

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

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	)	

To the Commission:

**COMMENTS BY THE STATE OF FLORIDA  
TO THE NOTICE OF PROPOSED RULEMAKING**

1. The State of Florida, State Technology Office, Bureau of Wireless Communications (“Florida” or “the State”)<sup>1</sup>, offers these comments to the Notice of Proposed Rulemaking (the *NPRM*) in the above referenced matter. As a licensed user of public safety spectrum, and an agency with regulatory responsibility for other state and local public safety agencies within Florida, we have direct interest in the outcome of this proceeding. Our comments are divided into the same broad categories as the *NPRM*, and include a reference to the paragraph numbers of the *NPRM* to which they respond. We applaud the Commission for such a major undertaking and understand that the challenges ahead will be considerable for both the Commission and the affected licensees. We stand ready to continue our participation throughout these proceedings with the hope that the CMRS interference experienced by Florida and others will be mitigated if not eliminated entirely.

2. (Re: ¶16) We concur with the *NPRM* that a solution must be found to the Commercial Mobile Radio Service (CMRS) interference problem, and that band restructuring is only one potential answer to the problem. In view of the enormous cost, complexity, and time required to accomplish band restructuring, we strongly encourage the Commission to thoroughly investigate all possible non-restructuring options for mitigating the problem.

3. (Re: ¶18) The severity of the CMRS interference problem, as noted by the Commission, is partly due to the lack of a guard band between the upper NPSPAC<sup>2</sup> channels and the lower

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<sup>1</sup> By action of the 2000 Florida Legislature, the Bureau of Wireless Communications, previously organized within the Division of Information Technology of the Florida Department of Management Services, now functions within the new State Technology Office under the direction of Florida’s Acting Chief Information Officer, Kimberly Bahrami.

<sup>2</sup> 821-824/866-869 MHz in accordance with the Final Report of the National Public Safety Planning Advisory Committee (“NPSPAC”).

portion of the CMRS “A” band. As noted further below in our comments, frequency separations as small as 142.5 kHz occur between Florida’s statewide radio system and certain Nextel sites, causing “dead spots” in areas requiring reliable public safety radio coverage. We know of no proposal to establish a guard band above the NPSPAC channels, and suggest that such a proposal be examined fully before committing to a plan of band restructuring.

4. (Re: ¶19) Florida agrees in general with the Commission’s assessment of the scope and causes of CMRS interference to public safety systems. Our direct experiences of interference are completely related to situations involving high power CMRS stations, and we cannot offer comments regarding experience with interference from low power CMRS stations.

5. (Re: ¶20-25) Of the two major restructuring proposals (Nextel and NAM) presented in the NPRM, we believe the Nextel proposal to be closest to the needs of public safety and which would provide the greatest degree of overall improvement in the 800 MHz allocations. Beyond providing public safety with much needed additional spectrum within a single block, the Nextel proposal in effect “thins out” the number of users in the 800 MHz band. The main problem with the 800 MHz band is that it simply has too many diverse users all competing to satisfy rapidly growing communications needs. The existing fractured structure promotes out-of-band noise interference as well as intermodulation interference. By restructuring the band into two main groups (public safety and digital SMR) with a guard band in-between, the 800 MHz band will become a resource well suited to its users, capable of growth, and such that long-range planning and sophisticated frequency coordination become realizable goals. With the band reduced to two distinct blocks, the likelihood of out-of-band intermodulation products is minimized. In contrast, the present overloaded, interleaved, and fractured structure of the 800 MHz band makes any attempt at planning and coordination, and prevention or resolution of interference problems, all but impossible except on a very local scale.

6. (Re: ¶26) The alternative restructuring plan presented in paragraph 26 of the NPRM appears less desirable than either the Nextel or NAM plans. The alternative plan would leave public safety fractured into a lower block (above general category) and the existing NPSPAC block. It also would leave open the possibility of interference between the upper 200 SMR channels and the NPSPAC block, as well as providing no inherent reduction in the potential for intermodulation interference between the diverse blocks.

