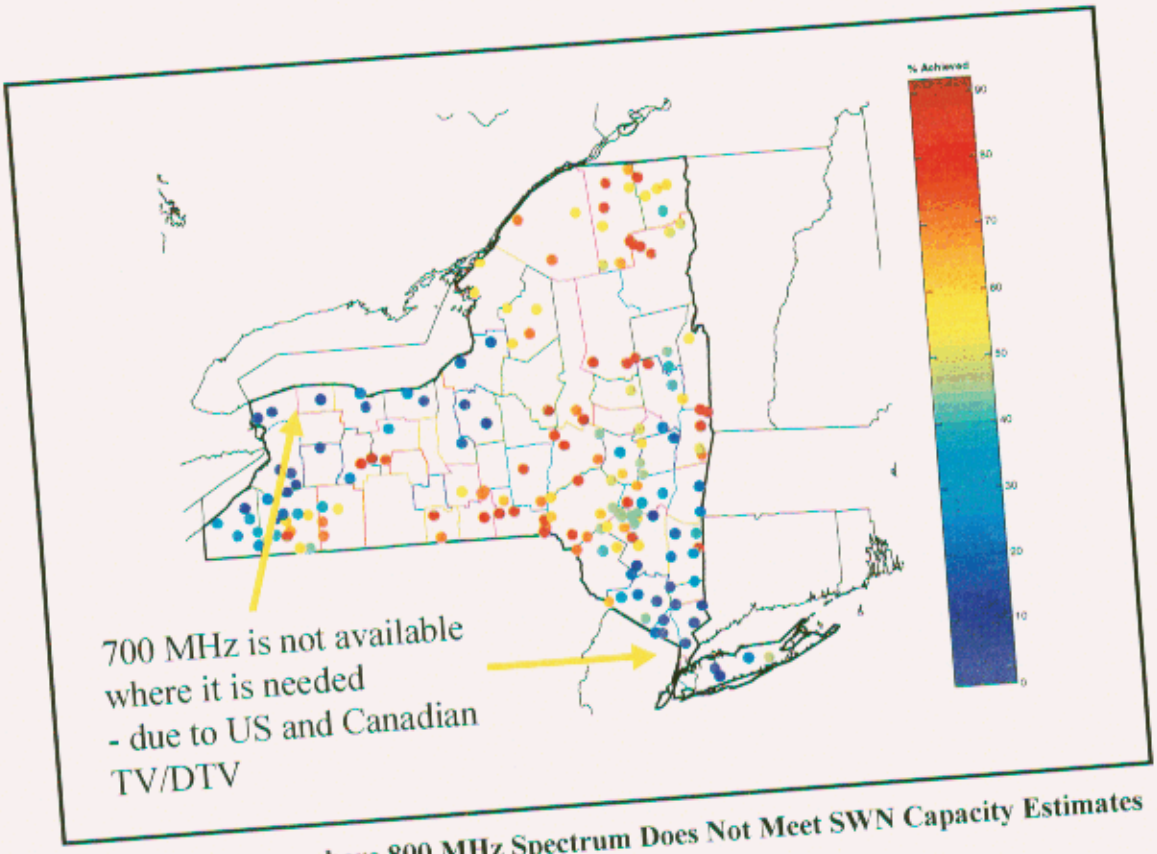

Figure 11: Areas where 800 MHz Spectrum Does Not Meet SWN Capacity Estimates

5. Licensing and Frequency Coordination for a De-Interlaced Band

The Commission is soliciting recommendations on the spectrum management issues raised by de-interlacing the services within the 800 MHz band. In this section we present our recommendations for how this could be accomplished within the framework of existing Regional Planning and Frequency coordination, but with a more modern aspect included to enhance spectral reuse on a National basis.

5.1 Super Regional Planning Committee

As indicated in Section 3, New York believes that the Nextel proposal offers the opportunity to "re-pack" and "re-pool" all NPSPAC spectral allotments, along with an additional 10 MHz of spectrum. This would optimize the spectral reuse of the entire band, free additional spectrum, and relieve some of the burdens placed upon the 800 MHz Regional Planning Committees by offering them fresh pre-allotted pools which they can use to respond to new applicants.

In essence, instead of a "Super-Coordinator" as discussed by the Commission, we propose that the first step of the spectrum relocation process ("re-pack") be performed by a "Super Regional Planning Committee" (SRPC), composed of representatives of Public Safety entities, Public Safety Coordinators, and existing NPSPAC Regional Planning Committees. Under such a plan, a single entity — using advanced spectrum management tools — would provide a new frequency assignment to each relocated NPSPAC licensee. These new assignments would minimize interference with not only existing services, but also all relocated services, and these

assignments would be generated by optimizing (jointly minimizing interference and maximizing reuse) the entire country simultaneously.

Once all of relocated licensees have a new assignment, the second step of the spectrum relocation process ("re-pool") would then be performed. In this step, the same method could be applied to identify and characterize additional pool allotments that would be distributed to the 800 MHz Regional Planning Committees, so that the spectrum could be quickly made available in response to new license requests.

The combination of the "re-pack" and "re-pool" processes would offer enhanced spectral reuse and minimal interference on a national scale, and save the Regional Planning Committees a tremendous amount of effort. It also would free additional spectrum by optimizing frequency reuse on a national basis, thus improving geographic spectral efficiency. The methodologies applied would be debated and agreed to by the Super Regional Planning Committee. This approach draws heavily on the precedent set by the advanced methodology and spirit of cooperation characterizing the joint generation by the National Public Safety Telecommunications Council (NPSTC) and the National Institute of Justice (NIJ) of pool allotments for the 700 MHz Pre-Coordination Database, and continues forward with this fair standard of spectrum management. We envision that the costs incurred by the generation of SRPC and the National "re-pack" and "re-pool" processes would be paid for as part the financial relocation compensation package offered by Nextel.

5.2 Regional Planning Committees

As discussed, the Regional Planning Committees would have two major roles in the band de-interlacing process. First they would offer representation to the Super Regional Planning

Committee so that their concerns are represented within the relocation process. Second, they would continue to act as the 800 MHz Regional Planning bodies. In this capacity, they would have a new allotments pool to draw upon to quickly and effectively assign the new public safety spectrum to applicants. Eventually, as the current 25 kHz public safety channels transition to narrowband operation, the RPCs would become the primary coordinating body for the entire 800 MHz public safety allocation. This will allow for consistency in spectrum management across the entire 800 MHz band.

