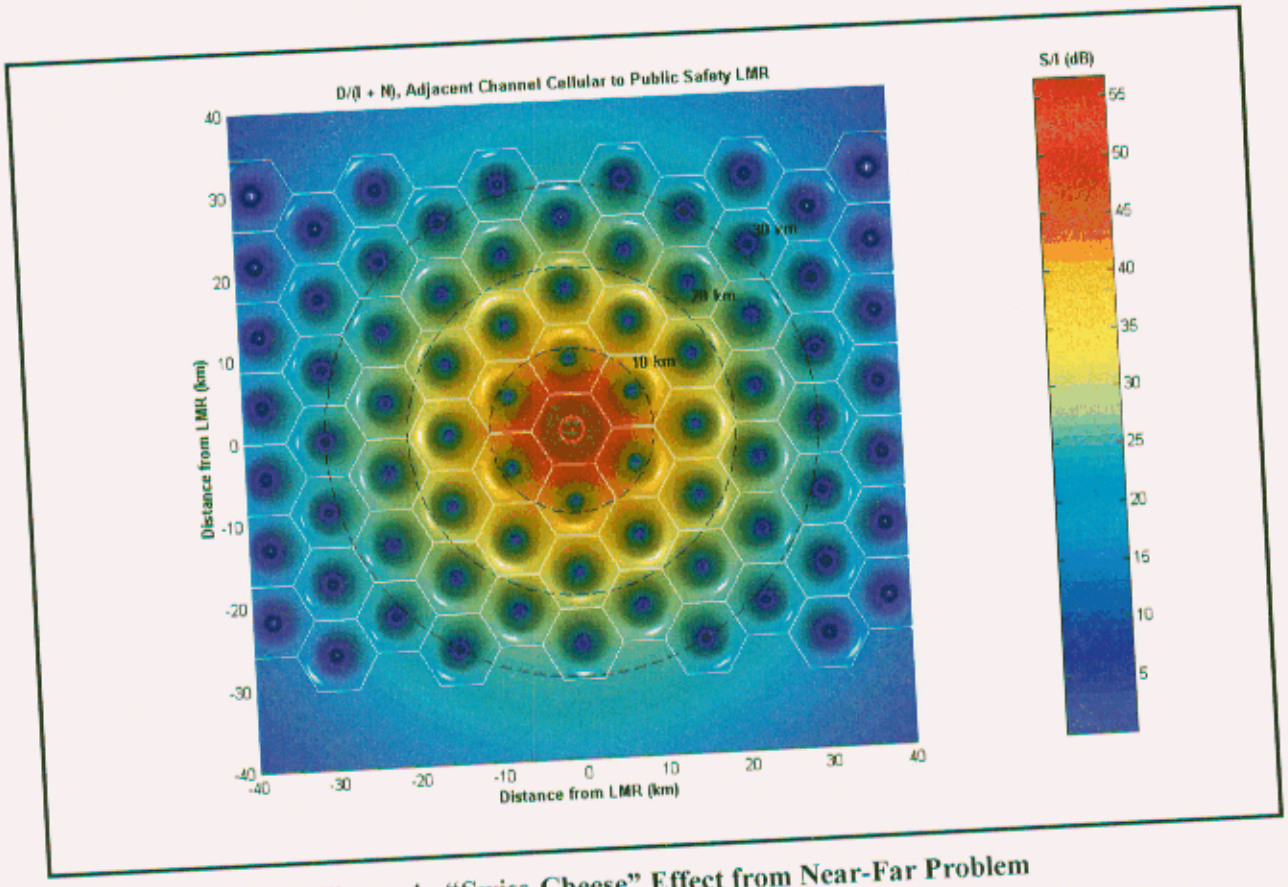

Figure 4: "Swiss-Cheese" Effect from Near-Far Problem

3. De-interlacing Strategies to Remedy 800 MHz Interference

In general, we do not think that de-interlacing strategies alone are likely to fix all of the interference issues, especially intermodulation, and will read with great interest any comments filed to the contrary. However, we do believe that placing technologies with similar operational requirements in contiguous spectral blocks is the best solution available to the Commission. As the Commission notes, the *Best Practices Guide* does indicate that public safety systems tend to be noise-limited in their design, whereas CMRS systems clearly tend toward interference-limited designs.

Care must be taken, however, because interference-limited Public Safety designs may interfere with other noise-limited Public Safety system designs whenever the service areas and infrastructures of these systems overlap each other. The current trend in Public Safety is to consolidate resources, and create shared multi-agency infrastructures. This not only will minimize the interference potential, but also will maximize operational interoperability.

3.1 The NAM (National Association of Manufacturers) Proposal

The NAM proposal outlined within the NPRM certainly has some desirable attributes. It addresses the interference problem by properly de-interlacing the spectrum. Furthermore, it minimizes the amount of relocation that needs to be performed, especially since it will not be necessary for any Pool to relocate outside 800 MHz. Because of this, it is likely that simple

equipment re-tuning will be all that is necessary to accommodate the transition, resulting in lower transition costs.

However, interference is not the only issue at hand, and the NAM proposal clearly does not provide public safety with any significant amount of new spectrum. Furthermore, it is not clear whether this proposal can provide an equitable split in the Canadian and Mexican border regions. In addition the State of New York has limited short- and long-term access to 700 MHz resources, and thus needs additional 800 MHz spectrum. Because of all these factors, we cannot offer support for this proposal going forward.

3.2 The Nextel Proposal

The Nextel proposal contains the greatest merit in our estimation. While this proposal does not specifically address international border issues, it does provide significant additional public safety spectrum, outside of the international border areas. This spectrum would provide immediate relief to New York State in the Greater Metropolitan New York City areas. However, we cannot fully endorse this proposal, and instead reserve final judgment until the time we can issue reply comments, so we can examine alternative proposals in the US/Canadian border regions.

3.2.1 Desirable Attributes

The Nextel proposal has a number of extremely desirable characteristics. The proposal solves many of the interference problems, but we believe that other complementary measures are required (see Section 6). The proposal also offers Public Safety a significant amount of spectral relief, which is immediately required in the major metropolitan and border areas. Furthermore, the cost-reimbursement plan for public safety is attractive, decreasing the cost burdens imposed

by relocation. The proposal yields a contiguous block of public safety spectrum that could immediately be divided into narrowband 12.5 kHz channels, and eventually to 6.25 kHz spectral efficiency, yielding additional public safety channels. The proposal also would allow the opportunity to "re-pack" and "re-pool" all NPSPAC allotments, along with an additional 10 MHz of spectrum. This would optimize the spectral reuse of the entire band, and relieve some of the burdens placed upon the 800 MHz Regional Planning Committees (RPCs) by offering them fresh pre-allotted pools with which they could quickly respond to new applicants. However, the Nextel proposal does not deal specifically with Mexican and Canadian border issues. These issues are critical, since whatever solution the FCC eventually decides upon must be applicable consistently anywhere in the nation — not just outside of the Mexican and Canadian border areas.