7. (Re: ¶27) Florida questions Nextel’s assertion that intermodulation is the primary interference mechanism, due exclusively to public safety receiver characteristics. The “dead spot” cases examined within Florida’s statewide 800 MHz system appear to be caused by receiver overload due to excessively high sideband noise.<sup>3</sup> Notwithstanding the frequency of occurrence of intermodulation interference, we agree with the Commission that it is not “intuitively obvious” as to what degree it would be reduced by band restructuring. We do believe however, that the likelihood of intermodulation interference would be reduced somewhat

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<sup>3</sup> With 5 or more CMRS carriers operating within 3 MHz of the desired signal, or 9 or more operating at 5 MHz separation, our mobile radios experienced interference within the immediate vicinity of the CMRS site. The CMRS carriers were measured to have a signal level of about –20 dBm into a unity gain mobile antenna located on a public roadway located 150 feet horizontal distance from the CMRS site.

by the Nextel proposal, for the simple reason that the larger blocks proposed by Nextel will allow individual systems to be constructed with closer spacing between highest and lowest frequencies. The closer spacing will tend to produce intermodulation products that are “in-band” rather than scattered across several bands. Within the public safety bands for example, large systems (such as Florida’s) utilize frequencies from both the public safety and NPSPAC pools which produce intermodulation products spread over a wide range of spectrum. The Nextel proposal would provide a band structure that would eliminate such situations, and which would tend to reduce the signal strength of high-order intermodulation products to a less harmful level.

8. (Re: ¶28) Florida agrees that spectrum efficiencies that can result from frequency reallocations should be encouraged insofar as possible. However, as proven for “refarming” efforts below 512 MHz, those efficiencies are difficult to appreciate in spectrum that already has an embedded base of radio equipment. Given the potential improvements in available spectrum and the financial incentives for relocating public safety users, spectrum efficiencies promulgated by rule (transmitter, receiver, system, and operation efficiencies) would be more effective than voluntary participation, particularly if the result is to be achieved in a short period of time.

9. We urge the Commission however, to allow public safety to continue utilization of a 25 kHz channel bandwidth on any restructured 800 MHz spectrum. Florida would also concur with a requirement that all new or replaced 800 MHz public safety equipment comply with the standards presently required of equipment in the NPSPAC band. As Florida has commented in prior proceedings, we also maintain that appropriate receiver standards for public safety (such as -20 dB receiver selectivity at 12.5 kHz) would reduce the incidence of interference and thereby improve spectrum efficiency. Along similar lines, we also recommend that any restructured 800 MHz spectrum for public safety be established with 12.5 kHz channel spacing as is done in the NPSPAC band.

10. (Re: ¶29) Regarding the need for additional public safety spectrum which may become available as a result of band restructuring, the considerable data submitted in response to the Commission’s proceedings on 700 MHz, as well as the Public Safety Wireless Advisory Committee (PSWAC) report of 1996, attest to the extent and severity of the need. In the case of Florida’s statewide digital 800 MHz public safety system, the growth in our need for spectrum has continued to increase, as can be seen in the following progression of requests from 1984 to the present:

1984 – Initial applications for twenty (20) statewide 800 MHz channels denied in the public safety pool due to spectrum shortage. Subsequent waiver granted in 1985 for 20 general category channels to be used in trunked mode. The statewide system was initially conceived to serve eight (8) statewide law enforcement agencies.

1989 – Establishment of thirty (30) statewide 800 MHz “NPSPAC” channels in the Region-9 Public Safety Plan for Florida. The addition of these channels allowed a workable initial statewide design to be developed. Phase I of the statewide system was completed in 1993.

1997 – Waiver of the general category freeze granted to allow Florida to continue construction of its statewide system which included essential use of the general category channels. Phase II of the statewide system was completed in 1998.

2001 – Waiver granted to provide Florida the use of nineteen (19) 12.5 kHz “offset” channels interleaved with its 20 general category channels. These channels were essential to enable continued construction of the expanding system, now serving seventeen (17) statewide public safety agencies.

2001 – Applications granted to provide Florida the use of several channels in the public safety pool of 90.617(a) at specific sites to alleviate spectrum shortage within the statewide system.

2002 – Applications filed for waiver to allow Florida the use of several 12.5 kHz “offsets” in the public safety pool of 90.617(a) in view of unavailability of standard 800 MHz channels in congested areas. Phase III of the system will be completed in 2002, pending approval of these waiver requests.

11. Despite all of the above actions, Florida’s statewide 800 MHz system continues to expand its user base and is in need of even more channels and more transmitter sites for which there are no suitable frequencies currently available. Repeated instances of channel shortages have forced Florida’s system engineers to rearrange channels at significant expense, and to reduce the number of available channels below that required at certain sites in order to achieve a workable, though less than optimum, system design. This situation will continue to worsen until additional spectrum becomes available that is compatible with the overall system design.