5.3 Frequency Coordination

The final spectrum management process for the relocation of Public Safety licensees would be frequency coordination. We propose that this be handled similarly to the way it is currently done at NPSPAC — with the exception that, for initial relocation, the new frequency assignments would come from the Super Regional Planning Committee. These would be distributed directly to the current licensees, who would then turn to an authorized Public Safety Frequency Coordinator to complete the licensing process. We envision that the fee structure for these frequency coordination services would be similar to that for NPSPAC spectrum, and that these fees would be paid for as part the financial relocation compensation package offered by Nextel.

6. Complementary Means of Reducing Interference

6.1 Receiver Standards

The commission notes that the NCC (National Coordination Committee) has recommended ANSI Class-A receiver standards for the 700 MHz band Interoperability Channels[26]. The State of New York agrees that the adoption of ANSI Class-A receiver specifications in the 700 MHz Interoperability Channels does not place an undue burden on the community at large, and offers the highest level of performance and inference rejection.

The issue of legacy equipment complicates the adoption of Class-A receiver standards at 800 MHz, since this will necessitate the replacement of large inventories of legacy equipment, placing undue financial burdens upon the end users. For example, because most of the incumbents in the 800 MHz Public Safety lower 70 interleaved channels would not need to be relocated under the Nextel proposal, those systems should be allowed to operate "as-is"[27]. However, we also believe that restructuring of the 800 MHz band is essential, and further recognize that many public safety agencies will continue to utilize legacy equipment that will only require "re-tuning" or reprogramming for operation on their new frequency assignments. In summary, the State of New York feels that the Commission should allow for all legacy equipment to continue operating over its usable life. Note, however, that later in this response we indicate that all new licensees within the band would be required to operate at 12.5 kHz spectral efficiency with an eventual migration to 6.25 kHz equivalent spectral efficiency. This may have an effect on receiver

[26] 74, FCC 02-81.
[27] Until narrowbanded - see Section 8.1.

standards with regards to common air interface requirements if the Commission designates any digital interoperability channels.

The State of New York recommends the following course of action, which we believe would provide the most flexibility to public safety end users. During the Frequency Coordination/Regional Planning processes, tailor all spectrum management activities around the assumption of ANSI Class-A receiver performance and let all end-users individually decide what trade-offs between performance and equipment costs are acceptable. This would allow the end users to essentially purchase the level of performance that they require. If the choice is made to utilize receivers that do not meet Class-A performance standards, the users either can accept the interference that may or may not result from that decision or can update their equipment to reflect Class-A standards.

6.2 Out-of-Band Emissions Requirements for Commercial Spectrum

In order to protect Public Safety from spectral splatter and spillover, we recommend that, at a minimum, the 700 MHz Commercial out-of-band emission (OOBE) requirements be applied to the CMRS services in the new 816-824 MHz block. However, we ask that this be modified so that the OOBE requirements are measured as power coupled into a 12.5 kHz channel, such as is predominantly utilized in the 800 MHz public safety spectrum. The following are recommendations that would apply to any location with the Public Safety allocations[28]:

- CMRS Base & Fixed: 76+10log(P), into *12.5 kHz* and
- CMRS Mobile & Portable: 65+10log(P), into *12.5 kHz*.

[28] For example, under the Nextel Proposal, 806-616 MHz/851-861 MHz.

Note that, if it was the Commission's intention at 700 MHz to allow each interferer to be allowed to rise (in-band) to the level of the public safety thermal noise floor, then the degradation from multiple sources can dramatically decrease public safety sensitivity levels and, therefore, coverage. This is why we ask that this 1) be a minimum requirement and 2) apply to the 12.5 kHz channel case, essentially making the requirement more stringent by 3 dB. Further supporting information is provided in Appendix K.

6.3 Frequency Coordination

There may be additional ways of mitigating interference that could be dealt with at the Frequency Coordination level. Specifically, the Commission has requested comment on whether intermodulation effects should be taken into account during frequency coordination, and whether an increase in the service contour levels would help Public Safety reduce interference levels.

We believe that considering intermodulation during frequency coordination would decrease the number of new cases of interference occurring between public safety systems. However, the actual degree that this would reduce interference is difficult to ascertain. One thing that is clear is that intermodulation considerations are likely to reduce the available frequency pool at any given location, and therefore would result in a net loss of usable spectrum. For this reason, we do not believe that intermodulation should be a factor during frequency coordination. Furthermore, we believe that many cases of intermodulation could be either avoided or reduced by the proper design and selection of transmitter and receiver equipment.

It has been noted recently that there is rising support in the public safety community for raising the maximum power at the Public Safety service contour by 10-12 dB (or more). As discussed in Sections 2 and 3, Public Safety's operational requirements for high reliability and for

portable and in-building coverage are leading to a point where higher power signal levels are required throughout Public Safety's service areas. This also directly leads to interference-limited system designs. New York agrees that these operational requirements are real and that raising the edge of service area power levels is one solution to this problem. However, interference-limited Public Safety designs may interfere with the typical (and existing) noise-limited system designs whenever the service areas and infrastructures of these systems overlap each other. This will either result in 1) public safety interfering with public safety in a manner for which this NPRM and its band de-interlacing strategies are attempting to provide a solution or 2) forcing much of public safety eventually into interference-limited system designs. The second point is of some concern, since these designs often result in increased siting and system costs, which are heavy burdens for Public Safety to carry. We believe that, while a higher-level service contour value has some merit, we would like to see an approach that allows for both noise- and interference-limited systems to coexist without interference. This will allow individual public safety agencies to have some financial and budgetary flexibility when deploying their systems. This is especially true for statewide systems, which most often design for noise- and/or terrain-limited mobile coverage[29].

[29] Implementing a Statewide Public Safety system with portable and in-building coverage can be practically impossible in terms of financial, environmental, and budgetary constraints. Therefore, these systems most often are designed to provide mobile coverage only. Mixing these system with cellular-type interference-limited Public Safety systems (such as local or municipal) without regards to the possible effects would create tremendous coverage problems for the statewide systems. Furthermore these coverage issues would likely arise in populated areas, where serious incidents are more likely to occur.

7. RE-BANDING ISSUES

Within this section we respond to issues related to re-banding the 800 MHz band to mitigate against the interference issues and to provide additional spectrum for Public Safety.

7.1 Relocation Cost to Public Safety

As indicated in Section 3.2, the issues that New York recognizes as the most contentious in the Nextel proposal are centered on the cost reimbursement for both public safety and CMRS incumbents. We believe that it is critical that the Commission quickly initiates a cost-benefit study to address the financial reimbursement issues. Furthermore, although Nextel's offer of $500 million is generous, it is not guaranteed to fully reimburse public safety for the costs of relocation, which would include the costs of re-tuning, reprogramming and replacing radio and antennas system equipment. These costs would include those related to generation the proposed SRPC (and to perform the national "re-pack" and "re-pool" tasks), as well as all fees associated with frequency coordination services incurred during the relocation of the NPSPAC band licenses. In short, we recommend that Nextel be fully prepared to fund the total relocation of public safety. If additional funds are required, the source of such funds must be guaranteed prior to plan acceptance.

