below 512 MHz. Having made the investment in these systems in order to preserve the reliability of critical infrastructure communications, they cannot afford to compromise the integrity of these systems which support the safe, efficient and reliable delivery of essential services to the public at large. Compared to Nextel's costs measured in dollars and cents, the cost to utilities and other CII would be priceless.

Nor would Nextel's financial responsibility constitute an undue burden. Nextel has already pledged $500 million to pay for the relocation of public safety incumbents.[20] Assuming *arguendo* that this figure would even begin to cover those costs, let alone the costs of relocating affected CII licensees, if Nextel is willing to accept $500 million as part of the cost of doing business, it should be willing to accept far less expensive, alternative solutions, particularly ones that would not require restructuring of the band, if mitigating interference is indeed its goal.

Memorandum Opinion and Order on Reconsideration, WT Docket No. 95-157, 15 FCC Rcd. 13,999 (2000).

[20] *NPRM* at ¶ 39, *citing* the White Paper at 8.

Nextel asserts that interference to public safety is a growing problem that requires a long-term solution.[21] UTC cannot confirm or deny the extent to which this problem will continue to grow. Although growth of analog and digital 800 MHz PLMR and cellular CMRS systems would logically produce a greater potential for interference, especially in urban areas, by the same token new equipment exists now and is being developed that would mitigate the intermodulation and spurious emissions that are the root cause of the interference. Even if it is unreasonable to assume that such system upgrades will occur organically, the same result would be achieved by requiring Nextel to correct the interference it creates. Moreover, it appears that this would result in a long-term solution to the interference problem.

The Commission's instincts were correct when it questioned statements that intermodulation caused by Nextel could be fixed by restructuring the band to separate public safety and digital CMRS operations.[22] The premise is that interference is being caused solely to public safety and that separating these licensees from digital CMRS operations would necessarily alleviate the interference. Neither premise is correct. First, utilities are among the other licensees that can and have received interference from Nextel. Second, utilities have learned through their own experience with interference from Nextel that spectral separation alone does not solve the interference problem. It helps, but even a five-MHz separation did not prevent one utility from receiving interference

[21] White Paper at 7-9.

[22] *NPRM* at ¶ 27 ("It is not intuitively obvious that either Nextel's or NAM's proposed reconfiguration of the 800 MHz band would significantly reduce intermodulation interference.")

from a Nextel site a quarter-mile away. Instead, technical solutions have proven consistently successful at eliminating the interference to utility operations in the 800 MHz band.

i. Specific measures – filters and combiners

The problem is at least partially attributable to Nextel's lack of post-filtering combining equipment on its transmitters. Nextel made the conscious choice to use hybrid combiner technology, because it provides greater frequency agility at the expense of creating out-of-band emissions. The use of preselector cavity filters would prevent the intermodulation and spurious emissions, and in fact such equipment is required by certain organizations for that reason.

In cases where interference has occurred to utilities, the installation of a cavity-based combiner between Nextel's transmitter and antenna has been effective. The combiner device acts like a narrowband filter, and, for each Nextel transmit channel, it sharply attenuates adjacent "spurs" or "noise" from the digital iDEN™ system. It is these noise products (also called wideband noise) that add together to de-sensitize mobile receivers when in close range to a Nextel site.

Why doesn't Nextel just install these combiners in all their sites? First, the technical rules for this band, developed in a far pre-digital environment, don't require this equipment. Second, it costs approximately $30,000 per site. Third, it complicates Nextel's frequency reuse plan because a cavity combiner requires at least 100 kHz channel separation.

Why Nextel failed to mention this technical solution anywhere in its White Paper, only it can answer. But, given the success of implementing this solution

in the field, the onus shifts to Nextel to prove that this solution would not work in every case. In any event, UTC recommends that the Commission adopt a rule requiring the installation of this equipment, particularly in urban areas where the potential for interference from nearby sites tends to be greatest.

ii. Specific measures – reduce out-of-band emissions

Ultimately, the effect the devices listed above have on the transmitters to which they are applied is to reduce the out-of-band emission (OOBE) for each channel. The Commission should ensure this protection by modifying the OOBE standards currently in the Rules. Current rules call for an 80 dB reduction in signal at the edge of the emission mask.[23] Several UTC members have commented that this value should be –100 dB, or even higher. A "tighter" emissions mask, especially for digital systems, would be a long-term solution applied at the type-acceptance stage of equipment approval. UTC urges equipment manufacturers in the 800 MHz band to review these standards and recommend action for improvements.

iii. Specific measures – band-pass antennas, etc.

Other technical solutions will develop in the marketplace to assist licensee in resolving interference problems. One engineer recently suggested that mobile and handheld antenna manufacturers develop band-pass filters that connect between the antenna and the mobile radios. These filters could be frequency-segment-specific and add additional rejection to signals coming from devices operating in the upper 200 SMR channels (861-866 MHz), for example. Many have ignored this type of receiver-based solution because of the variety of

handheld and mobile products deployed currently. UTC is confident that manufacturers will direct their attention to receiver-based solutions, an alternative to the high development costs of solutions based on modifying base station equipment.design.

Whether the solution in a particular case is an auto-tuning, frequency-specific combiner or band-pass mobile antennas, UTC believes the marketplace can correct the interference now experienced by Public Safety, critical infrastructure and others – with underlying rules from the FCC requiring this work. Engineering-based solutions ultimately will be a superior solution economically for all parties, including licensees, manufacturers and the Commission. The combination of solutions already documented in the Best Practices Guide, solutions yet to be released and stronger rules forcing the interfering party to correct the problem will be more beneficial to the licensees in this band than a wholesale re-channelization in which many would be forced to buy new equipment.

B. Parties Seeking Interference Resolution or Otherwise Needing to Adjust Channel Position Should Have the Flexibility To Do So.

In order to eliminate interference by all possible means, licensees must have the flexibility to take more drastic action in the few cases when more common technical solutions are not effective. In addition, users of the band must look ahead to means by which they can prevent interference from getting worse. Along with a strict requirement that licensees causing interference must fix it, UTC's solution relies on market-based solutions such as channel "swaps" and

[23] *See* 47 C.F.R. § 90.210.

negotiated re-locations that will allow this important frequency band to self-correct. Given flexibility, UTC believes that compatible licensees will move to the best areas of the band for their continued operation.

i. The FCC should permit channel "swaps" among existing licensees to resolve interference and/or change channel positions for future upgrades.

UTC agrees that the interleaved channel pools from 855-860 MHz contribute to the interference problem, as well as limiting the implementation of advanced systems. In certain cases, retuning Nextel operations has solved interference to CII 800 MHz systems. The FCC should support similar informal resolutions to the interference problem, such as channel swaps among existing licensees, even negotiated changes to channel positions for future upgrades where no interference currently exists. Allowing such swaps would create incentives for market-based solutions that would result in more efficient and effective resolutions than a strict realignment regime. For example, a Public Safety Category licensee in the NPSPAC channels may decide that it would prefer to swap its frequencies for Nextel frequencies in the interleaved bands rather than live with current or anticipated interference. Likewise, Nextel might prefer to move to the NPSPAC frequencies adjacent to its licenses in the Upper 200 SMR channels, to obtain more clear, contiguous spectrum and prevent the continued cost of fixing the interference its system creates. Of course, any such agreement between the two parties must be strictly voluntary and conditional upon compliance with the general rule (outlined above) that they not create interference to others.

Some rule changes will be necessary to make this process work. First, the Commission should eliminate eligibility restrictions for the various pools – Business, Industrial/Land Transportation, SMR and Public Safety[24] -- for the limited purpose of swapping licenses between service pools. This would eliminate the need for a waiver of the eligibility restrictions whenever a swap was proposed. Not only would this conserve Commission resources, it would also serve the underlying purpose of the rule, since the elimination of the eligibility restriction for swaps would not result in the depletion of spectrum allocated to a specific service -- swaps assumedly would be for equal bandwidth.[25] For example, two 12.5 kHz NPSPAC channels would be exchanged for one 25 kHz Business, I/LT or General Category channel. The relaxation of the eligibility restrictions for swapping would also be consistent with the Commission's policy objectives for flexible use.

Of course, these exchanges would require the filing of a prior-coordinated application with the Commission. As part of that application, the Commission should require a certification that (a) all the co-or adjacent channel 800 MHz licensees (not just public safety) in the same geographic area have been notified of the application; and that (b) affirmative steps will be taken to avoid causing harmful interference to these licensees. Anecdotal evidence suggests that interference from Nextel operations may extend beyond the immediately adjacent

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[24] UTC also includes the General Category as a possible source of negotiated exchanges.