3.2.2 The Nextel Proposal in the Canadian Border Regions - Description

In the US-Canadian border Regions, a variant of the Nextel plan would need to be introduced[8]. This is because the Commission, through international-border-sharing agreements, has implemented four distinct spectrum plans in the US-Canadian border areas, and these each depend on geography and population demographics. These US-Canadian border regions are defined for the 800 MHz band as shown in Table 2 and further illustrated[9] in Figure 5.[10]

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[8] Unfortunately, the 30-day response time to this NPRM did not allow for a comprehensive analysis of the impacts of the Nextel proposal within the Mexican border areas. Since the 800 MHz sharing agreements in these areas also diverge from the band plan outside of the border areas, similar issues would be expected.

[9] For all figures and illustrations within this response, we adapted a Roman numeral convention to identify these regions.

[10] Ref. §90.619

Table 2: US-Canadian Border Region Definitions

Region	Location (longitude)	# of Current US Channels Allocated
I	66° W - 71° W (0-100 km from border)	300
II	71° W - 81° W (0-100 km from border)	180
III	81° W - 85° W (0-100 km from border)	420
IV	85° W - 121° - 30' W (0-100 km from border)	300
V	121° - 30' W - 127° W (0-140 km from border)	300
VI	127° W - 143° W (0-100 km from border)	300
VII	66° W - 121° - 30' W (100-140 km from border)	600
VIII	127° W - 143° W (100-140 km from border)	600

In essence, this variant could employ the same principles as Nextel's plan, but would achieve somewhat different results. If implemented as outlined here, no new US-Canadian sharing agreements would need to be developed, since neither the spectrum layout nor the split between the countries would change. The primary features of the modified plan would be:

- Divide the 800 MHz Spectrum into two main blocks: Public Safety and SMR/ESMRs.

- Allocate all 806-816/851-861 MHz spectrum available for US usage in any given border region to public safety. This will give public safety a total of 7.5 MHz of spectrum in Regions I, IV, V, and VI; 4.5 MHz in Region II, 11 MHz in Region III, and 14 MHz in Regions VII and VIII. This concept is consistent with Nextel's plan outside of the border Regions.

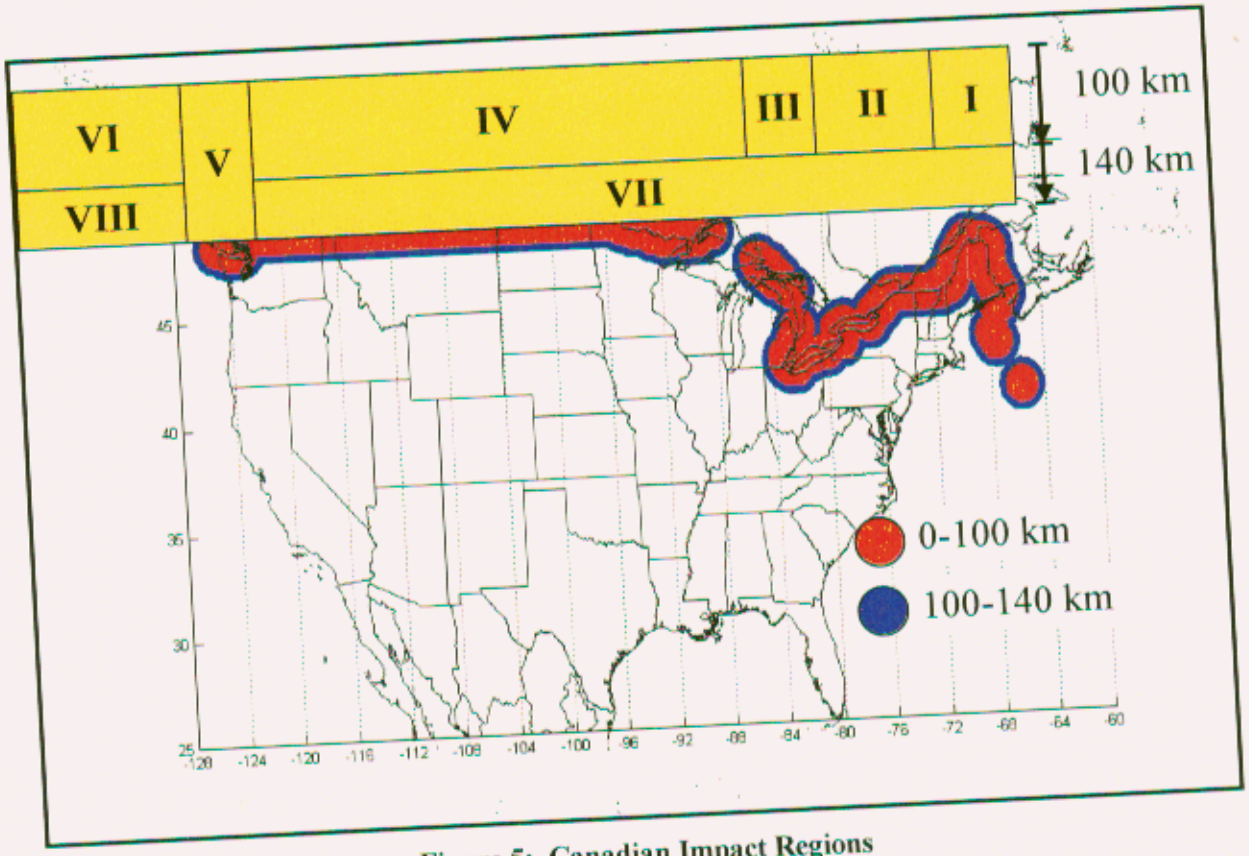

Figure 5: Canadian Impact Regions

- Allocate all 816-824/861-869 MHz spectrum available for US usage in any given border region to ESMRs. This is also consistent with Nextel's plan outside of the border Regions.