7.2 Requirement for a Guard Band

With regards to Nextel's proposal, the Commission has requested comment on the requirements for a guard band between the transmitter portions of the new public safety and CMRS spectral blocks, with the understanding that this 800 MHz guard band would come from the public safety allocation of the spectrum.

New York does not believe that Public Safety should have to give up spectrum in order to avoid interference from Commercial providers transmitting wideband signals with far-reaching interference. Therefore, we believe that the idea of a large guard band coming out of the public safety spectrum is inappropriate and instead look toward a solution that makes the CMRS, particularly ESMR, providers responsible for their own spectral purity. One such solution would be to place strict OOBE requirements on these services and to require that these requirements hold in any location within the Public Safety spectrum.

7.3 Schedule, Roadmap and Disruption of Services During Transition

New York has stated that the Commission should take this opportunity to re-band the 800 MHz spectrum in order to mitigate interference and free additional Public Safety spectrum. We realize, however, that this will undoubtedly lead to disruption of some services. In response to the Commission's request for comment on the schedule, roadmap and disruption of services during the transition period, New York reserves response until it submits its reply comments. This is due to the fact that no realizable proposal has yet been introduced[30].

[30] Again, the Nextel proposal has significant merit, but needs to be modified in the Canadian border regions in order to make it tractable.

8. RULES FOR THE NEW ALLOCATION

New spectrum brings new rules and regulations and the opportunity to reform and update previous rulings. In this section, New York welcomes the opportunity to present its views on how the additional spectrum freed during the re-banding process could be regulated.

8.1 Narrowband Migration

If the NPSPAC spectrum were to be consolidated with the "old-block" Public Safety spectrum, we would have the opportunity to consider the eventual narrowbanding of all Public Safety 800 MHz spectrum to 6.25 kHz equivalent spectral efficiency. New York suggests that, to immediately free additional public safety channels in this band, all new licensees would receive 12.5 kHz channel assignments based upon a band plan similar to the 700 MHz public safety band[31]. Furthermore, as the 800 MHz public safety band eventually reaches channel saturation, operations could be transitioned to 6.25 kHz effective spectral efficiency. At this point, the only operations that would be authorized to operate in the wider (12.5-25 kHz) bandwidths would be those that maintain at least a 6.25 kHz effective spectral efficiency. This would eventually offer up to a four-fold increase in available public safety channels at 800 MHz.

8.2 Interoperability Channels

One critical aspect of the relocation of the NPSPAC band is that the mutual-aid (interoperability) channels would need to be moved. This would need to be coordinated on an international basis. The total number of Public Safety interoperability channels within a re-banded 800 MHz would depend upon the amount of additional spectrum that is made available to

public safety. At a minimum, the five existing international mutual-aid channels would need to be re-designated within the new allocation and remain at a bandwidth of 25 kHz for analog operations. While the Commission may also wish to designate new interoperability channels in this band, it should consider that 1) the 700 MHz band already promises 1.6 MHz of similar spectrum and 2) the 2.5 MHz of interoperability spectrum requested by PSWAC was for operation *below* 512 MHz. If the Commission still wishes to create new interoperability channels in this band, then these should be designated as 12.5 kHz channels and dedicated to digital mode operation. Furthermore, new 12.5 kHz digital interoperability channels will necessitate that two distinct common air interfaces will need to be defined within the band.

8.3 Interoperability Channel Common Air Interface (CAI)

In a re-banded 800 MHz band, existing equipment would be capable of supporting operation on the interoperability channels relocated from the NPSPAC allocation[32]. The common air interface for this mode will remain 25 kHz analog FM to accommodate the embedded base of 25 kHz analog systems.

If the Commission designates new digital interoperability channels as described in Section 8.2, all new type-accepted equipment for operation in this band must be capable of operation anywhere within the designated interoperability channel sets (analog and digital), and should do so utilizing the appropriate common air interface. Because of the precedent set in 700

[31] That is, channelized using a 6.25 kHz basic channel width, which can be aggregated to 12.5 and 25 kHz.
[32] Relocated from the former NPSPAC allocation.

MHz[33], the ANSI-002 digital standard should serve as the CAI standard for operation on the digital interoperability channels.

[33] 47 CFR §90.547 and §90.548

9. CONCLUSION

In conclusion, reorganizing and consolidating the 800 MHz band is required to mitigate against a number of issues that exist both nationally and within New York State. Further, public safety has an immediate need for additional spectrum within which it can operate. This is particularly true in New York State, and especially along the Canadian border and in the metropolitan New York City area.

In this response, the State of New York has addressed the issue of 800 MHz interference and its causes, and concurs that this interference must be resolved. We have commented on the ability of de-interlacing strategies to effectively mitigate against the interference problems, and have provided detailed analyses and specifically addressed the NAM and Nextel proposals. New York supports the essence of the Nextel proposal, outside of the international border regions, but has identified critical shortcomings within the Nextel plan in the Canadian border regions. Therefore, we conclude that an alternative proposal must be developed to effectively deal with Public Safety requirements and the international sharing agreements in these border areas. New York has also demonstrated that public safety has critical near- and long-term spectrum needs that remain to be addressed. If the entire 800 MHz band in to be de-interlaced, New York has discussed means of handling the spectrum management, relocation and re-coordination of the band. We have also recommended complementary means to reduce interference. We note that an eventual narrowband migration of all 800 MHz Public Safety channels will free additional spectrum and request that any band reorganization reflect, at a minimum, 12.5 kHz spectral efficiency for new operations — with an eventual migration to 6.25 kHz spectral efficiency. We

believe that, in the event of a band reorganization, there is a critical need for new 25 kHz analog interoperability channels to replace the NPSPAC International Mutual Aid channels. We provide comment on a possible set of new narrowband (digital) interoperability channels. Finally, in the event of band reorganization, New York asks for a requirement that all new type-accepted public safety equipment within the band be able to operate on the analog interoperability channels utilizing an analog FM common air interface, and, if digital interoperability channels are adopted, on digital channels using a digital common air interface consistent with 700 MHz operations.

In closing, we applaud the Commission for its diligence in acting to mitigate against the interference within this band, and its willingness to further consider freeing additional Public Safety spectrum in the process. Again, the State of New York urges the Commission to use this proceeding as a vehicle to provide near-term spectral relief to public safety — relief that is desperately needed to protect our citizens, implement a new Statewide Wireless Network, and provide homeland defense and security in an age where the security and safety of our people can no longer be taken for granted.