[25] 1998 Biennial Review -- 47 C.F.R. Part 90 -- Private Land Mobile Radio Services, WT Docket No. 98-182, Replacement of Part 90 by Part 88 to Revise the Private Land Mobile Radio Services and Modify the Policies Governing Them, and Examination of Exclusivity and Frequency Assignment Policies of the Private Land Mobile Services, PR Docket No. 92-235, *Report and*

channel, and UTC recommends that this certification account for adjacent - channel licensees that are up to three channels removed from the channels being swapped.

The interference problem in the 800 MHz band is a complex mix of various technologies used by various industries in various segments. Moreover, it will change over time, as Nextel's cellularized system grows and other licensees expand and upgrade their equipment. The last thing the Commission should do is complicate the matter further by adopting detailed rules that attempt to account for every conceivable permutation, in today's environment. Instead, UTC submits that the basic technical and market-based solutions described above will provide sufficient flexibility to mitigate the interference among the wide variety of industries and technologies operating within the 800 MHz band.

ii. Flexible eligibility should include the consolidation of the Business and I/LT pools.

In the NPR, the Commission invites comment on a petition by PCIA, seeking to consolidate the 800 MHz Business and I/LT Category service pools.[26] UTC agrees that there is merit in such a proposal, particularly to the extent that it would represent an alternative source of channels to which licensees could voluntarily relocate to avoid interference. In order to further that goal, UTC recommends that eligibility in such a consolidated pool be extended to public safety, as well as Business and I/LT Category entities. UTC believes that consolidation of the Business and I/LT Category channels in this band will not

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Order and Further Notice of Proposed Rule Making, 15 FCC Rcd. 16673 at ¶20 (2000) ("2000 Biennial Review Report and Order").

[26] *NPRM* at ¶ 85.

lead to the problems – congestion and interference to critical voice and data systems – that pool consolidation has created in the bands below 512 MHz; the 800 MHz band is licensed on an exclusive basis, providing for protected service areas based on distance. Moreover, UTC offers its support for this proposal as a symbol of its commitment to mutual cooperation to help resolve the interference problem.

iii. Market-based solutions will tend to self-correct the use of the 800 MHz band by widely varying industries with various technologies, at the lowest cost.

Licensees in this, as any other, frequency band must have the choice to use the appropriate technology, make the appropriate investment, at the appropriate time for them, assuming they do not cause harm to others by doing so. Strict non-interference requirements, coupled with the flexibility outlined above, will encourage licensees to upgrade through individual or shared efforts. They also will tend to encourage licensees to move to the area of the band best suited for their use, regardless of their current regulatory classification. Mandatory bandplans based on business type, on the other hand, create illogical barriers in a band that is in a state of wide-ranging transition, and prevent such improvements.

UTC submits that this proceeding must remain focused on resolving interference and maximizing the long-term use of the 800 MHz band, rather than improving spectrum position for any specific entity. The licensees of the 800 MHz band are in the best position to know their own needs and how to meet them through innovative solutions over time. The Commission is in the best position to ensure their ability to do so through a foundation of strong technical rules,

regulatory policy that does not permit any licensee to obtain an unfair advantage and an absence of outmoded barriers.

C. Should the FCC Determine that the 800 MHz Band Must be Re-allocated, UTC Recommends A Simple, Voluntary Plan

If the Commission decides it must undertake the administrative difficulties and burdensome cost of restructuring the 800 MHz band, UTC recommends that it minimize the disruption from relocation by adopting a simple, voluntary and inclusive plan (*see* bandplan chart, included as Appendix B to these Comments) under which:

- EA-based SMR operations in the "lower 80", interleaved channels that cause interference would be permitted to relocate to the NPSPAC channels (866-869 MHz) at their cost.
- Those costs would include the cost of clearing the NPSPAC channels necessary for relocation. This would enable public safety entities to move from the band, which, sandwiched between the upper 200 SMR channels and the Cellular A Block, will receive increasing interference from systems with cellular configurations.
- NPSPAC licensees could choose to swap channels with the relocating EA licensee or could relocate to the 700 MHz spectrum allocated for Public Safety communications. Either option would be an improvement over the prospects for interference in the NPSPAC channels, and would be more compatible for Public Safety communications.

- Should a Public Safety system move to the 700 MHz allocation and a lower 80 EA licensee move to the vacated NPSPAC frequencies, the newly vacated lower 80 frequencies would be made available to Business, Industrial/Land Transportation or Public Safety applicants using the first-come, first-served, coordinated licensing process in use throughout the rest of the interleaved frequencies.

By moving to the NPSPAC channels, EA licensees would gain access to contiguous spectrum more suited to commercial purposes than the interleaved channels, and which could be more easily integrated with spectrum licensed in the upper 200 SMR channels. Other licensees in the interleaved channels also would benefit through the absence of adjacent, interference-causing cellularized systems. All other licensees, including the difficult mix of entities in the General Category, also would be spared the cost and inconvenience of a forced retuning or re-location when they have neither experienced nor caused interference to others.

These reciprocal incentives should encourage voluntary relocation to occur where it is needed, rather than arbitrarily forcing everyone to move at once or when triggered as part of a re-location daisy chain. As such, it would result in minimal disruption in the band and provide for the interests of public safety AND other users also impacted by interference in the 800 MHz band. Despite these merits, UTC emphasizes that its relocation plan should be entirely voluntary, and that it should only be adopted if the Commission concludes that it is compelled to restructure the band to mitigate interference. As with all other bandplans, UTC

notes also that this plan would not provide an answer to all interference problems.

D. UTC Does Not Recommend Allocating Additional Public Safety Spectrum in the 800 MHz Band.

i. The band is highly congested, with nearly 30 years' investment and licensing.

The focus of this proceeding must remain on mitigating the interference problem, which does not require allocating additional spectrum to Public Safety. UTC understands the congestion and interference concerns of public safety, especially since its members are "public safety radio services" eligibles that currently share all bands they use with thousands of other private wireless licensees, having no spectrum allocated exclusively for their use.

As much as UTC agrees that more PLMR spectrum is needed for private, internal communications used to protect life, health and property, the 800 MHz band is not the answer. The band has evolved over 30 years and is heavily used by utilities, among others, that have invested hundreds of millions of dollars into deploying and maintaining extensive systems. Many utilities migrated to the 800 MHz band to escape from the interference and congestion that plagues the bands below 512 MHz. To displace these systems at a time when they are more critical than ever would court disaster, not to mention the stranded investment it would create.

ii. Advanced technologies and shared systems could provide additional capacity should Public Safety require it.

As mentioned above, all user segments of the 800 MHz band are migrating toward higher-capacity, more interference-resistant digital systems, although at different speeds. Such systems create three to six or more times the capacity of analog technology. Utilities continue to invest in upgrades to their 800 MHz systems, and they share these systems with Public Safety. These shared systems promote interoperability with, and improve the quality of, Public Safety communications by extending coverage and capacity; they are made affordable because the costs are shared on a non-profit basis. Moreover, the Commission has made it easier for utilities to contribute their frequencies for Public Safety use by eliminating the waiver requirement that formerly existed at Section 90.179.[27] UTC recommends strongly that this flexibility be extended to permit Public Safety licensees, at their choice, to share their frequencies with other users without a waiver. Shared systems should help to mitigate the need for additional public safety spectrum in the 800 MHz band.

iii. The FCC has made recent Public Safety allocations in other bands to accommodate future needs and applications.

Public Safety also has been allocated additional spectrum in other bands. The Commission recently allocated 50 MHz in the 4.9 GHz band for highly advanced wideband services for which Public Safety has indicated a need.[28] Prior to that, 24 MHz were allocated in the 700 MHz band, none of which is yet in

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[27] 2000 Biennial Review Report and Order at ¶ 21.

[28] In re 4.9 GHz Band Transferred from Government Use, *Second Report and Order and Further Notice of Proposed Rulemaking*, WT Docket No. 00-32, FCC 02-47 (rel. Feb. 27, 2002).

use.[29] Finally, additional spectrum in the 700 MHz band may be earmarked for Public Safety.[30] UTC respectfully argues that additional spectrum in the 800 MHz band for Public Safety does not seem warranted, given that alternative allocations have been made and future upgrades could offer more capacity in existing allocations.

iv. Should the FCC make a new Public Safety allocation in the 800 MHz band, it must adopt the "public safety radio services" definition of § 309(j)(2)(A) of the Communications Act to determine eligibility.

If the Commission allocates additional spectrum for public safety in the 800 MHz band, it should extend eligibility to providers of public safety radio services, including CII, as defined by the Commission in its *BBA Report and Order and Further NPRM.*[31] This would meet the needs of public safety for additional spectrum, while providing a means whereby utilities and other CII could continue to protect life, health and property through the extensive 800 MHz systems they operate to support the safe and reliable delivery of essential services to the public at large. More inclusive eligibility would also promote interoperability among traditional Public Safety agencies and CII entities during critical emergency situations, an issue of growing concern since the tragedies of September 11, 2001.