- Move all displaced Business, Industrial and Land Transportation (B, I/LT) services into either Nextel's 900 MHz or the 700 MHz spectrum, again following the current 900 MHz border-sharing agreements with Canada. This will require rule changes by the commission to allow for noise-limited high-power wide-area operations within the 700 MHz Guard Bands.[11]

[11] Noise-limited high-power wide-area operations within the guard bands may be affected by Canadian digital television interference for some time. Therefore, indoor, industrial service, and

- In certain border areas, particularly Region VII, Nextel has not offered enough 700 and 900 MHz spectrum to accommodate the B, I/LT and other displaced services. The additional spectrum to meet this need could come out of the public safety allocations within the affected regions. In Region VII, public safety has more spectrum available than the other Canadian regions. One possible approach to resolve this shortfall is that a portion of this spectrum might be offered to accommodate the new band plan, as long as the relocated services operate in narrowband mode on 12.5 kHz channel centers.[12]

3.2.3 The Nextel Proposal in the Canadian Border Regions - Analysis

The analysis for the approach described is as follows. Within the eight Regions, 800 MHz availability is summarized in Table 3, and the 900 MHz availability is summarized in Table 4. These tables describe the US spectrum in each Canadian Region, and its distribution among the services for each Region. Note that the examination of 900 MHz spectrum is necessary to determine how much of the spectrum for B, I/LT relocation needs to come from the 700 MHz guard bands. Additional material is provided in Appendices A, B, C, D, and E. This material details the band structure within each region and further provides the spectral breakdown by service and international split.

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campus-type operations, which will be robust to television interference, should be the first services migrated to the 700 MHz Guard Band spectrum. This leaves more 900 MHz spectrum available for wide-area high-power services, and optimizes the use of the available spectral resources in both bands.

[12] In the other Canadian regions, public safety not only has relatively little spectrum, but also its 700 MHz spectrum is blocked for an indefinite period of time in many areas (due to Canadian DTV allotments). Since public safety has scarce resources in these areas, every effort to utilize the 900 MHz and 700 MHz Guard bands must be made.

Table 3: Canadian Impact Regions, 800 MHz Border Agreements - US Spectrum

	Canadian Region				
	Outside	I,IV,V,VI	II	III	VII,VIII
	Channels				
SMR	280	95	60	135	190
General Cat.	150	*see(1)*	*see(1)*	*see(1)*	*see(1)*
Business	50	60	35	85	120
IL/T	50	60	35	85	120
Public Safety (806)	70	85	50	115	170
Public Safety (821)	230	116	71	195	230
US Channels	830	416	251	615	830
	% Channels				
SMR	34%	11%	7%	16%	23%
General Cat.	18%	*see(1)*	*see(1)*	*see(1)*	*see(1)*
Business	6%	7%	4%	10%	14%
IL/T	6%	7%	4%	10%	14%
Public Safety (806)	8%	10%	6%	14%	20%
Public Safety (821)	28%	14%	9%	23%	28%
US Channels	100%	50%	30%	74%	100%
	% Bandwidth				
SMR	39%	13%	8%	19%	26%
General Cat.	21%	*see(1)*	*see(1)*	*see(1)*	*see(1)*
Business	7%	8%	5%	12%	17%
IL/T	7%	8%	5%	12%	17%
Public Safety (806)	10%	12%	7%	16%	24%
Public Safety (821)	17%	9%	6%	14%	17%
US Channels	100%	50%	31%	73%	100%

(1) - General Category Combined with SMR

Table 4: US CMRS Canadian Impacts at 900 MHz by Region

	Canadian Region				
	Outside	I,IV,V,VI	II	III	VII,VIII
	Channels				
SMR	200	100	60	170	200
Business	100	50	30	90	100
IL/T	99	52	30	80	99
US Channels	399	202	120	340	399
	% Channels				
SMR	50%	25%	15%	43%	50%
Business	25%	13%	8%	23%	25%
IL/T	25%	13%	8%	20%	25%
US	100%	51%	30%	85%	100%

Upon examination of this material, we come to the conclusions reached in Table 5. In summary, this table illustrates the net movement of 800 and 900 MHz spectrum based upon the Nextel proposal as implemented in each of the Canadian border regions. As mentioned previously, while public safety yields a net increase in 800 MHz spectrum of 10 MHz outside of the border regions, inside of the border regions, the additional spectrum ranges from a gain of 150 kHz to a loss of 475 kHz. Obviously, the amount of new spectrum to be obtained is insignificant with regards to the needs of public safety, especially given that 700 MHz may be blocked in some of these areas for more than a decade (due to the current Canadian Digital Television Transition Allotment Plan and the International Letter of Understanding with the FCC).[13]

Also important is the amount of spectrum that will need to come from the 700 MHz guard band to relocate the Business and Industrial Land Transportation services. This amount ranges from 2 MHz (paired) to 7 MHz (paired). Unfortunately, Nextel only has 4 MHz of guard band spectrum, so clearly there are conflicts with relocation of these services, particularly in Canadian Regions VII and VIII. While it is possible that Public Safety may be able to offset these losses, it is important to note that Public Safety would already experience a net loss of 500 kHz (paired) in these same regions.

[13] We elaborate on this later in this Section, as well as in Section 4.1, and in Appendices F and G.

Table 5: The Nextel Proposal in the Canadian Impact Regions - 800 and 900 MHz

Canadian Region

	800 MHz Channels					900 MHz Channels				
	Outside	I,IV,V,VI	II	III	VII,VIII	Outside	I,IV,V,VI	II	III	VII,VIII
SMR/Gen Cat	430	95	60	135	190	200	100	60	170	200
Business	50	60	35	85	120	100	50	30	90	100
IL/T	50	60	35	85	120	99	52	30	80	99
Public Safety 806	70	85	50	115	170					
Public Safety 821	230	116	71	195	230					
US Channels	**830**	**416**	**251**	**615**	**830**	**399**	**202**	**120**	**340**	**399**
Nextel Plan Channel Deficit						-100	20	10	0	40
Additional Public Safety Channels (25.0 kHz)						100	120	70	170	240
Additional Public Safety Channels (12.5 kHz)						200	240	140	340	480

	800 MHz Bandwidth (MHz)					900 MHz Bandwidth (MHz)				
	Outside	I,IV,V,VI	II	III	VII,VIII	Outside	I,IV,V,VI	II	III	VII,VIII
SMR/Gen Cat	21.5000	4.7500	3.0000	6.7500	9.5000	5.0000	2.5000	1.5000	4.2500	5.0000
Business	2.5000	3.0000	1.7500	4.2500	6.0000	2.5000	1.2500	0.7500	2.2500	2.5000
IL/T	2.5000	3.0000	1.7500	4.2500	6.0000	2.4750	1.3000	0.7500	2.0000	2.4750
Public Safety 806	3.5000	4.2500	2.5000	5.7500	8.5000					
Public Safety 821	5.9750	3.1250	2.0000	5.1000	5.9750					
US Channels	**35.9750**	**18.1250**	**11.0000**	**26.1000**	**35.9750**	**9.9750**	**5.0500**	**3.0000**	**8.5000**	**9.9750**