A. 800 MHz Public Safety Spectrum in the Canadian Border Regions

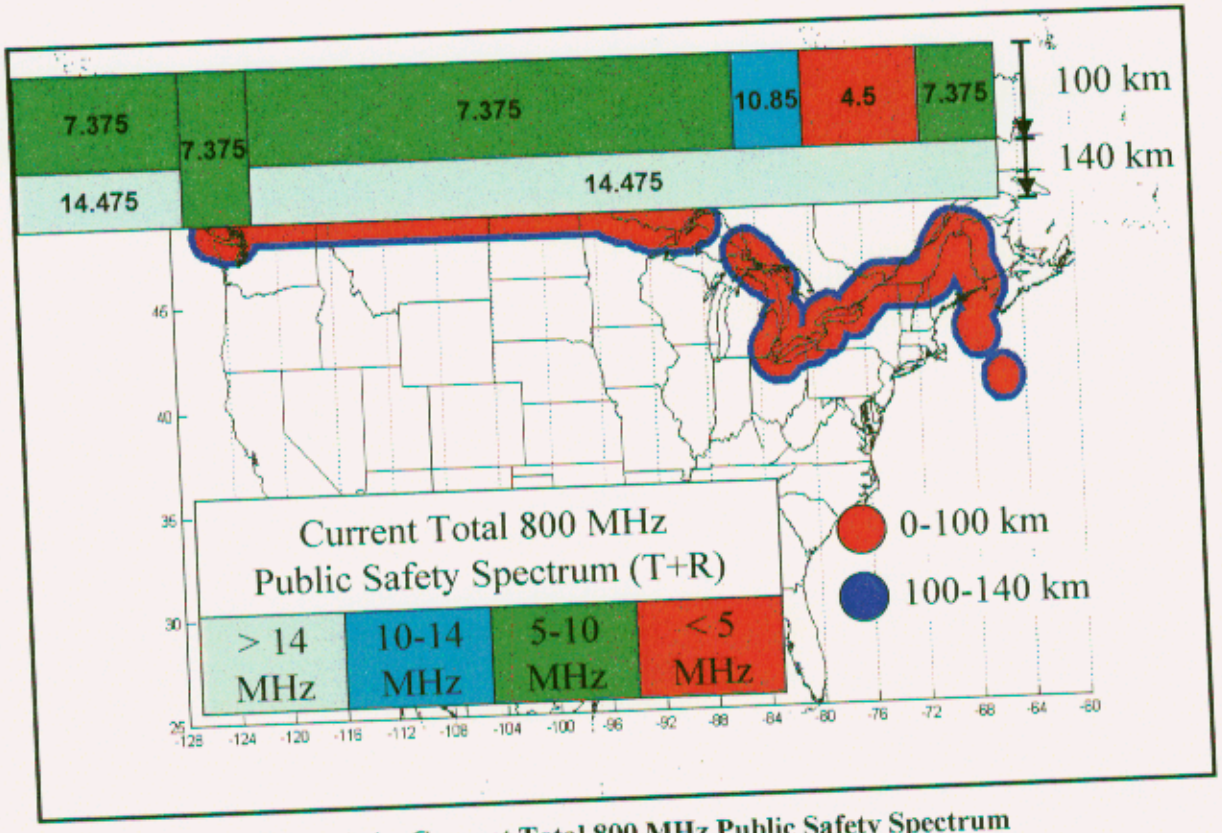

Figure A-1: Current Total 800 MHz Public Safety Spectrum

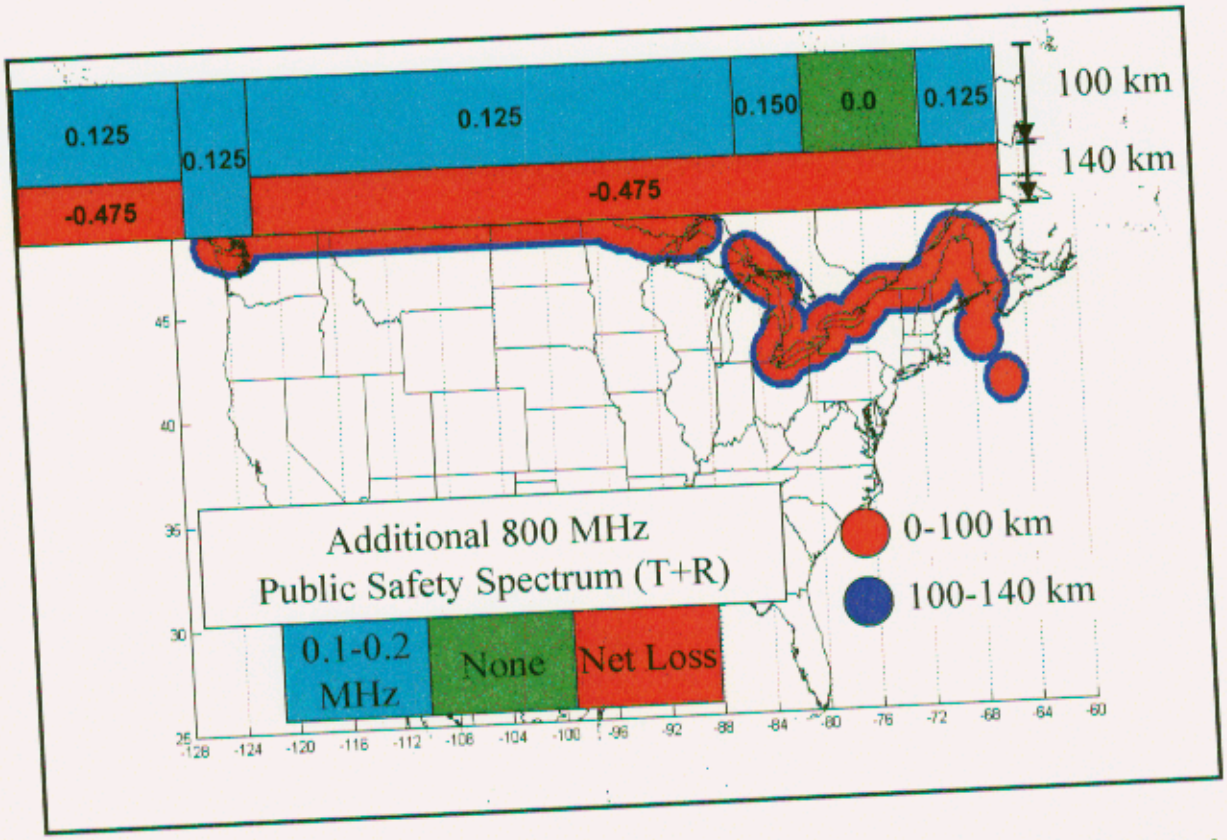

Figure A-2: Additional 800 MHz Public Safety Spectrum Freed by Modified Nextel Proposal