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[29] The Development of Operational, Technical and Spectrum Requirements for Meeting Federal, State and Local Public Safety Agency Communication Requirements Through the Year 2010, WT Docket No. 96-86, *First Report and Order and Third Notice of Proposed Rulemaking,* 14 FCC Rcd 152 (1998).

[30] Industry proposals have been made to delay the auction of television channels 60-69 in order to designate that 700 MHz spectrum for public safety.

[31] In the Matter of Implementation of Sections 309(j) and 337 of the Communications Act of 1934 as Amended, *Report and Order and Further Notice of Proposed Rule* Making, 15 F.C.C.R. 22,709 at ¶ 5 (2000).

V. CONCLUSION

UTC urges that the FCC work expeditiously to adopt amended rules for the 800 MHz as recommended herein.

Respectfully submitted,

UNITED TELECOM COUNCIL

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Jill M. Lyon
Vice President & General Counsel

May 6, 2002

Brett W. Kilbourne
Director of Regulatory Services

Appendix A

Response of Consumer's Energy, MI to UTC Survey Concerning Inteference to Member Systems from Digital CMRS Systems

November 2001
Flint, MI
Area of Dupont and Dayton Streets. Initial investigation confirmed that Consumers Energy local site channel 2 is unusable. Problem started about 3 weeks ago. Investigation revealed new channel in use at a Nextel site that they were not licensed for caused problem. Offending Nextel channel was turned off and coverage returned to above area.

Area of I-75 and I-69, poor receive from mobiles in this area. Resolution pending

I-69 and Belsay Road poor receive from mobiles in the area. Resolution pending

Midland, MI
Area in downtown, poor receive from mobiles in this area. Problem cleared up with solution implemented in Dupont Street incident above. Suspect similar problem to that found above.

Mason, MI
US127 at Cedar Street exit in Mason Nextel site approximately one mile north interfering wth Consumers Energy channels. Resolution pending.

Lansing, MI
Frandor shopping center area at US127 and M43, signal quality goes down then recovers. Resolution pending.

October 2001
Bay City, MI
Nextel site on Wilder Road interferring with Consumers Energy channels. Investigation resulted in Nextel moving offending channel to antenna pointing away from Consumers Energy building.

September 2001
Pontiac, MI
Nextel site in parking lot of Pontiac Silverdome adjacent to Consumers Energy office building causing interference. Resolution pending.

June 2001
Livonia, MI
Nextel site adjacent to Consumers Energy office building caused interference since it was constructed. Resolved in August with installation of auto-tune combiner. As the first experience we had with this type of problem we devoted signifiant effort to understanding the issue. The attached files detail the steps we took.

(See attached file: livonia_nextel.PDF)(See attached file: livonia_nextel_2.PDF)(See attached file: livonia_nextel_3.pdf)

January 1999
Jackson, MI
One channel suddenly unusable at Kibby Road tower. Investigation traced on-channel interference to Nextel tower at Cooper Street and I-94. Offending Nextel channel turned off and problem went away.

DOCUMENT:	RF Interference Analysis; Livonia CSC / Nextel			
DEPARTMENT:	CSD/IS&T/IIS/NT/WNT (Wireless Network Technologies)			
AUTHOR:	Mark A. Gutowski, 517-788-0279			
NUMBER:	010510	**DATE:**	May 10, 2001	**REV:** A

I. Summary:

Consumers Energy ("Consumers") is Michigan's largest electric and natural gas utility and one of the nation's largest combination utilities. Consumers provides electric and natural gas service to more than 6 million of the state's 9.5 million residents in all 68 counties of Michigan's Lower Peninsula. Consumers is the principal subsidiary of CMS Energy Corporation, a $6 billion (sales), $15 billion (asset) international corporation. Consumers Energy was formerly named Consumers Power.

Consumers provides electric service to more than 1.6 million customers and serves an area spanning an estimated 27,800 square miles, which includes 275 cities and villages in 61 counties. Principal cities served are Battle Creek, Bay City, Cadillac, Flint, Grand Rapids, Jackson, Kalamazoo, Midland, Muskegon and Saginaw.

Consumers provides natural gas service for heating and other uses to more than 1.5 million customers in 54 of the 68 counties in Michigan's Lower Peninsula. It serves an area that spans 13,000 square miles and includes 215 cities and villages. Among the principal cities served are Bay City, Flint, Jackson, Kalamazoo, Lansing, Macomb, Midland, Royal Oak, Saginaw and Warren. More than one-half of the utility's gas customers are in metro Detroit ("Metro").

Beginning in 1994, Consumers started a phased implementation of an Ericsson EDACS 800 MHz land mobile radio system to provide both voice and data dispatch to field workers throughout Michigan's entire Lower Peninsula. In 2000, Consumers commenced Phase IV of the project and began infrastructure installation in its metro Detroit region--consisting of portions of Wayne, Oakland and Macomb counties. Cutover of subscriber units began in April 2001 and will complete by mid-May, 2001.

The Metro region is divided into three distinct work groups, with headquarters for each in the cities of Livonia, Pontiac, and Macomb. A main system design criterion required 90% bounded area coverage with the use of existing radio towers located in Northville, Macomb, and Pontiac. In addition, mobile, portable and fixed subscribers require adequate coverage at their work headquarters.

Livonia-based field workers utilize the nearest radio tower, Northville, 10.4 miles away (bearing of 295-degrees). Subscribers directly on Consumer's property have experienced poor and unpredicted radio coverage. The subject of this report investigates this performance issue and identifies RF Interference from a radio tower adjacent to Consumer's property as the root cause. There are three tenants at this tower (paging, 800 MHz ESMR, 1900 MHz PCS), so three possible interference sources exist. This report, however, specifically addresses concerns with Nextel's 800 MHz iDEN site #2283.

The report recommends that the system operators of the potential RF Interference work cooperatively with Consumers to further identify, assess, and correct the problem.

II. Environment:

Consumer's Livonia Customer Service Center ("CSC") is located at 11801 Farmington Rd, south of I-96 and North of Plymouth Rd. The geography is a mixture of suburban, residential, and industrial land near the CSC, with small patches of "cropland" towards the Northville site, which is 10.4 miles away (bearing 295 degrees). There are no large, urban obstructions (skyscrapers, etc.) in the direct path between the Northville site and the CSC. A layout of the CSC is pictured in Figure 1.