Two-Sided Bandwidth	Spectrum Summary	Overall Gains/Losses (MHz)				
	Nextel Plan B-I/LT Bandwidth Deficit (MHz)	0.0000	3.5000	2.0000	4.2500	7.0000
	Additional PS Bandwidth From SMR/GC (MHz)	11.5000	0.2500	0.2500	0.7500	5.5000
	Additional PS Bandwidth From B-I/LT(MHz)	5.0000	3.0000	1.7500	4.5000	0.0000
	Relocation of NPSPAC (MHz)	-5.9750	-3.1250	-2.0000	-5.1000	-5.9750
	Existing PS Bandwidth (MHz)	9.4750	7.3750	4.5000	10.8500	14.4750
	Overall Public Safety Gains/Losses (MHz)	10.5250	0.1250	0.0000	0.1500	-0.4750
	Total Public Safety Bandwidth (MHz)	20.0000	7.5000	4.5000	11.0000	14.0000

To further complicate matters, the 700 MHz Guard band spectrum is also encumbered in the Canadian border areas, due to Canadian Digital Television allotments, and a US/Canadian Letter of Understanding[14] that designates US 700 MHz Public Safely and Commercial services as secondary[15] to Canadian broadcast television services. The locations of the high-power, primary-class US and Canadian broadcast services that affect the usage of the 700 MHz guard bands are shown in Figure 6 (also see Appendix F). Figure 7 overlays these broadcast locations with the amount of spectrum from the guard bands that is required within each Canadian Region in order to relocate the displaced 800 MHz services. Clearly the potential for additional conflicts exists within this plan. It is for these reasons that we recommend that displaced licenses operating in Industrial, Campus, or Indoor locations be moved primarily to the 700 MHz guard bands, since they would be the least affected by interference from these broadcast services (as well as the least likely to cause interference to these same services).

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[14] LETTER OF UNDERSTANDING BETWEEN THE FEDERAL COMMUNICATIONS COMMISSION OF THE UNITED STATES OF AMERICA AND INDUSTRY CANADA RELATED TO THE USE OF THE 54-72 MHz, 76-88 MHz, 174-216 MHz AND 470-806 MHz BANDS FOR THE DIGITAL TELEVISION BROADCASTING SERVICE ALONG THE COMMON BORDER, September 22, 2000.

[15] "Until a separate agreement is reached on non-broadcast uses, such new services shall not claim protection from DTV stations or analog TV stations established in accordance with the existing Agreement." (Ref. Footnote 14)