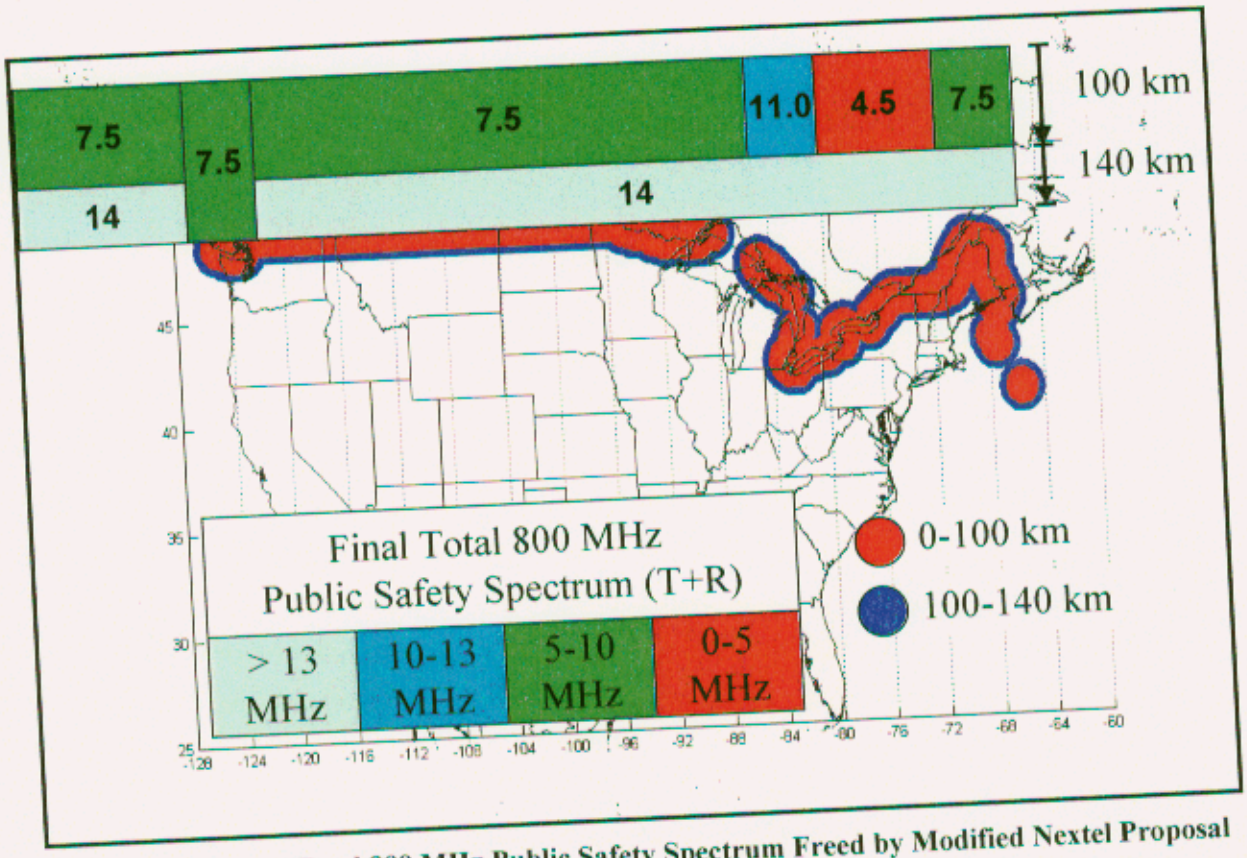

Figure A-3: Final Total 800 MHz Public Safety Spectrum Freed by Modified Nextel Proposal