12. Florida is additionally planning a statewide mobile data network as an enhancement to its statewide digital voice radio system. The mobile data network will require additional channels beyond any that are currently available. The 700 MHz band may eventually be suitable for this purpose, but only after the new band becomes sufficiently available to enable wide-area uses.

13. Beyond Florida’s state agencies, longstanding shortages of 800 MHz public safety and NPSPAC channels continue to hamper any geographic growth or channel increases badly needed in city and county public safety radio systems throughout most of Florida. Other than 700 MHz for new systems of the future, there is no other relief in sight for these agencies.

14. The eventual availability of public safety channels in the 700 MHz band is an essential development toward providing the spectrum resources that will be needed during the next decade. However, the uncertainty of when the 700 MHz spectrum will be fully available, and when, and at what cost, the required technology will be available prevents the detailed planning and design for use of this spectrum at present. In contrast, an expanded public safety pool at 806 MHz as presented in the Nextel proposal<sup>4</sup> would provide spectrum wholly consistent with all

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<sup>4</sup> 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 Proposal*), Nov. 21, 2001.

existing 800 MHz public safety infrastructure, and which could be immediately used in the manner of existing 800 MHz channels in either new or expanded public safety systems.

15. As to the accuracy of existing 800 MHz databases, Florida's State Technology Office maintains the 821 MHz database for the Florida – Region 9 Public Safety Communications Plan and believes the database to be entirely accurate. While we can not speak for APCO, these and other license applications pass through APCO for frequency coordination. Given the recent action for other certified frequency coordinators to process 800 MHz public safety license applications, APCO and the other frequency coordinators will have to comment on the inherent accuracy of their respective databases. The Commission is urged to glean as much confidence possible from the certified frequency coordinators' comments to preclude a spectrum audit. An audit would further delay actions to mitigate the interference identified herein and place additional burden on every 800 MHz licensee.

16. (Re: ¶30) With regard to additional public safety interoperability spectrum at 800 MHz, Florida strongly urges the Commission to consider an expanded version of the interoperability plan established in the NPSPAC band. As part of any restructuring plan, Florida recommends that sufficient additional spectrum be made available to provide a minimum of twenty interoperability channels. Our experience with the five NPSPAC interoperability channels<sup>5</sup> indicates that five channels is a bare minimum in any local area, but that geographic reuse limitations demands that least four or five such sets of tactical channels be available to provide independent coverage without interference over any large area. In view of the large installed base of NPSPAC interoperability channels, and the fact that the existing equipment cannot be reprogrammed for operation on 700 MHz interoperability channels, we strongly urge the Commission to allow continued use of conventional analog 25 kHz channels by public safety for interoperability purposes at 800 MHz. We also urge the Commission to continue to require all new 800 MHz public safety mobile and portable radios to have the capability of communicating on all 800 MHz interoperability channels. The requirement for interoperability-capability, combined with conventional analog 25 KHz operation, enables very low-cost mutual aid capability to be available to all public safety agencies, even those who cannot afford to establish an 800 MHz system for their primary communications.

17. (Re: ¶32 & 38 and ¶63-66) Concerning the proposed relocation of public safety systems, Florida is pleased that Nextel is willing to commit up to \$500 million for such relocations, but is concerned that the actual cost may far exceed that commitment. Public safety agencies should not be subject to any financial burden created by the transition. We urge the Commission to undertake a study of some of the more congested states, such as Florida, to develop a realistic model of all of the costs that would actually be required, as well as the time and other resources required to execute such a plan. The expertise gained in such a model would be invaluable toward planning and executing a smooth band restructuring in other states. Under the Nextel plan, all public safety systems above 816 MHz (or 814 MHz if the guard band is used) would have to be relocated to lower channels. The largest group of users in this category is that using the NPSPAC block (which also encompasses the 5 national public safety mutual aid channels). Any relocation of NPSPAC users would disrupt operations on the mutual aid channels, and should therefore be accomplished in a minimum amount of time, requiring thorough planning in

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<sup>5</sup> The five NPSPAC interoperability channels are comprised of one Calling channel and four Tactical channels.

great detail.<sup>6</sup> If analyzed in sufficient detail, we suspect that there will be found an insufficient number of RF technicians and engineers available to accomplish the massive amount of work involved in such a short period of time. There would also be likely shortages of equipment and parts since the demand could far exceed the manufacturers' normal production rate. If all of these factors are taken into account in a fully developed model, we suspect that the time and cost of relocating public safety alone will significantly exceed the amounts projected in the NPRM. Florida urges the Commission to investigate this fully so that all affected parties are completely aware of what will be involved.