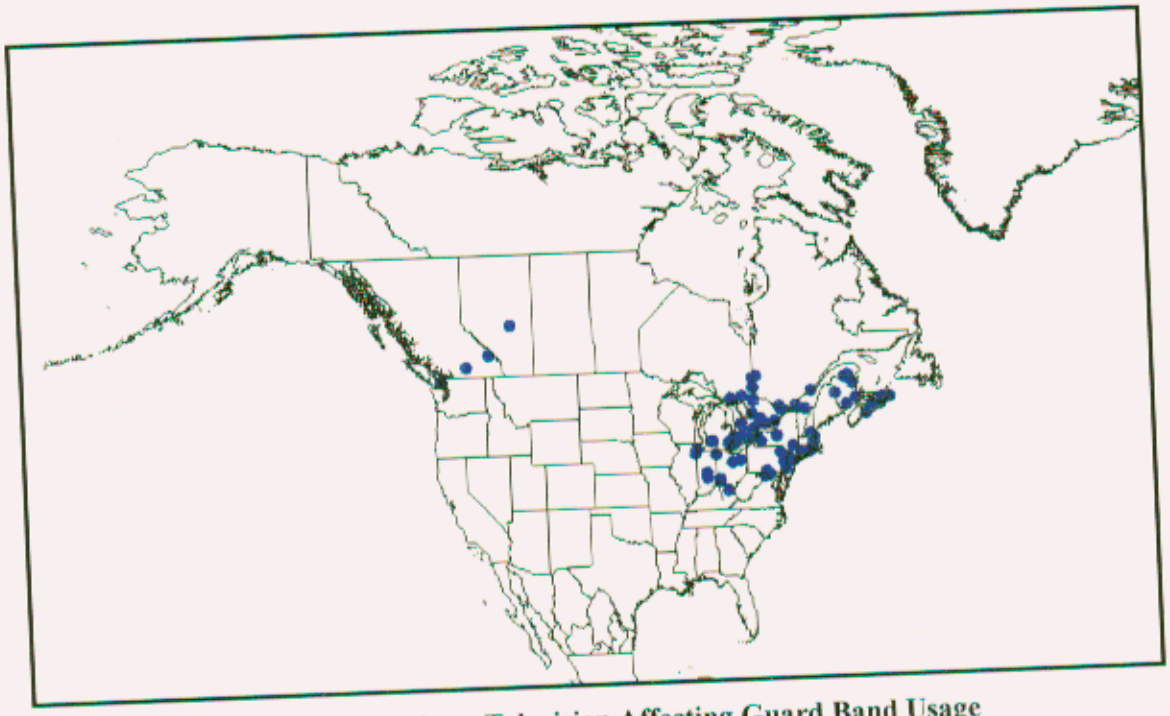

Figure 6: Broadcast Television Affecting Guard Band Usage

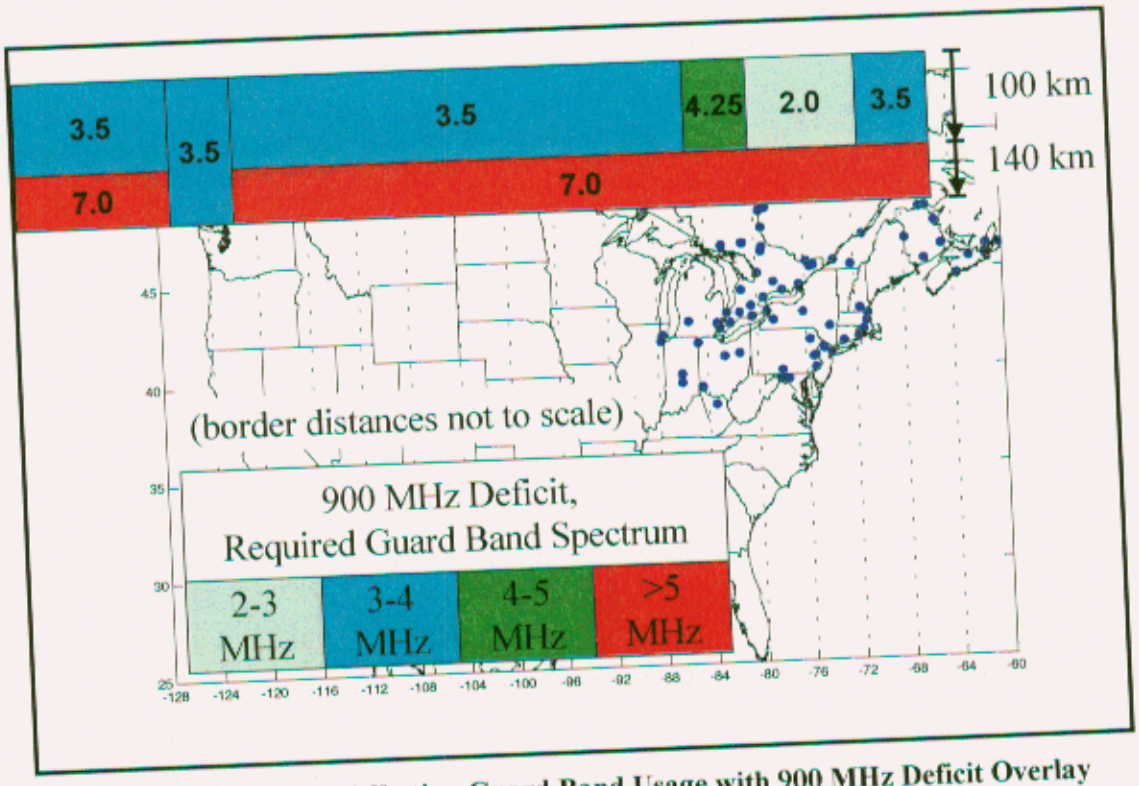

Figure 7: Television Affecting Guard Band Usage with 900 MHz Deficit Overlay

The availability of relocation spectrum is not the only issue with the Nextel proposal in the Canadian border Regions. As previously mentioned, Public Safety receives no significant additional spectral relief in these areas, and, in some regions, even experiences a net loss of spectrum. This is clearly illustrated in Figure 8, with additional material provided in Appendix A. It is important to realize that these Canadian border areas have some of the most critical needs for spectral relief, and that, in most of these areas, 700 MHz spectrum will not be available to provide this relief.

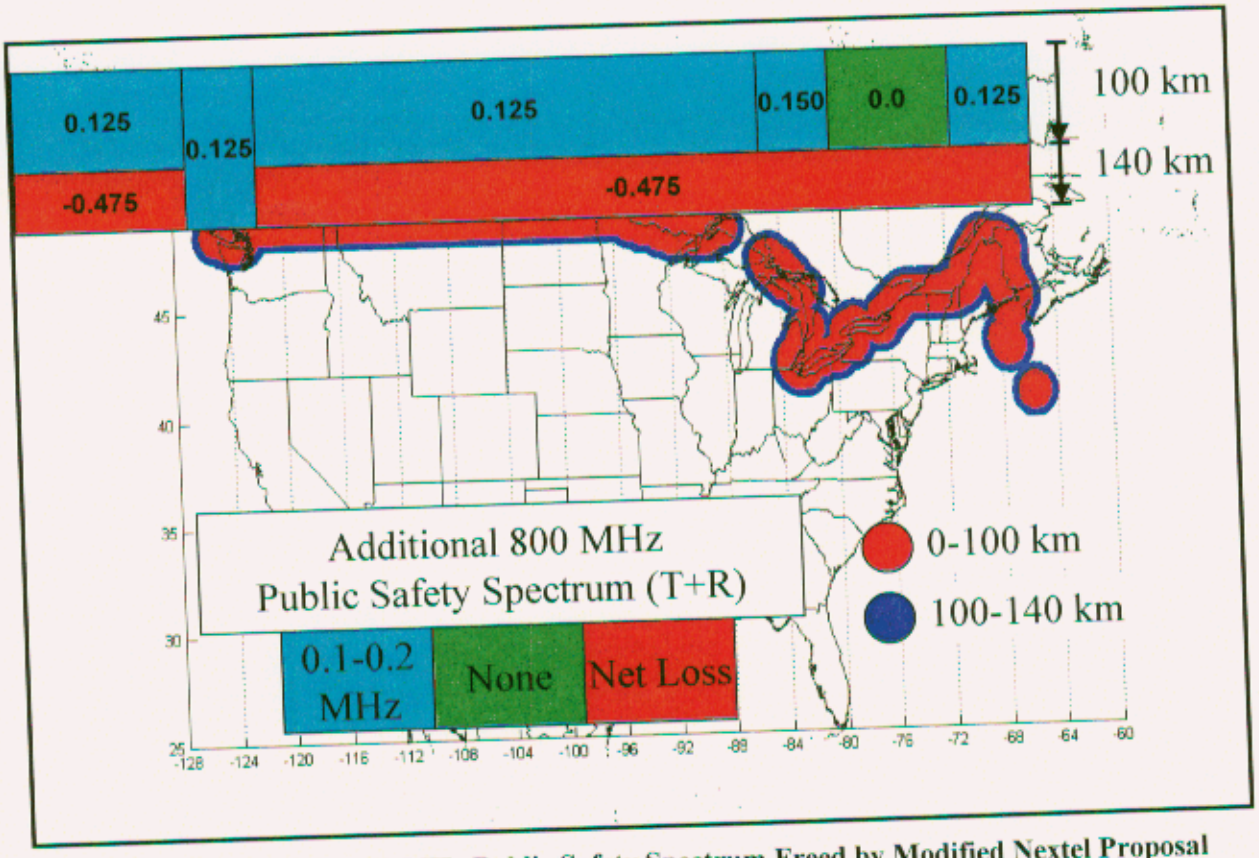

Figure 8: Additional 800 MHz Public Safety Spectrum Freed by Modified Nextel Proposal

3.2.4 Cost Reimbursements

An issue that New York recognizes as contentious within the Nextel proposal is 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 relocation cost reimbursement issues. Furthermore, Nextel's proposal of $500 million does not guarantee to fully reimburse public safety for the costs of relocation. If additional funds are required, the source of such funds must be guaranteed prior to plan acceptance. Therefore, we recommend that, if a variant or modification of the Nextel proposal is to be accepted, Nextel should be prepared to fully fund the relocation of public safety.