B. 800 and 900 MHz Band Plans - Canadian Border Regions I, IV, V, and VI

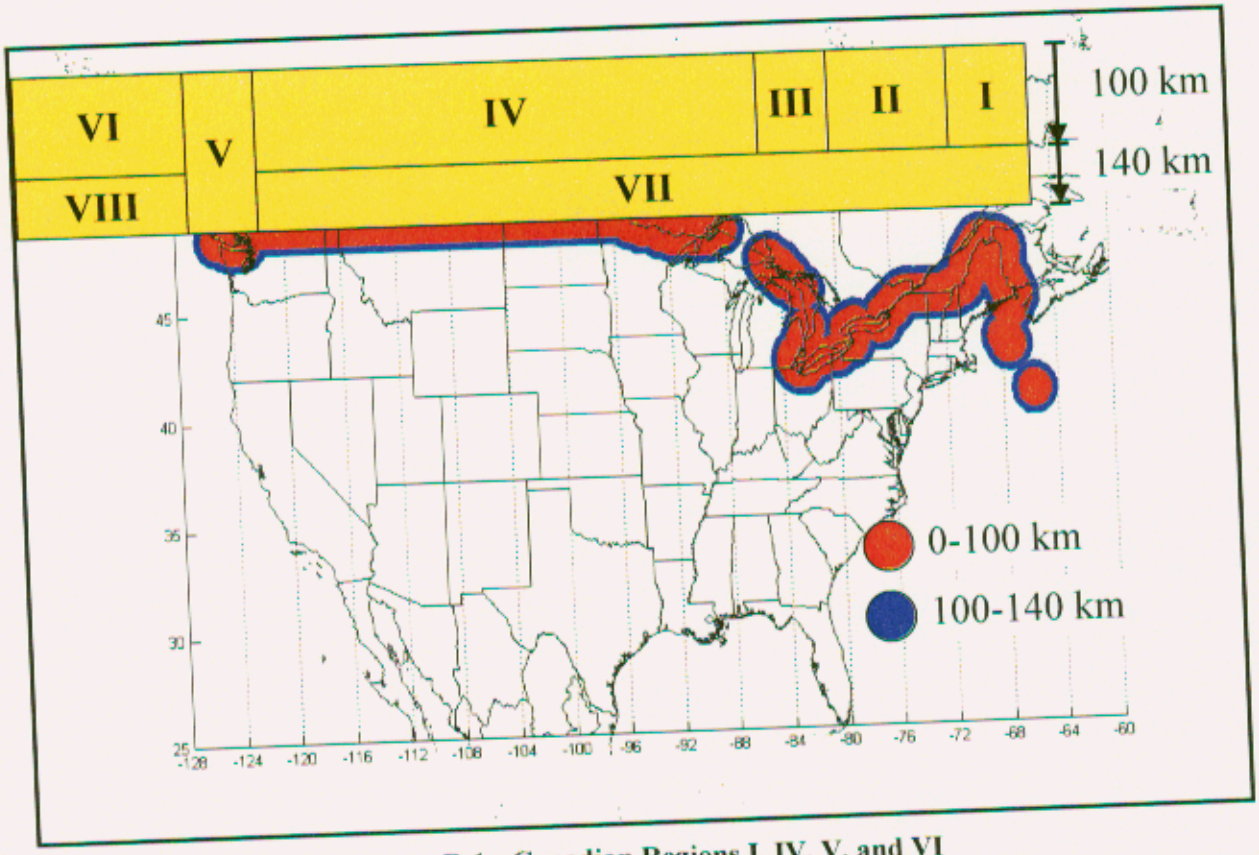

Figure B-1: Canadian Regions I, IV, V, and VI

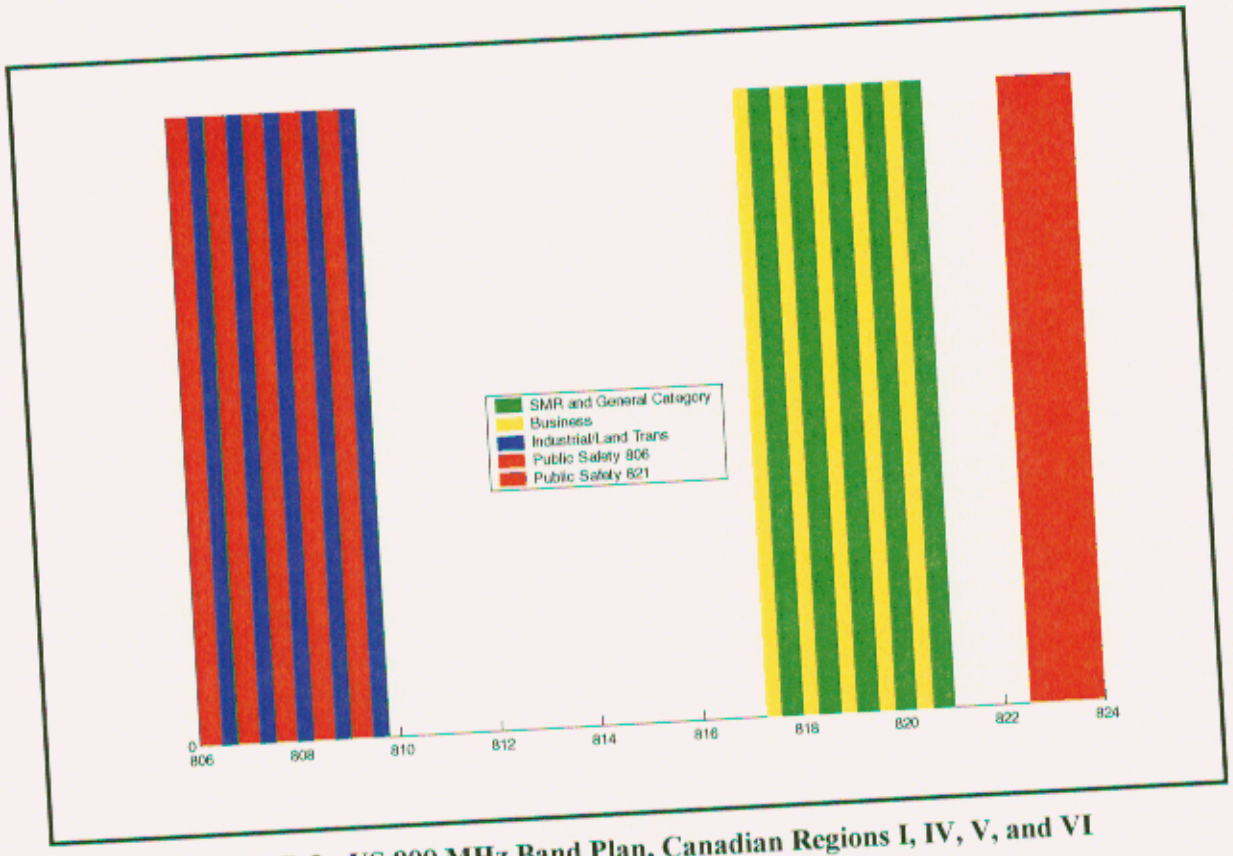

Figure B-2: US 800 MHz Band Plan, Canadian Regions I, IV, V, and VI