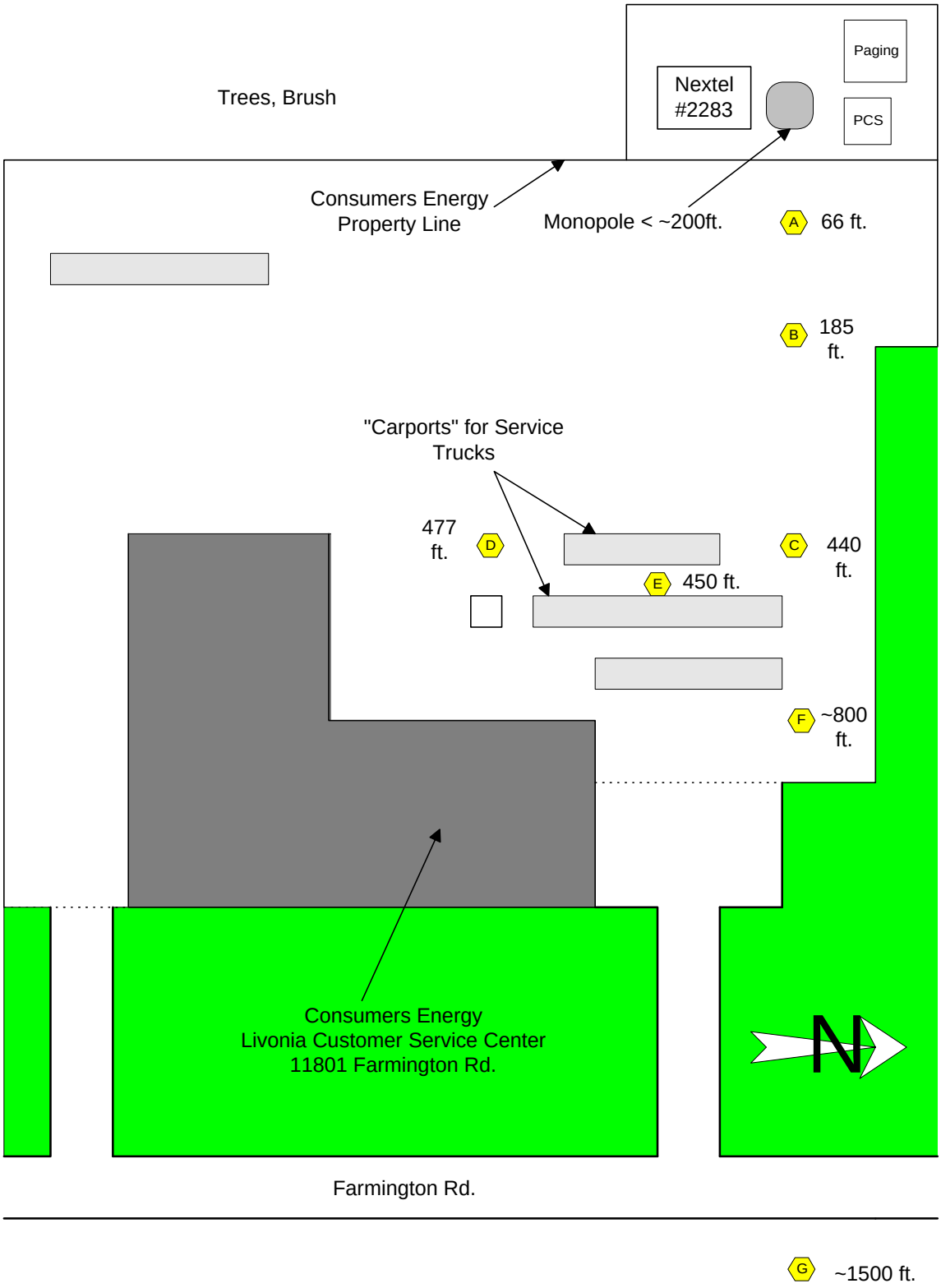


Figure 1: Livonia Customer Service Center

III. Predicted Coverage:

Figure 2 shows the predicted receive coverage plot, using the Okumura/Hata/Davidson model with land use attenuation factors and Bullington's diffraction model, expected by a typical mobile. Northville's 40 dBu F(50,50) service contour is also plotted, which indicates that the Livonia CSC is within the FCC-defined service area by about 4.1 miles.

The Okumura model predicts that the received signal strength ("RSSI") by a mobile with a 3 dB gain antenna, 6 ft AGL should expect a –90 dBm signal from the Northville site.

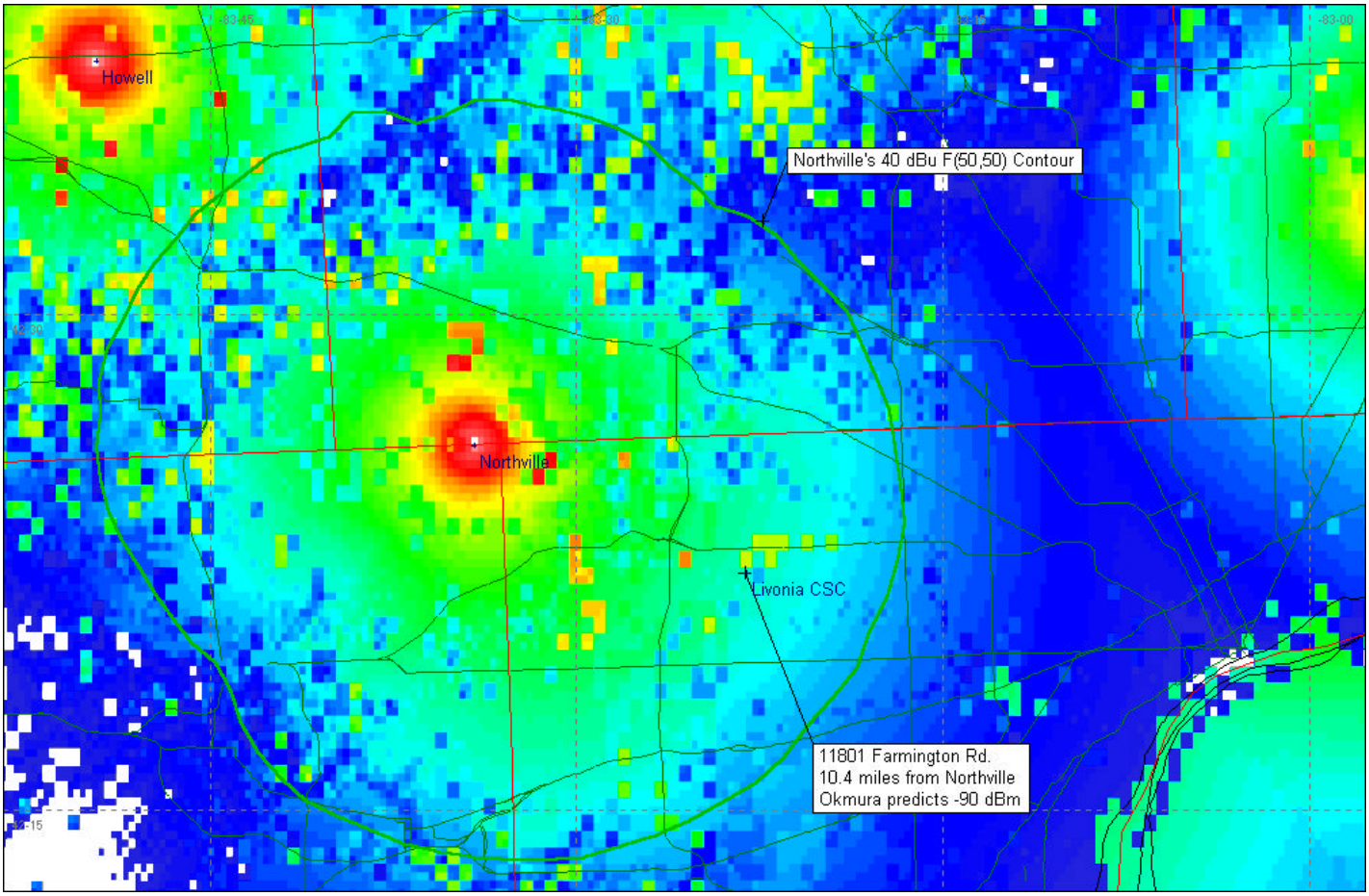


Figure 2: Predicted coverage of the Northville site
(green = -80 dBm, lt. Blue = -90 dBm, dk. Blue = -100 dBm)

IV. Northville site configuration:

Frequency	*Ch#.*	*Comments*
856.3125	1	
856.3375	16	(Control Channel)
857.3125	13	
858.3125	14	
859.3125	2	
861.0125	4	

Antenna: DB810, omni
ERP: 125 W

V. Nextel site #2283 configuration:

Frequency	*Control?*	*Sector*	*Az.*
854.9875		1	0
858.4375		1	0
858.9375		1	0
859.4875		1	0
862.6375	Y	1	0
858.2375		2	120
858.4875		2	120
859.1875		2	120
862.3375		2	120
863.7375	Y	2	120
859.9875		3	240
860.0625		3	240
861.4875		3	240
862.5125	Y	3	240
863.1375		3	240

Figure 3: Nextel Monopole

VI. Test Configuration:

An HP 8920 Communications Test Set with a unity gain antenna was used to determine the magnitude of received signals from the Northville site and each of Nextel's sectors. Also, for qualitative comparisons, an Ericsson EDACS Orion Trunked Mobile Radio with 3 dB gain antenna, as used by the field workers, was used. Circuit Merit ratings describing the Orion's performance are indicated in the "Comments" column in the Results section; note that WA SCAN indicates the radio believes the control channel is < -120 dBm.

Measurements of each Nextel sector's control channels and Northville's control were taken at eight (8) measurement points, indicated as yellow hexagons (a-g), as shown in Figure 1. Note that point 'h' is not shown on the map; it was taken in the parking lot of 13374 Farmington Rd.

VII. Results:

				Nextel per sector			Co-channel int.*			Worst	C/I
	Dist (ft.)	*Comments*	Northville	1	2	3	1	2	3	I	(dB)
a	66	CM4	-105	-60	-50	-50	-120	-110	-113	-110	5
b	185	CM4	-100	-50	-45	-65	-110	-105	-128	-105	5
c	440	CC SCAN ~CM2	-100	-65	-40	-60	-125	-100	-123	-100	0
d	477	WASCAN CM0	-100	-60	-35	-50	-120	-95	-113	-95	-5
e	450	CC SCAN ~CM4 on one TX	-105	-70	-45	-75	-130	-105	-138	-105	0
f	800	WASCAN CM2	-98	-65	-40	-60	-125	-100	-123	-100	2
g	1,500	Solid CM5	-100	-70	-50	-70	-130	-110	-133	-110	10
h	3,000	Solid CM5	-95	-50	-65	-90	-110	-125	-153	-110	15

Notes: (1) All measurements in dBm unless stated otherwise.
* The co-channel interference assumes the worst case (MIN) ACRR factor shown below.