18. (Re: ¶39 & 67) While the Nextel proposal urges the Commission to waive application fees for relocated incumbents, a much more significant cost will be the associated frequency coordination fees. The coordination fees for Florida's statewide system alone, for example, would be in the order of \$150,000. We would hope that sufficient prior planning and engineering could be performed to enable reduced rates, but we doubt that the fees could be largely eliminated. These costs should not be borne by the affected public safety agencies.

19. (Re: ¶40-42) Florida agrees with Nextel's suggestion that relocation costs would be reimbursable to public safety, but that expansion and improvement costs would not. Florida maintains that all costs associated with the relocation of public safety systems be fully reimbursed, including all identifiable and justified engineering, legal, and administrative costs. In the case of Florida's statewide 800 MHz system which is under construction, we believe that all costs associated with modifying constructed stations be reimbursable, but that reimbursement for future construction be limited to only the engineering costs needed to develop a new channel plan, as well as other additional costs necessitated by the relocation. Such additional costs, for example, may be required to install an additional transmitting antenna if the new frequency plan cannot be accomplished with the existing transmitter combiners.

20. (Re: ¶43) Florida contends that any and all parties contributing to public safety interference should share in the financial obligation to remove the interference. Public safety agencies must remain free of any financial burden. This removes the ceiling imposed by Nextel's \$500 million limit, thereby creating an open-ended financial strategy.

21. (Re: ¶49) A band restructuring plan that results in public safety systems in the lower portion of 800 MHz spectrum (e.g., 806-816 MHz), would free up constraints for adjacent channel coupled power (ACCP) and out-of-band emission (OOBE) limits into the adjacent 764-776 and 794-806 MHz band. However, responsibilities chartered to the Public Safety National Coordination Committee may have to be expanded to similarly address the newly structured 800 MHz band. The ACCP and OOBE criteria would then be applicable only among public safety licensees.

22. (Re: ¶62) Provided that a newly restructured public safety 800 MHz band has sufficient spectrum to accommodate all relocated public safety systems, including establishment of interoperability channels, Florida agrees that some number of incumbent Business, Industrial/Land Transportation, and low power SMR licensees should be allowed to continue

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<sup>6</sup> Such a disruptive transition should not be undertaken during hurricane season in Florida (i.e., June through December).

operations on a secondary, non-interfering basis. Incumbents whose operation is inconsistent with an efficient spectrum plan for the new band should be required to relocate. Such determinations should be made at the time a spectrum plan is developed for each state or region, as discussed below.

23. (Re: ¶68-72) Florida is reluctant to endorse the concept of a “super coordinator” to oversee band restructuring, but agrees that such a concept has merit in view of the volume and specialized nature of the work to be done. Florida would prefer to see an arrangement between the currently certified coordinators and the NPSPAC region committees to accomplish the work on a regional basis. In view of the wide variation of characteristics and needs in different regions throughout the U.S., we believe that a regional planning effort, similar to those undertaken for the NPSPAC and 700 MHz bands, should be pre-requisite to any relocation activity.

24. Florida expects to complete the implementation of its statewide 800 MHz land mobile radio system by October 2003, which includes the replacement of 800 MHz equipment installed in the original two phases of the project. Changing equipment due to a band reallocation plan would likely impact our implementation schedule, which would then be subject to availability of replacement equipment, particularly if replacement equipment was being sought nationwide by all public safety agencies and commercial enterprises.

25. Regardless of the band reallocation plan, public safety agencies with documented interference cases should be afforded immediate relief. Public safety agencies experiencing interference suspected from CMRS sources should be afforded relief immediately upon documented determination of such. Public safety agencies with the more immediate potential to experience interference from CMRS sources should follow accordingly. Public safety agencies with a lesser potential to experience interference from CMRS sources should then be next (i.e., agencies in rural areas with practically no CMRS operations).

26. (Re: ¶75) Regardless of a recommended value referenced to the CMRS carrier, the vicinity of the CMRS in which interference is experienced would still be there, to a different degree. While the interference may be minimized, it would still be there potentially to a lesser degree. However, public safety services respond to where emergency incident occurs. The emergency incident is not partial to interference-free zones, however small the zones may be.