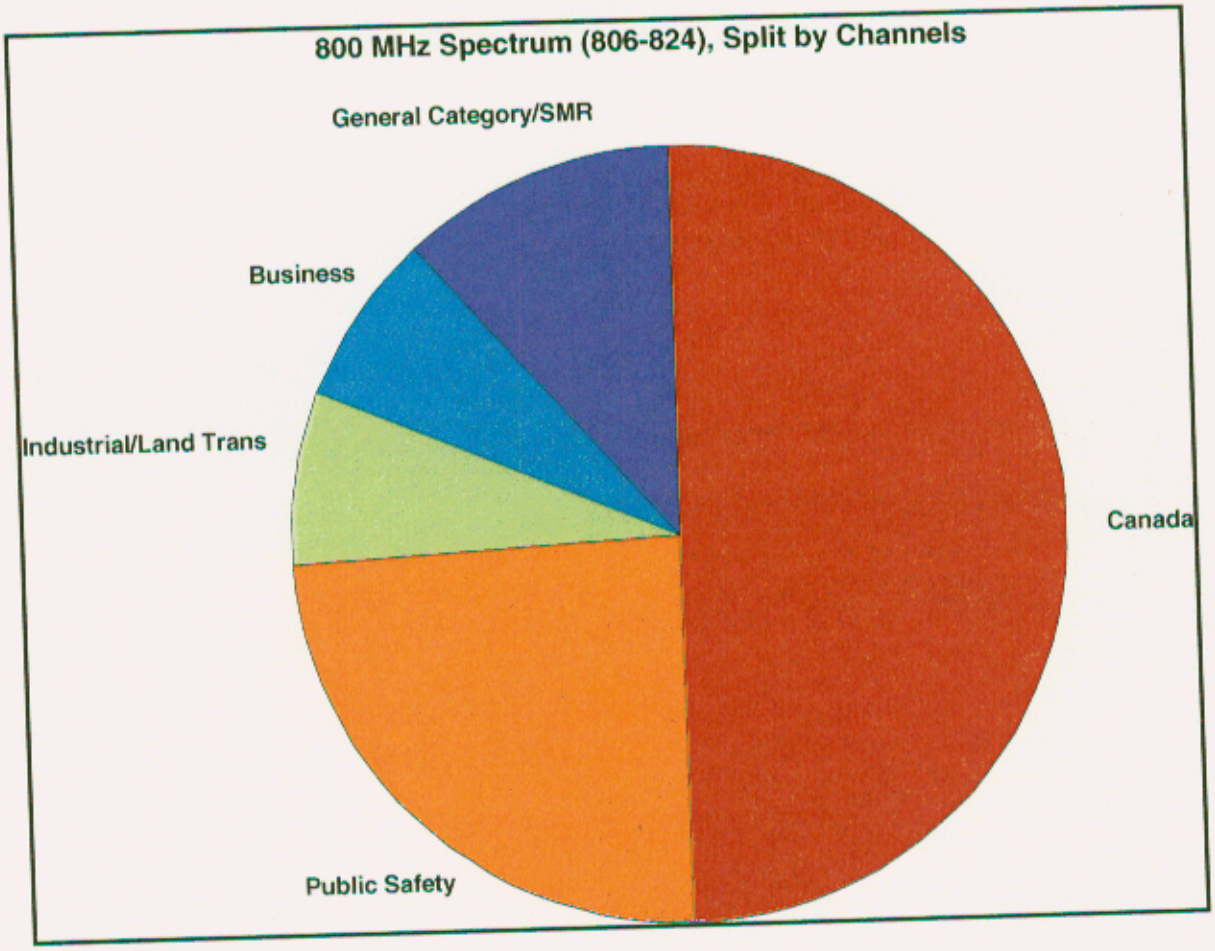

Figure B-3: US 800 MHz Band Plan, Canadian Regions I, IV, V, and VI, Split by Channels

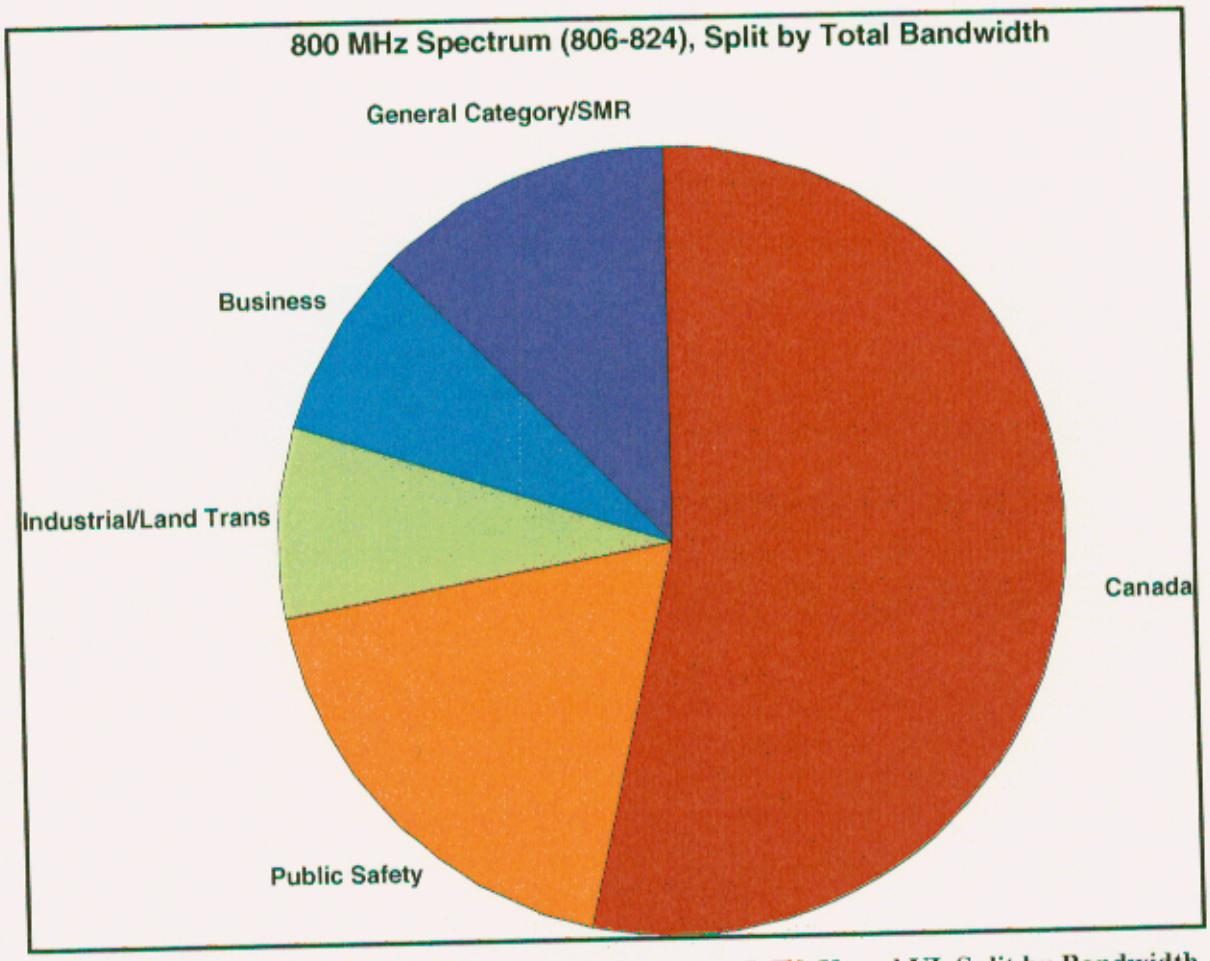

Figure B-4: US 800 MHz Band Plan, Canadian Regions I, IV, V, and VI, Split by Bandwidth