VIII. ACRR determination:

f	*sector*	**856.3125**	**856.3375**	**857.3125**	**858.3125**	**859.3125**	**861.0125**
854.9875	1	1.325	1.350	2.325	3.325	4.325	6.025
858.2375	2	-1.925	-1.900	-0.925	0.075	1.075	2.775
858.4375	1	-2.125	-2.100	-1.125	-0.125	0.875	2.575
858.4875	2	-2.175	-2.150	-1.175	-0.175	0.825	2.525
858.9375	1	-2.625	-2.600	-1.625	-0.625	0.375	2.075
859.1875	2	-2.875	-2.850	-1.875	-0.875	0.125	1.825
859.4875	1	-3.175	-3.150	-2.175	-1.175	-0.175	1.525
859.9875	3	-3.675	-3.650	-2.675	-1.675	-0.675	1.025
860.0625	3	-3.750	-3.725	-2.750	-1.750	-0.750	0.950
861.4875	3	-5.175	-5.150	-4.175	-3.175	-2.175	-0.475
862.3375	2	-6.025	-6.000	-5.025	-4.025	-3.025	-1.325
862.5125	3	-6.200	-6.175	-5.200	-4.200	-3.200	-1.500
862.6375	1	-6.325	-6.300	-5.325	-4.325	-3.325	-1.625
863.1375	3	-6.825	-6.800	-5.825	-4.825	-3.825	-2.125
863.7375	2	-7.425	-7.400	-6.425	-5.425	-4.425	-2.725
ACRR (dB)		77	77	75	60	76	76
(from Figure 4 graph)					63	74	76
					63	74	73
					73	68	77
					74	63	77
					76	63	
						73	
						73	
MIN		**77**	**77**	**75**	**60**	**63**	**73**

Sector 1 MIN = 60 dB
Sector 2 MIN = 60 dB
Sector 3 MIN = 63 dB

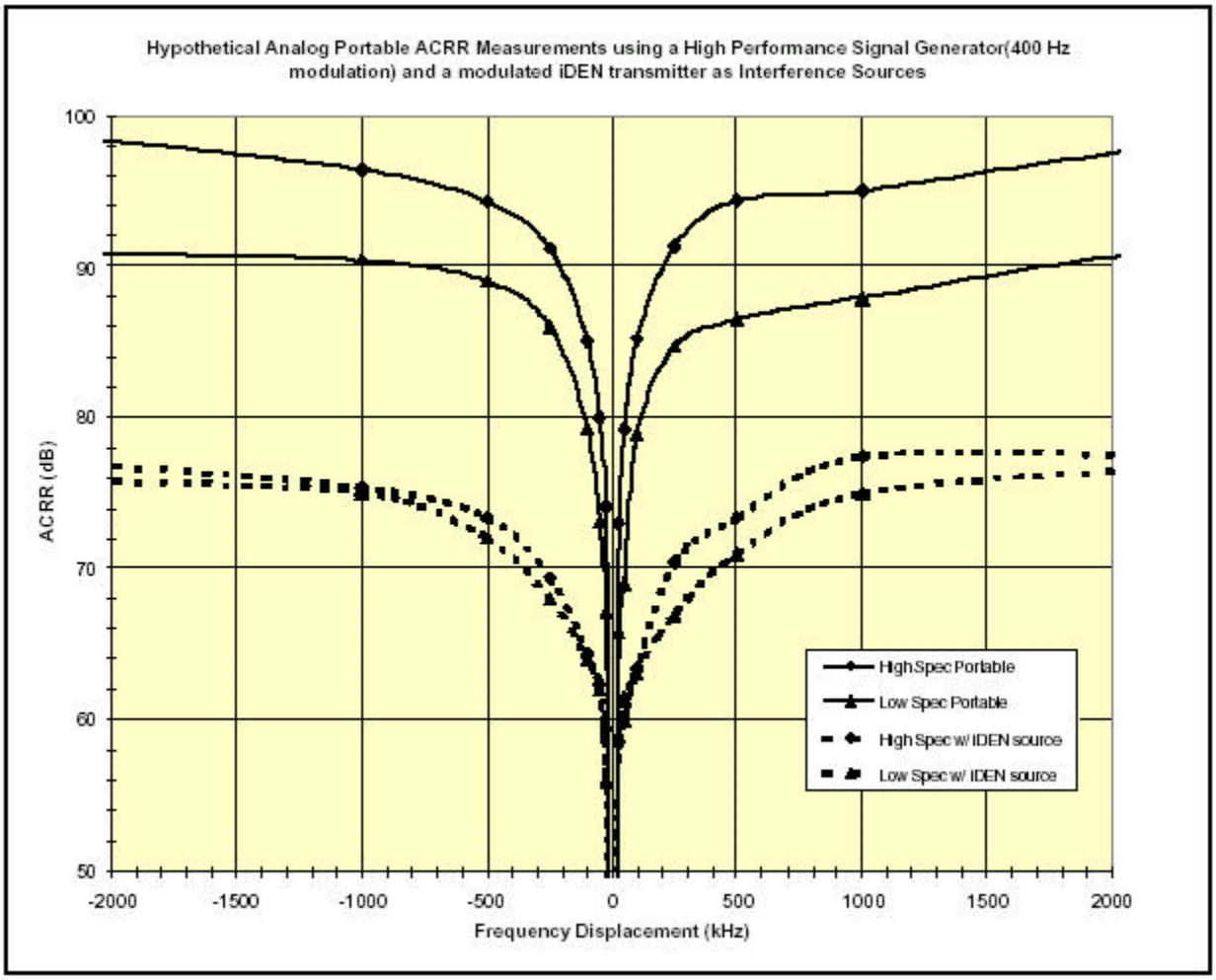


Figure 4: ACRR measurements with IDEN interferers (source: Motorola)

IX. Discussion:

From the Section VII, Result, Northville's RSSI was, on average, -100 dBm. Okumura's prediction of –90 dBm, as shown in Figure 2, isn't too far off—considering the approximate nature of the model as well as the difference in antenna gains (3 dB vs. 0 dB). For all eight measurement points, the Northville site's RSSI stayed relatively constant, however, a broad circuit merit range from extremely "poor/unusable" to "solid/full-quieting" was observed. The Orion Radio was unusable in cases where Nextel's Sector-2 (120 degrees) contributed a –40 dBm or stronger signal.

Figure 4 shows how typical receivers may reject adjacent channels (ACRR), comparing a traditional, analog FM interfering transmitter with an iDEN interfering source. It shows that receivers typically have ≥ 90 dB rejection of signals that are offset ≥ 500 kHz from the desired channel. But, when an iDEN base radio is used as the interfering signal source, the ACRR desensitization level is approximately 20 dB less than when a traditional analog FM source is used. This has been cited by some as the "penalty" for using noise-limited systems (like iDEN) in the same or nearby bands where interference-limited systems are deployed.

The co-channel interference column in Section VII, Results, transforms the adjacent channel interferers into what the typical mobile receiver will 'perceive' the on-channel interference component to be. Obviously, this is made up of several interfering signals from several adjacent frequencies—all with varying phases. Section VIII, ACRR Determination, lists the separation (in MHz) for all combinations of adjacent Nextel frequencies onto the desired Northville channels. The Northville channels, 858.3125 MHz and 859.3125 MHz have a number of "close" Nextel channels. The corresponding ACRR from the graph in Figure 4 is applied to the various adjacent channels with separations < 1.5 MHz, resulting in a range from 60 to 77 dB. Applying the minimum (or worst case) of 60dB for Nextel Sector 2 provides the "Worst I" column in the Results table. The C/I is simply the ratio (in dB) of the desired Northville carrier signal to the worst calculated interference.

One design criterion for EDACS systems is to utilize an 18 dB or better C/I radio. The Results imply a C/I of about 5 dB provides a CM4 grade of communication. Likely this number is deflated a bit, due to the applying the worst case ACRR of 60 dB. Nonetheless, the quantitative measurements and interference calculations correlate quite well with the qualitative observations.

While further work should be done to provide a conclusive source of the claimed RF Interference, one likely cause could be the desensitization is due to local oscillator sideband noise heterodyning the undesired signal(s) into the IF pass-band by mixing with the extremely strong Nextel adjacent channel(s). We hope to work closely with Nextel in identifying options to solve this problem.