27. (Re: ¶76) While increasing the strength of the desired (public safety) signal may reduce interference from high powered undesired (interfering) signals in some circumstances, we doubt that improvement would be seen in cases of receiver overload as we have experienced in Florida. In one of our interference cases in Miami, FL (99<sup>th</sup> Ave & Bird Road), a test was performed using a 18 dB pad on the mobile receiver, which reduced both the desired (-80 dBm) and undesired (-20 dBm) signals by an additional 18 dB. Following insertion of the pad, the mobile receiver could successfully operate on the desired frequency. At another location, a 15 dB pad allowed the mobile receiver to operate. It is not apparent to us that an increase in the desired signal alone would mitigate the interference in the presence of such strong interfering signals.

28. Increasing the strength of the desired (public safety) signal is not a feasible option within the existing framework of public safety systems because it would cause increased interference to

other systems on the same or adjacent channels. It would require increasing the frequency reuse distances upon which public safety and other private land mobile systems are coordinated, thus worsening an already severe spectrum shortage.

29. (Re: ¶77) We encourage the Commission to thoroughly explore the possibility of setting maximum limits on the signal strength of CMRS stations at specific distances from CMRS transmitters operating in the vicinity of the 800 MHz public safety band. In our documented test cases, receiver pads indicated that reductions of 15 to 18 dB of the undesired CMRS signal would allow the public safety mobiles to operate on nearby roadways where “out of range” indications were observed without the pad.<sup>7</sup> An equivalent solution, which may be applicable in some cases, would be to limit the construction of CMRS towers to locations at least 1000 feet distant from public roads.<sup>8</sup> While this would limit the selection of available sites in some cases, the physical separation would provide a sufficient reduction in the undesired CMRS signal strength to mitigate the interference in locations routinely used by public safety mobiles.

30. Regardless of all other proposals in this NPRM, we strongly urge the Commission to explore all possible options of reducing interfering CMRS signal levels through out-of-band emission limits, reduction of signal level, increased distances from public roads, and a decrease in use of the lower CMRS “A” frequencies (or any combination), prior to any decision to proceed with band restructuring. Any feasible option short of band restructuring would be highly attractive in view of the enormous burdens that restructuring would impose.

31. (Re: ¶78) Guard bands have been established by the Commission for 700 MHz spectrum, and should be considered for 800 MHz. As the public safety spectrum becomes more and more consolidated, fewer guard bands will be required. However, 1.5 to 2 MHz may not be sufficient. As documented in the State of Florida’s case, 3 MHz would not be sufficient, and in some cases 5 MHz would not be sufficient, though any amount of guard band will offer some degree of protection.

32. (Re: Appendix 2) The paragraph on “Public Safety Radio Licenses” states, “There are currently 1320 public safety and NPSPAC licensees who would be required to relocate their station facilities, with some reimbursement, if the NAM or Nextel proposals... were adopted.” Public safety agencies cannot afford only “some reimbursement.” The Commission is urged to culminate this proceeding such that any financial impact to public safety agencies is minimized if not avoided altogether.

33. For any additional information concerning these comments, contact Mr. Kourosh Bastani, P.E., Chief of the Bureau of Radio Services of Florida’s State Technology Office at (407) 977-6592, e-mail [kourosh.bastani@myflorida.com](mailto:kourosh.bastani@myflorida.com).

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<sup>7</sup> In these cases, the CMRS transmitters utilized antennas mounted 50 feet above ground level and approximately 150 feet (horizontally) from the roadways where interference was observed. The frequency separation between the closest frequencies of each system was 142.5 kHz (868.9875 MHz desired, and 869.1300 MHz undesired)

<sup>8</sup> Based on our Miami, Florida case of interference at 150 feet separation between CMRS transmitter and public safety mobile, the horizontal distance would have to be increased to 850 feet to achieve a free-space loss increase of 15 dB to the undesired signal. An increase to 1000 feet separation would yield a loss increase of 16.5 dB, which is closer to the 18 dB observed to be required in one of our cases.

Respectfully submitted,

A handwritten signature in black ink that reads "Kourosh Bastani". The signature is written in a cursive, flowing style.

Kourosh Bastani, P.E., Chief  
Bureau Radio Services  
State Technology Office  
State of Florida

May 6, 2002

CWW&RBF:FLORIDA Comments to NPRM in WT 02-55.doc

cc: Joint Task Force Board of Directors  
Joint Task Force Agency Heads  
Mark Pallans, Region-9 Chairman