3.2.5 Summary

In summary, New York embraces certain portions of the Nextel proposal. The proposal represents an excellent first step toward alleviating interference within the 800 MHz band. Furthermore, outside of the Canadian border Regions, the Nextel proposal would provide some critical spectral relief — especially in the New York City area, which has had no spectrum in any band available for new licensing for many years. Spectral relief in this area is especially important: with no date set to mandate an end to analog television operations, the 700 MHz band can not be counted upon to provide relief in the near term, even perhaps out past 2010.

Because the Nextel proposal, as stated in the NPRM, does not adequately address Canadian border issues, New York can only give qualified support of the proposal. The State of New York therefore reserves complete judgment on the Nextel proposal until the time is appropriate for NYS Reply Comments, when additional analyses will document whether the Nextel plan

could be adequately and reasonably modified to provide much needed spectral relief to Public Safety in the Canadian border areas.

Furthermore, we recommend that, if a variant or modification of the Nextel proposal is to be accepted, Nextel should be prepared to fully fund the relocation of public safety. If additional funds are required, the source of such funds must be guaranteed prior to plan acceptance.

4. Spectrum Needs of Public Safety

The Commission has asked that public safety update and reiterate its needs for additional spectrum, especially in the light of the 700 MHz[16] and 4.9 GHz[17] public safety allocations, and the narrowband initiatives that have been implemented since the Public Safety Wireless Advisory Committee (PSWAC)[18] presented its findings to the Commission. Ironically, five years to the day that this landmark report on interoperability and public safety needs was completed, the World Trade Center and Pentagon were attacked by terrorists, resulting in the largest public safety interoperability and terrorism responses ever to occur within the US.

Within this section, New York will detail how the Commission's spectral relief initiatives have unfortunately failed to provide spectral relief where it has been needed most, resulting in a tremendous gap between public safety's needs and the available public service spectrum. In summary, New York believes that the Commission should welcome and support the opportunity to clear additional spectrum for public safety at 800 MHz and to use this proceeding as a catalyst to achieve this goal.

4.1 Lack of Canadian 700 MHz Harmonization

For several years now, New York has worked to facilitate 700 MHz harmonization between the US and Canada. Currently, Canada has placed Digital Television allotments in close

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[16] WT-Docket 96-86, Development of Operational, Technical, and Spectrum Requirements for Meeting State, Local and Federal Public Safety Communications Requirements through the Year 2010.

[17] WT-Docket 00-32, The 4.9 GHz Band transferred from Federal Government Use.

[18] Final Report of the Public Safety Wireless Advisory Committee, September 1, 1996.

proximity to the US and within the US Public Safety and Commercial 700 MHz allocations.[19] The magnitude of this problem is clearly illustrated in Figure 9, in which 100- and 200-km contours are referenced around the digital and currently operational primary class[20] analog television stations. These allotments have taken away much of the use of 700 MHz along the border with Canada from Eastern Michigan to Maine. The Commission has yet to negotiate a change to the Canadian Allotment Plan, and therefore 700 MHz harmonization and availability appears to be more than a decade away. For additional material, reference Appendices F, G, and H, which extensively cover the locations and interference aspects of these television services.

Despite the loss of the 700 MHz spectrum, international interoperability and border security are more important than ever, especially due to the role that they play in an a strong homeland defense network. Yet the State of New York has little spectral resources at 800 MHz to devote to these operations. It is clear that the FCC has left the State of New York with few tangible options for spectral relief in the border regions. We strongly believe that this proceeding should be utilized as an opportunity to free additional spectrum in the border areas to offset the loss of 700 MHz.

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[19] It will likely only occur after the full Digital television transition in Canada, a transition that is yet to be defined.

[20] Class A, B, C, D, N. R. S, VL, or VU.

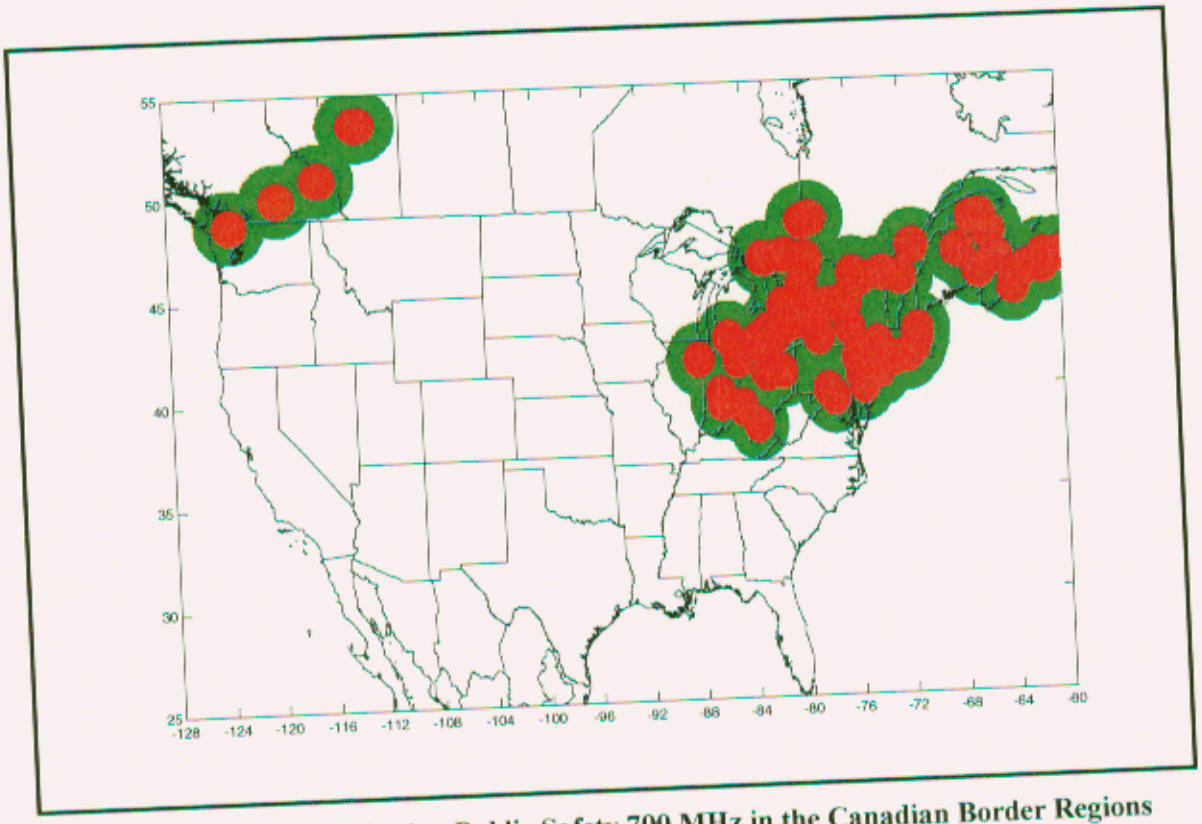

Figure 9: TV/DTV Affecting Public Safety 700 MHz in the Canadian Border Regions

4.2 Metropolitan Congestion, and US 700 MHz Blocking

The near- to mid-term availability of 700 MHz public safety spectrum is not any better in the lower half of New York State, particularly in the Metropolitan New York City area. Here, broadcast television permeates the 700 MHz public safety channels, very effectively blocking the availability of 700 MHz. This area is easily one of the most spectrally congested in the nation. However, with no date certain for DTV transition, there is also no date certain for public safety spectrum availability. Figure 10 illustrates the degree that current analog television 700 MHz is blocking 700 MHz in the vicinity of New York State. For additional material, reference Appendices F, G, and H, which extensively cover the interference aspects of these television services.