DOCUMENT:	RF Interference Remediation I; Livonia CSC / Nextel			Consumers Energy Count on Us
DEPARTMENT:	CSD/IS&T/IIS/NT/WNT (Wireless Network Technologies)			
AUTHOR:	Mark A. Gutowski, 517-788-0279			
NUMBER:	010604	**DATE:**	June 4, 2001	**REV:** A

I. Summary:

On Friday, June 1, 2001, Consumers and Nextel staff members met at Nextel site #2283 to determine the interference effects of said Nextel site onto 800 MHz trunked radio operations at the Consumers Energy Livonia Customer Service Center (CSC) at 11801 Farmington Rd.

This meeting was organized by Consumers and Nextel in response to Consumer's interference claim, as stated in a document entitled, "RF Interference Analysis; Livonia CSC / Nextel", Rev. A., May 10, 2001.

The following representatives were present:

Tonia Archibald	Senior RF Design Engineer, Nextel
Jason Bowker	RF/System Performance Engineer, Nextel
Mike Cordes	M/A-Com Wireless Systems (contracted maintenance for Consumers)
Mark Gutowski	Senior Engineer, Consumers Energy

II. Results:

All field observations were performed at a fixed, stationary location approximately 450 ft. S-SE of the Nextel site using an Ericsson Orion mobile radio logged onto the Northville site. The use of Circuit Merit (CM) ratings (1-5; 5=best) as a subjective audio quality grading was performed under various scenarios.

Initially, Nextel sector 2 was turned-off completely. The Consumer's network control technician was then instructed to provide voice audio tests on each of the five Northville "outbound" channels. With sector 2 "off", all channels were graded CM5.

Table 1, Circuit Merit ratings, shows the results obtained after individually turning 'on' each Nextel base radio (BR), with the corresponding RF channel appropriately indicated.

			Northville Channels / Separation (MHz) / CM's											
			1		16		13		14		2		4	
f	***BR***	***Sector***	**856.3125**		**856.3375**		**857.3125**		**858.3125**		**859.3125**		**861.0125**	
858.2375	2	2	-1.925	C	-1.900	2.0	-0.925	4.0	0.075	2.0	1.075	5.0	2.775	4.0
858.4875	3	2	-2.175	*	-2.150	1.0	-1.175	1.0	-0.175	1.0	0.825	2.0	2.525	1.0
859.1875	4	2	-2.875	C	-2.850	3.0	-1.875	4.0	-0.875	3.0	0.125	4.0	1.825	4.0
862.3375	5	2	-6.025	C	-6.000	3.0	-5.025	5.0	-4.025	4.0	-3.025	5.0	-1.325	4.0
863.7375	1	2	-7.425	C	-7.400	4.0	-6.425	5.0	-5.425	4.0	-4.425	5.0	-2.725	4.0
861.7125	6	2	-5.400	C	-5.375	5.0	-4.400	5.0	-3.400	5.0	-2.400	5.0	-0.700	5.0

Table 1: Circuit merit (CM) ratings

Notes: "C" indicates control channel; "*" means BR#3 interfered with control channel.

III. Conclusions:

Nextel BR#6, at 861.7125 MHz, had no observable affect on radio communications from the test. BR#1 showed the next best performance, nominally degrading three channels to a CM4 (perfectly readable, some noise). BR#5 was the next best, but showed one channel at a CM3 level (readable, some syllables missed).

BR #2, BR #3, and BR #4 were graded "less than acceptable" voice quality, on many channels.

Based on the data in Table 1, the first observation is that the "good" Nextel channels (BR#6, #1, & #5) are all in the upper 200 SMR band, and, on average have much greater separation from the Consumers channels (over 2 MHz in 2/15 cases) than the "poor" Nextel channels (BR#2, #3 & #4). When looking at the separation distance as a function of the CM rating, however, no firm conclusion can be drawn.

During the June 1st meeting, Nextel re-affirmed their willingness to further work with Consumers in a mutually cooperative environment to remedy this problem. As discussed, a next-step may involve Nextel "retuning" this site so Upper-200 SMR channels are used entirely in sector 2.

Consumers looks forward to testing any possible solution Nextel may offer.

DOCUMENT:	RF Interference Remediation II; Livonia CSC / Nextel			Consumers Energy Count on Us
DEPARTMENT:	CSD/IS&T/IIS/NT/WNT (Wireless Network Technologies)			
AUTHOR:	Mark A. Gutowski, 517-788-0279			
NUMBER:	010622	**DATE:**	June 22, 2001	**REV:** A

I. Summary:

On Tuesday, June 19, 2001, Consumers and Nextel staff members again met at Nextel site #2283 to follow-up on recent channel retunes by Nextel--an attempt at mitigating the interference effects of said Nextel site onto 800 MHz trunked radio operations at the Consumers Energy Livonia Customer Service Center (CSC) at 11801 Farmington Rd.

The following representatives were present:

Jason Bowker	Nextel
Mike Cordes	M/A-Com Wireless Systems (contracted maintenance for Consumers)
Mark Gutowski	Consumers Energy
Ken Tyler	Consumers Energy

II. Results:

PART A: *Circuit Merit ratings*

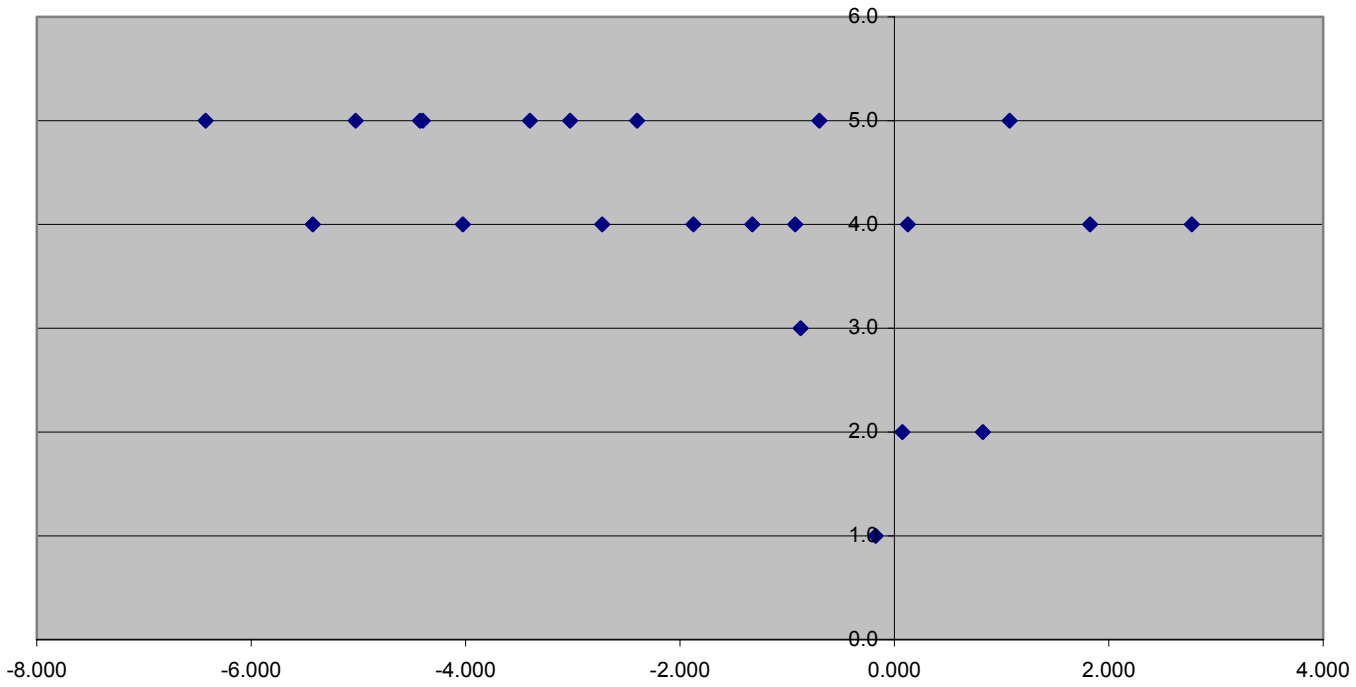
All field observations were performed at a fixed, stationary location approximately 450 ft. S-SE of the Nextel site using an Ericsson Orion mobile radio logged onto the Northville site. The use of Circuit Merit (CM) ratings (1-5; 5=best) as a subjective audio quality grading was performed under various scenarios.

A review of the June 1 data measurements revealed a problem Consumers identified with the Northville channel plan—Channel 1 and 16 are adjacent channels. Channel 16 was therefore disabled during the June 19th data gathering and will not be used. Disregarding the Channel 16 CM's from the June1 data, Table 1 recaps the results.