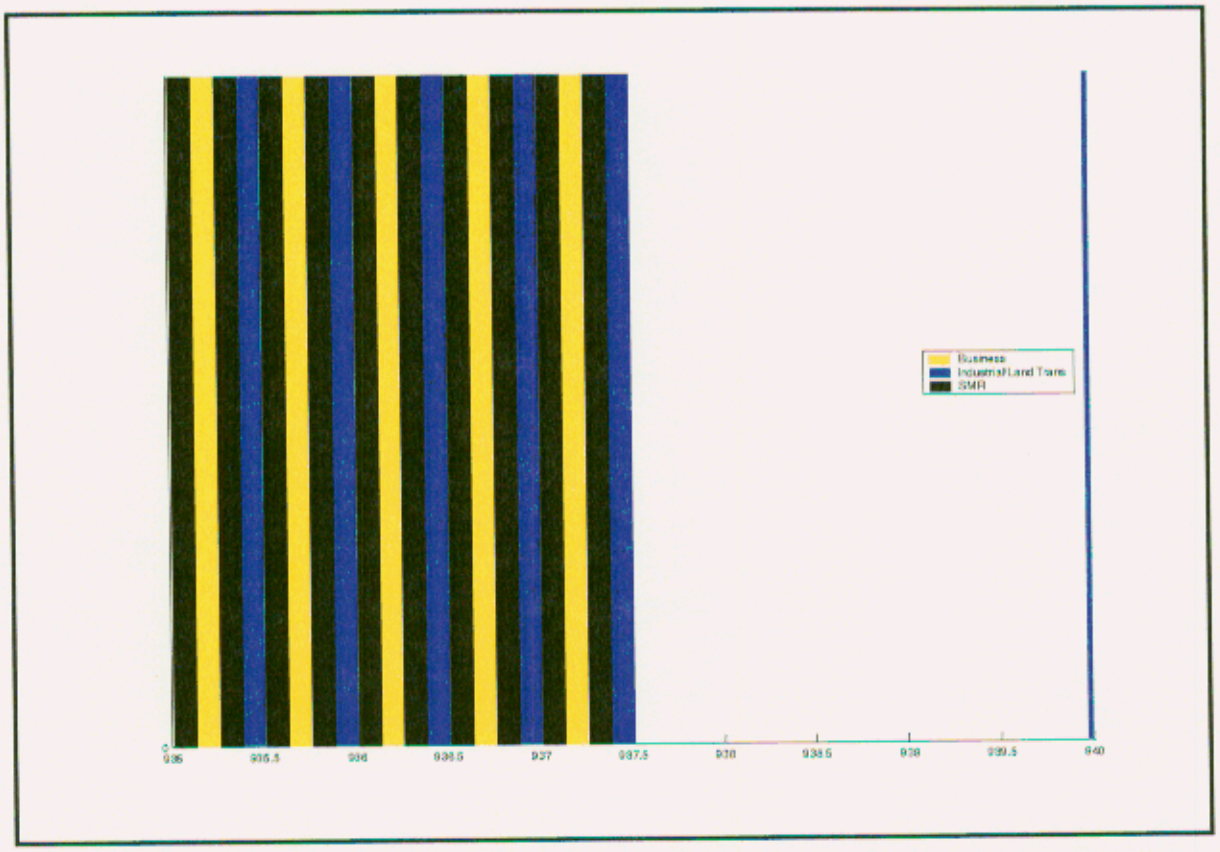

Figure B-5: US 900 MHz Band Plan, Canadian Regions I, IV, V, and VI

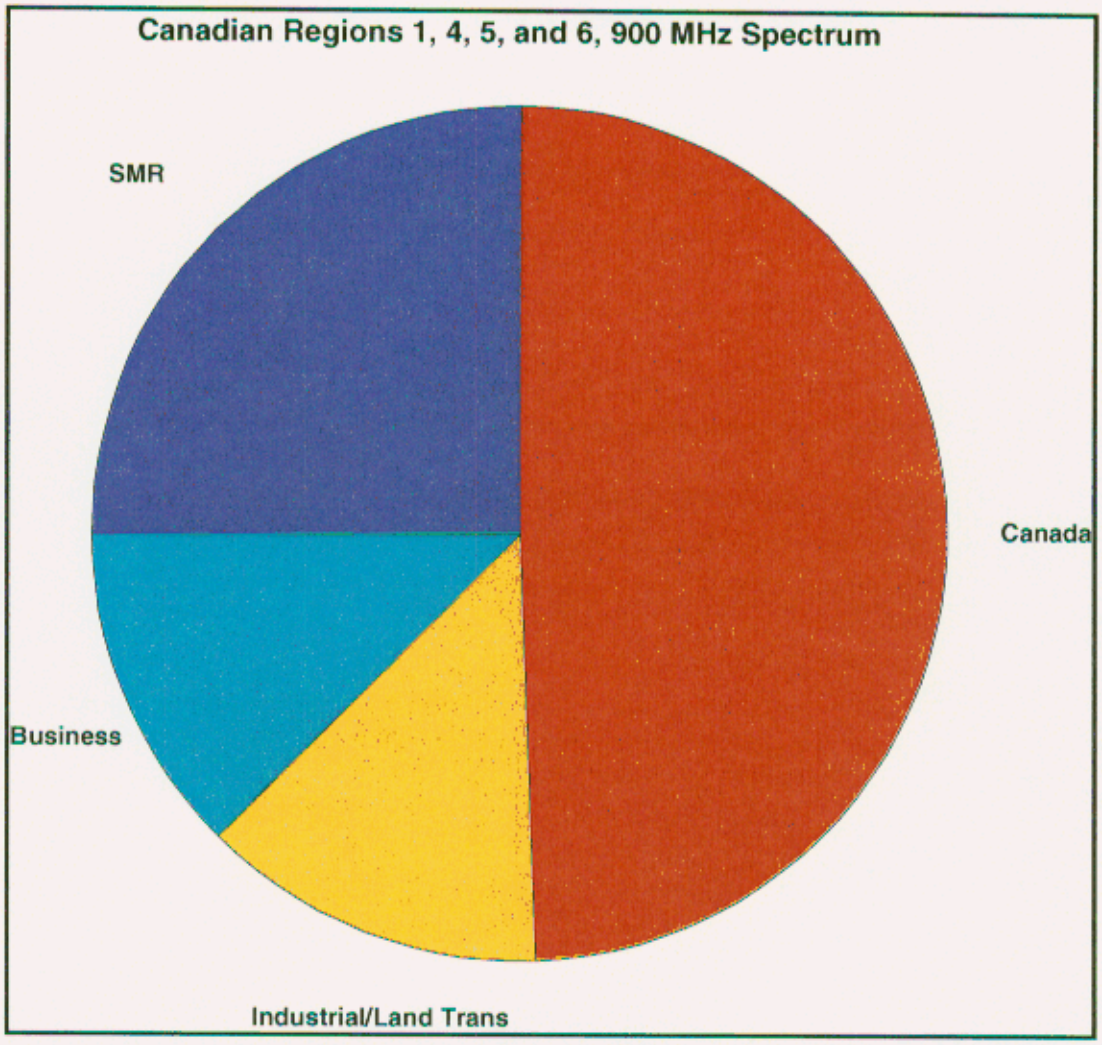

Figure B-6: US 900 MHz Band Plan, Canadian Regions I, IV, V, and VI, Split by Bandwidth