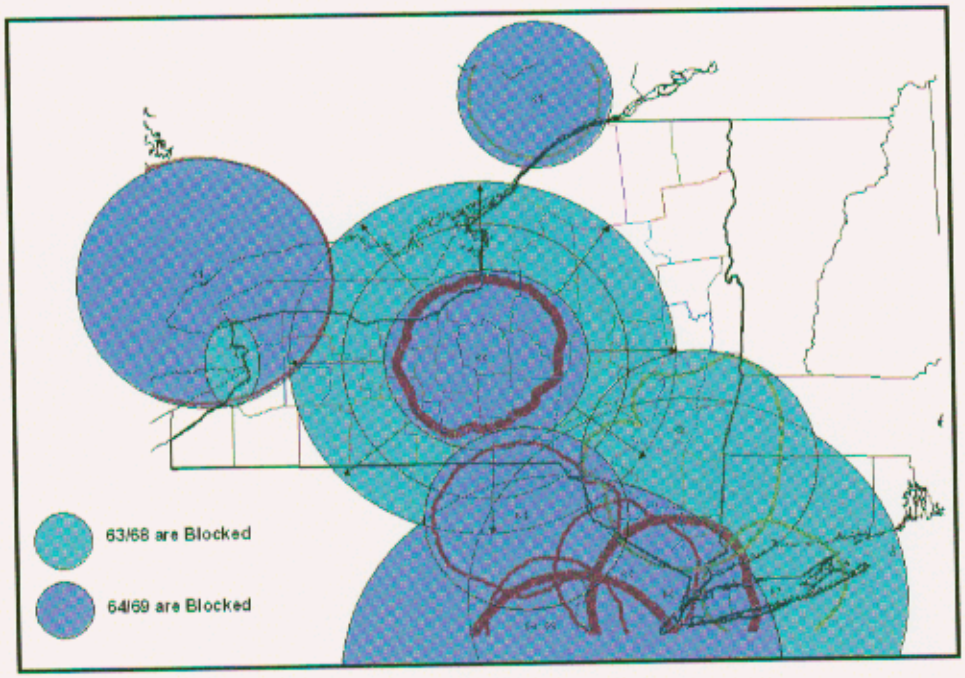

Figure 10: Currently Blocked 700 Hz Public Safety Spectrum - New York State

4.3 Public Safety's Needs in a Post-September 11th Era

On September 11, 1996, the Public Safety Wireless Advisory Committee (PSWAC) reported Public Safety's spectrum needs through the year 2010. The PSWAC Final Report in the Executive Summary, at page 3, stated:

- *More spectrum is required.*
- *Immediately, 2.5 MHz of spectrum should be identified for interoperability from new or existing allocations. In the short term (within 5 years), approximately 25 MHz of Public Safety allocations are needed. The present shortages can be addressed by making part of the spectrum presently used for television broadcast channels 60-69 available as soon as possible.*
- *Over the next 15 years, as much as an additional 70 MHz of spectrum will be required to satisfy the mobile communication needs of the Public Safety community.*

This projection was based on forward-looking estimates of spectrum efficiency. As reported in PSWAC's Spectrum Subcommittee Final Report starting at Appendix D - SRSC Final Report, Page 30 (636) {emphasis added}:

> ***7.2 Technology Subcommittee Input.*** *The Technology Subcommittee provided the expected state-of-the-art for the average installed system in 2010 as part of the basis for generating spectrum estimates. The Technology Subcommittee has stressed these technology estimates are quite aggressive —* ***thus any spectrum estimate based upon them will be correspondingly conservative.***
>
> ***7.2.1 An Example.*** *The technology forecast provided estimates that the public safety voice radio system in use in the year 2010 would require* ***an average of*** *4 kHz of spectrum per active conversation*[2]*. Realistically, this high level of efficiency could only be achieved by universal replacement of existing equipment and the widespread deployment of public safety systems more spectrum efficient than any on the market today.*
>
> [2.] *The value of 4 kHz per voice channel is based on an offered load of 6 kb/s for digitized voice today, and, by the year 2010, an improvement in coding of 2:1, the use of error-correcting code and overhead that requires double the offered load, and a transmitted rate (or modulation efficiency) of 1.5 b/s/Hz.*
>
> ***7.2.2 Impact of Projection.*** *To put this requirement in perspective, assume that the older one-fourth of installed equipment in 2010 operates with a spectrum efficiency of 12.5 kHz per speech path (the level required for new type acceptances today under the FCC's refarming rules, but not yet in significant use in public safety). Then, if the forecasts of the Technology Subcommittee are to be met, the other three-quarters of equipment must operate with a spectrum efficiency of 1.17 kHz per speech path (roughly twenty times more efficient than today's typical practice). This discussion considers one specific technological element, voice transmission. The forecasts were similarly aggressive in other areas such as data modulation, video coding improvement, etc.*

To illustrate the point in the paragraph above about public safety spectrum need as a function of spectrum efficiency, it should be noted that currently "Project 25" (ANSI-102) compliant radios offer frequency division multiple access (FDMA) technology and are available to meet public safety digital communication needs in 12.5 kHz channeling, but only have a 0.768 b/s/Hz spectrum efficiency. Radios compliant with Project 25 should be available with a spectrum efficiency of 1.536 b/s/Hz at some time in the future, but such systems have not been marketed and implemented as of this time. While TETRA (Terrestrial Trunked Radio) digital

radios, used by public safety in Europe and other places around the world, offer a 4-slot time division multiple access (TDMA) technology with a spectrum efficiency of 1.44 b/s/Hz, they have not been available in North America to date because of restrictions imposed on the licensing of certain Intellectual Property Rights.