			Northville Channels / Separation (MHz) / CM's													
			1		16		13		14		2		4			
f	***BR***	***Sector***	**856.3125**		**856.3375**		**857.3125**		**858.3125**		**859.3125**		**861.0125**			
858.2375	2	2	-1.925	C	-1.900	**	-0.925	4.0	0.075	2.0	1.075	5.0	2.775	4.0		
858.4875	3	2	-2.175	*	-2.150	**	-1.175	?	-0.175	1.0	0.825	2.0	2.525	?		
859.1875	4	2	-2.875	C	-2.850	**	-1.875	4.0	-0.875	3.0	0.125	4.0	1.825	4.0		
862.3375	5	2	-6.025	C	-6.000	**	-5.025	5.0	-4.025	4.0	-3.025	5.0	-1.325	4.0		
863.7375	1	2	-7.425	C	-7.400	**	-6.425	5.0	-5.425	4.0	-4.425	5.0	-2.725	4.0		
861.7125	6	2	-5.400	C	-5.375	**	-4.400	5.0	-3.400	5.0	-2.400	5.0	-0.700	5.0		

Table 1: Circuit merit (CM) ratings from June 1, corrected.

Graph 1 shows the channel separation in Table 1 vs. the assigned Circuit Merit.



Graph 1: June 1st CM (vertical) vs. frequency separation (MHz horizontal)

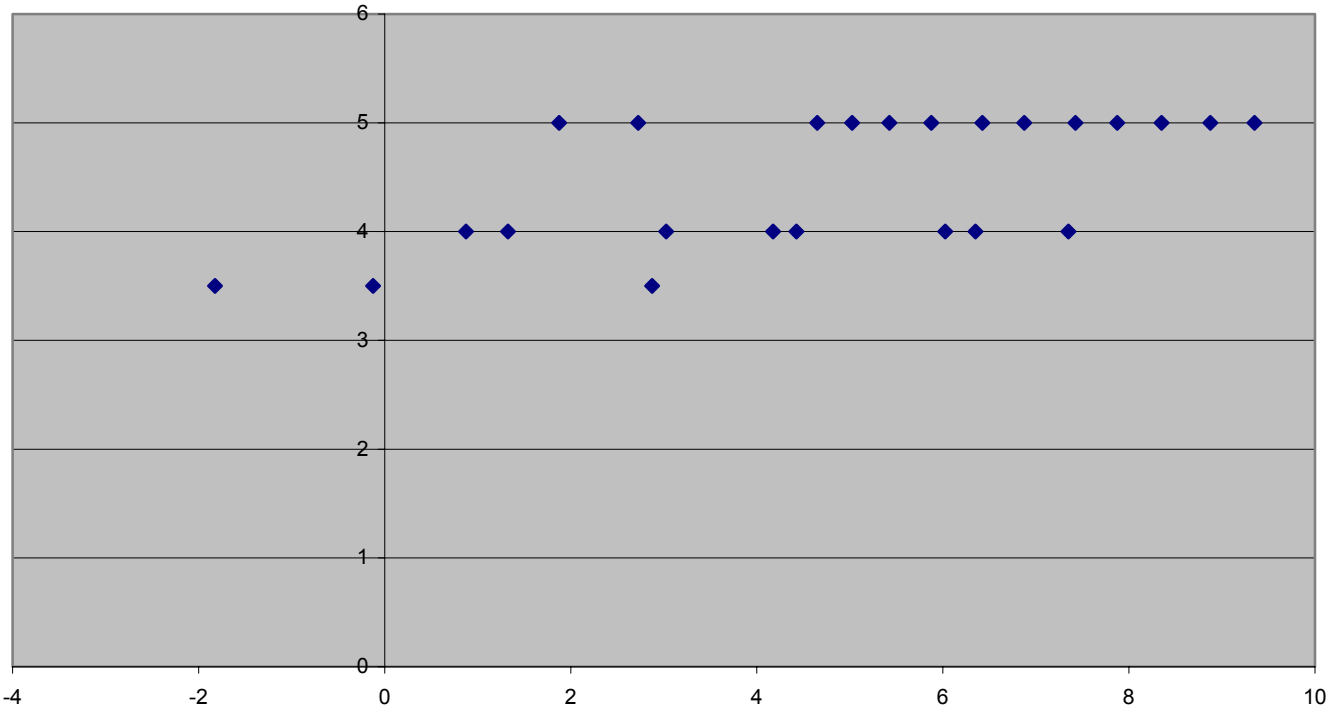
Graph 1 suggests that, with one Nextel BR 'on' for a given trial, lower circuit merit ratings correspond to closer frequency separations. For all instances of a CM 3 or worse, the graph shows the channel separation is less than 1 MHz.

Table 2 shows the Circuit Merit ratings from June 19th. Please note that BRs 2 and 3 were both retuned to a different, higher frequency.

			Northville Channels / Separation (MHz) / CM's									
			1		13		14		2		4	
f	***BR***	***Sector***	**856.3125**		**857.3125**		**858.3125**		**859.3125**		**861.0125**	
863.7375	1	2	7.425	5	6.425	5	5.425	5	4.425	4	2.725	5
865.6625	2*	2	9.350	5	8.350	5	7.350	4	6.350	4	4.650	5
865.1875	3*	2	8.875	5	7.875	5	6.875	5	5.875	5	4.175	4
859.1875	4	2	2.875	4	1.875	5	0.875	4	-0.125	3.5	-1.825	3.5
862.3375	5	2	6.025	4	5.025	5	4.025	cc	3.025	4	1.325	4
861.7125	6	2	5.400		4.400		3.400		2.400		0.700	

Table 2: June 19th Circuit merit (CM) ratings

Notes: "*" means these BRs were retuned since June 1st measurements.



Graph 2: June 19th CM (vertical) vs. frequency separation (MHz horizontal)

	1	13	14	2	4
1-6 ON	0	4	3	4	0
ALL OFF	5	5	5	5	5
1-3,5-6 ON	**4**	**5**	**5**	**5**	**4**
1-6 ON	3	5	cc	3.5	4
1-6 ON	4	5	cc	4.5	4
1-6 ON	cc		3		

Table 3: June 19th CM results

PART B: *Noise Floor Measurements*

The HP8920 Spectrum Analyzer was used to estimate the noise floor in an effort to examine the possible effect of transmitter sideband noise from Nextel sector 2 onto Consumer's mobile receive channels.

Measurements were performed in the same location that Circuit Merit ratings were taken in Part A. The Spectrum Analyzer was configured to display a 200 kHz bandwidth surrounding each of the five (5) Northville transmit channels. As shown in Table 4 below, a noise floor measurement was captured for two cases for each channel—(1) with Nextel Sector 2 'ON', and (2) with Nextel Sector 2 'OFF'.

		Noise Floor (dBm)		Delta
f	***ch***	***Nextel OFF***	***Nextel ON***	***(dB)***
856.3125	1	-110	-106	4
858.3125	14	-110	-107	3
859.3125	2	-110	-105	5
861.0125	4	-110	-109	1
857.3125	13	-110	-109	1
			Average:	2.8

Table 4: Noise Floor Measurements Near Receive Channels

III. Conclusions:

The Nextel channel retunes prior to the June 19th measurement session greatly improved receive signal levels at Livonia. Nextel BR4, however, seemed to contribute the most interference. With all Nextel BRs transmitting except for BR4, it appears that, based on Table 3, that received signal levels on all Northville channels are at acceptable levels (CM 4 or greater). The frequency separation between Nextel channels and Northville channels appears to have an impact on audio quality—from Graph 2, a 2 MHz (or less) separation shows the worst receive quality while Graph 1 implies about 1 MHz is required.

Individually, the CM results from Table 2 show fairly good results. It appears, however, that enabling multiple channels has a cumulative Circuit Merit degradation effect. If the claimed interference is due to Nextel transmitter sideband noise, this additive effect makes sense. The noise floor measurements further verify this.

For the short term, Consumer's feels the current channel scheme as shown in Table 2, with BR4 replaced/disabled, is an agreeable compromise. We do, however, wish to work together with Nextel to help identify a long-term solution that remedies this, and other similar, recently discovered, interference issues.

Other UTC Survey Responses

Baltimore Gas and Electric Company, Baltimore, MD

On behalf of the Baltimore Gas and Electric Company (BGE), I would like to submit the following response to your survey request. BGE has operated a 12-channel 800mhz trunked radio system for use by its critical operating departments over the past 14 years, and has enjoyed relatively interference-free operation until very recently. All of our frequencies are in the 'lower 800' band that would be directly affected by Nextel's proposal.

Interference from Non-compliant Operations by Nextel

Within the past 6 months, BGE has experienced a sharp rise in cases of harmful interference where mobile units will lose contact with our system due to an overpowering signal from a nearby commercial site. The rise of these interference cases has been directly related to the build-out of Nextel's digital system in the Baltimore area. In fact, BGE has partnered with Nextel to lease space on some of our towers for their system build-out. We did not anticipate this kind of interference based on traditional intermod calculations, but it has always been difficult getting Nextel to divulge their actual operating frequencies at any given site.

\When this interference began to appear on our system, BGE discovered that Public Safety had already been fighting the battle for quite some time. The symptoms described in the APCO Project 39 documents are the same as those now being experienced by BGE. A significant rise in the noise floor across a wide band of frequencies causes our mobile receiver to desense to the point that it loses the signal from our control channel. This problem occurs in close proximity to new Nextel antenna sites, and is supported by the explanation provided by Nextel in their own proposal letter. BGE has not specifically contacted Nextel or the FCC about these problems because of the recent rise in general awareness and activity on this issue. But BGE wants to be added to your list of utilities that are experiencing the effects of this interference.

Public Service / Public Safety Shared Systems

BGE is currently sharing the use of our 800mhz trunked system with two entities that may be eligible for public safety frequencies. The Maryland Emergency Management Agency (MEMA) shares one of our talk groups to coordinate communications with our nuclear power plant in case of emergencies. The Baltimore City Water Department uses another BGE talk group to provide expanded coverage into outlying areas where their own 800mhz system does not reach. In the case of Baltimore City, the sharing

is only possible due to the inherent compatibility of our two systems.

For some time, BGE has had periodic discussions with various County Governments and Police Departments about the possibility of mutual-aid channels on our respective systems, but to date no such agreements have been reached. These discussions may some day result in a statewide mutual aid system that is only possible by virtue of the inherent compatibility of our individual 800mhz systems.

Intermountain Gas Co., Boise, ID

Intermountain Gas Co., headquartered in Boise Idaho, is a privately held natural gas distribution company serving approximately 275,000 customers throughout the southern portion of the State of Idaho. In 1996, due to the re-forming plan implemented by the FCC, the company elected to implement an 800mhz LTR trunking system to provide company wide dispatch and full duplex interconnect to allow direct contact between our service technicians and our customers. This has lead to our increased productivity and helped to keep our customers supplied with reasonably priced Natural Gas. Our initial investment in this system was approximately $875,000.00. We are currently in the process of implementing the use of our radio system to send data to our vehicles, which will also add to our productivity thereby continuing to keep our rates reasonable. If we are forced to make a drastic change, as this proposal would imply, it is the consumer that would ultimately bear the brunt of this because we would be forced to ultimately pass any increase in operating costs on to the customer.

The aforementioned increase in productivity is however a side benefit of our radio system. The primary function of our radio system is to promote public safety during maintenance and repair to our gas distribution system. It is in this spirit of public safety and the liability that goes with this responsibility that we are forced to rely on our own radio system.

Therefore it is my opinion that this proposal would not only cause undue financial hardship upon Intermountain Gas Company but also upon the public it serves.

DTE Energy, Detroit, MI

DTE Energy representing both Detroit Edison and Michigan Consolidated Gas companies have NO 800 MHz systems. Our concern is that a 800 MHz band reallocation would severely limit our planning options for future voice and data mobile radio systems.

We have demonstrated a Nextel portable will locally interfere with our MAS 928-952 MHz equipment.

Presently we have several portable radios on the Michigan State Police 800 MHz trunked radio system to coordinate emergency activities.

Our internal concern discussions have included:

Nextel should bear the total cost of relocating existing users. We feel they should comply to ET rules for reallocating, like the 1.8 GHz band reallocation to the PCS carriers. Nextel should be relocated to the 1.8 GHz PCS commercial band and keep the 700 to 900 MHz bands for private and public safety systems. We feel that much 800 MHz radio equipment including antennas may not be capable of changing frequencies. Nextel should present detailed cost estimates for the various radio equipment that are used by the many 800 MHz band users along with frequency changes and radio re-programming. Does Nextel have the staff available to assist public safety entities in the proposed frequency migration? The many security and operating risks during a major frequency change need to be identified, and contingency plans developed.

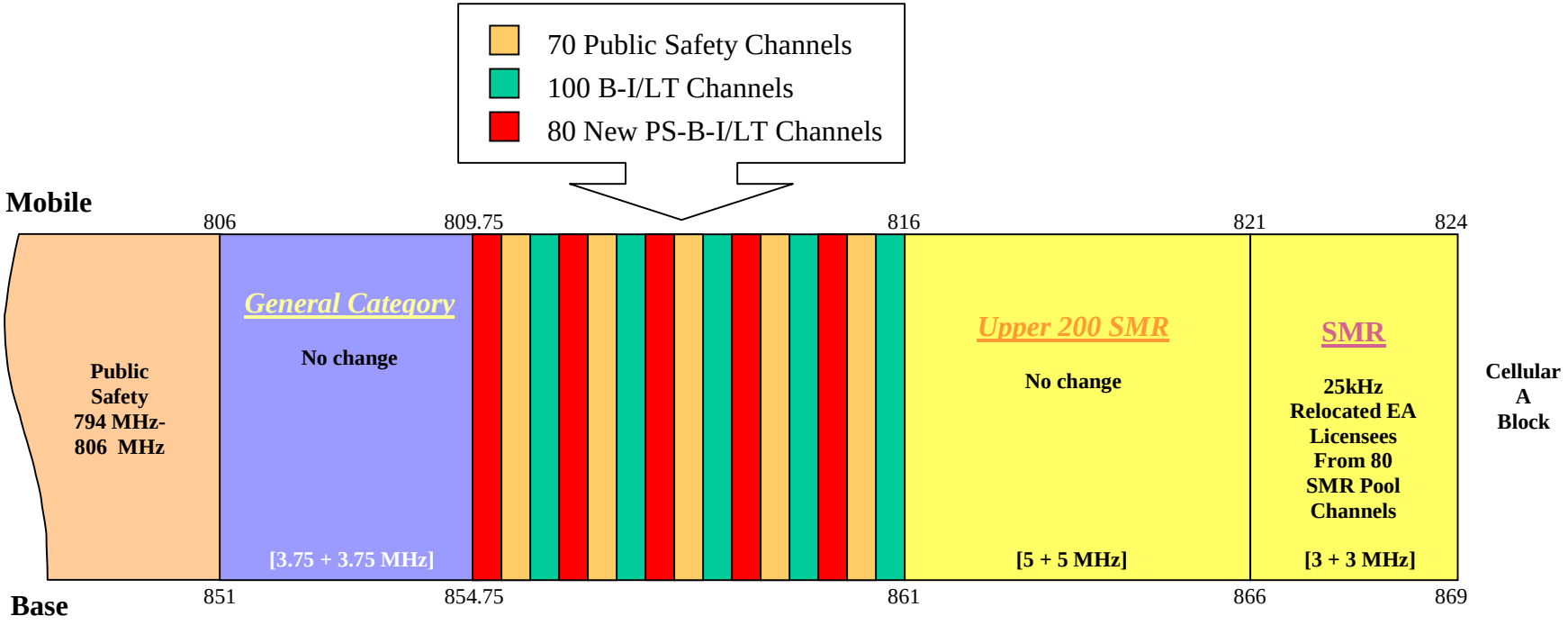
Would tightening the 800 MHz out of band emissions and providing enforcement reduce the interference problems?

East River Electric Power Cooperative, Madison, SD

East River operates a cooperatively shared 800 MHz system in South Dakota and Minnesota. We share the system with several electric and water utilities and commercial business users in addition to some governmental agencies. The most notable is the Yankton County 911 Center. They are the dispatch center for the Yankton County EMS (15 radios), the Yankton County Sheriff (8 radios), and the Yankton Police Department (39 radios). The Army Corps of Engineers also has a couple of radios on our system in the Yankton area. The Deuel County Sheriff has 5 radios on our system. While not a large number of users currently, these users will testify to the vital service we provide in the rural areas, where alternatives are limited. The FCC may look on such small systems more favorably than those operated by large utilities and public safety entities that have abundant resources and other alternatives. Of course, we are extremely concerned over the Nextel proposal which would prove devastating to the future of the 800 MHz wide area trunked system and its users. We have made what we consider a huge investment ($2.3 M) in this system to meet the needs of not only utility and public safety agencies, but rural water and telephone systems and other commercial fleet operators.

Appendix B

UTC 800 MHz Band Plan (alternative)



General Category

No Change.

Interleaved Area (including Middle 80 SMR)

Move EA SMR pool licensees to NPSPAC on voluntary basis. B-I/LT, Public Safety and site-licensed SMR systems stay. B-I/LT pools combined. Public Safety, Business and I/LT eligible for vacated 80 SMR channels as available. No cellular configuration.

Upper 200 SMR

No Change.

NPSPAC

Move NPSPAC systems to 700 MHz public safety allocation or swap for lower 800 MHz, as agreed by parties. Re-channelize 866-869 MHz into 25 kHz channels.