There was a considerable investment in time and money by Public Safety entities and others in the one-year process to develop the PSWAC Final Report. Since that report, the Commission only temporarily allocated 6 MHz of public safety spectrum to the New York City Metropolitan Area (482-488 MHz). It has allocated 2.6 MHz designated for interoperability at 700 MHz — well above the frequency limit requested by PSWAC. Also, it recently designated for interoperability four (4) reallocated narrowband simplex channels in VHF and four (4) reallocated narrowband duplex channels in UHF — for an addition of 300 kHz of spectrum of the 2.5 MHz of interoperability spectrum below 512 MHz that PSWAC had requested. The Commission has yet to allocate more than a portion of the 25 MHz of immediately required spectrum for public safety operational use — which, at 700 MHz, is not usable in the spectrum-starved NYC Metropolitan Area because of incumbent broadcast operations. Moreover, with eight (8) years left until 2010, the remaining more than 70 MHz PSWAC requested remains unfulfilled. Hopefully, the Commission will recognize these facts and take advantage of the current proposal to provide additional, badly needed spectrum for Public Safety that will effectively integrate into the development and expansion of Public Safety systems and have near-term availability. However, in this NPRM, the Commission seeks yet another analysis of Public Safety spectrum needs. Considering that PSWAC spent an entire year making a very extensive analysis of spectrum needs based upon forward-looking spectrum efficiencies that have not been achieved to date, it is not realistic to expect that yet another study can be completed in only 30

days as contemplated in this NPRM. The Commission would be well advised to re-read the PSWAC Final Report, including its Subcommittee Final Reports.

Public Safety has been on a heightened state of alert continuously since September 11, 2001. Local law enforcement has taken on additional roles, now patrolling and protecting nuclear power plants, airports, and other critical infrastructure resources. They have also needed to maintain a heightened presence in the overall community and along the international border in order to thwart terrorist attacks upon our populace. There is also an additional need for Federal interoperability with the National Guard providing a primary public safety presence in our airports as well as augmenting local law enforcement support at nuclear facilities. All Public Safety, Fire, EMS, and Police now require the resources not only to interoperate, but also to support operations under the most extreme conditions — conditions that unfortunately are more likely than ever before, given the current state of alert.

Due to all of these issues, Public Safety still has a critical need for additional spectrum to support its operations. In the NPRM, the Commission has indicated that, since the PSWAC report, it has provided the 700 MHz and 4.9 GHz allocations and has also adapted a narrowband initiative below 512 MHz. While New York does not disagree with the Commission in principle, little to no additional operational spectrum has actually been realized. The recent 700 MHz allocation will provide some relief. Its availability, however, is currently blocked in many areas of the US, including most of the major metropolitan areas. Additionally, there is no date certain set for when this spectrum will be available for use by public safety. Furthermore, 700 MHz may also be blocked more than a decade in many Canadian border areas. The recent 4.9 GHz Public Safety spectrum allocation will prove invaluable for providing tactical wireless LAN and WAN

types of services to Public Safety. However, its range is too limited to support the narrowband voice and data operations that are more operationally typical to Public Safety. Again, the Commission has pointed to its narrowbanding policies as providing additional Public Safely spectrum. While these policies are to be commended, narrowbanding has not been able to free spectrum at 800 MHz, where most Public Safety spectrum is located. Therefore, narrowbanding has offered little in terms of achieving interoperability at this band.

4.4 Current Availability of 800 MHz Public Safety Spectrum

Further detailed analysis was performed for both the NPSPAC and "old-block" Public Safety allocations. The approach taken was most likely one of the most thorough, accurate, and advanced approaches to determining spectrum availability that has been applied to date, utilizing realistic propagation and terrain characteristics, frequency reuse factors, and preliminary system design parameters.[21] The results clearly indicated that there was little or no spectrum available in either of these bands in two particular areas of the State — the Canadian border Regions and the vicinity of New York City. An explanation of the methodology used is presented in Appendix I, along with detailed results.

4.5 The New York Statewide Wireless Network (SWN) Project

In April 2000, Governor Pataki formed the SWN project, under the auspices of the New York State Office for Technology, to address the critical need for a new statewide emergency communications system. The present public safety communications infrastructure throughout New York State is often obsolete or outmoded, and systems differ substantially between agencies and levels of government. The SWN project will develop and implement an integrated statewide

mobile radio network to provide a common communications platform for 65,000 public safety and public service users.

The SWN will incorporate the latest technologies in land mobile radio and coordinate the use of additional bandwidth reserved for public safety. The design will provide a digital trunked radio network for both voice and data transmission. The trunked design will allow for autonomous talk groups among the various participants, as well as the capability to designate special or ad hoc talk groups for large-scale emergency situations. Voice and data encryption will ensure that public safety communications are secure.The SWN will benefit emergency responders and law enforcement and public service providers at all levels of government. Anticipated SWN participants include some twenty-nine State-level agencies and public authorities, The State University of New York (SUNY) system, and the Judiciary. All counties[22] and New York City have expressed interest in the SWN. Formal partnerships will be developed at the option of local entities. At a minimum, the SWN will provide communication gateways to all public safety systems within the State that request it.

The September 11th tragedies, and other large-scale emergencies in recent years, highlight the need for all responding agencies with different systems and frequencies to be able to talk to each other. One of the major goals of the SWN is to enable agencies at all levels of government to communicate and coordinate with each other during disaster situations and their aftermaths. In addition to the infrastructure and coverage capacity inherent in the SWN, effective interoperable communications for crisis situations will be provided. Statewide Public Safety Communications

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[21] The exact methodologies that New York State used to investigate the availability of 800 MHz public safety spectrum within its borders are discussed in Appendix I.
[22] Thirteen counties and NYC have requested immediate involvement in a SWN pilot project.

systems[23] such as SWN are characterized by their operational interoperability, offering an effective weapon against terrorism, and providing one of the most critical[24] tools for border security and homeland defense.

However, as noted in Section 4.4, there is very little 800 MHz spectrum available to support SWN operations — especially in the Canadian border areas and in the vicinity of New York City. Unfortunately, as noted in Sections 4.1 and 4.2, these latter areas (as well as much of the State) have 700 MHz availability also blocked, and in the border areas this blockage may last for more than a decade. Figure 11 illustrates areas where SWN's capacity[25] needs cannot be supported through currently available 800 MHz spectrum, and illustrates, by color coding, the fractional capacity attained. (Note the arrows pointing to the substantial number of blue dots — representing low achievement — in the vicinity of New York City and along the US-Canadian border below Lake Ontario.) It is clear that, without 700 MHz, SWN will require some type of additional 800 MHz spectrum. New York feels that the Commission must utilize this proceeding to offset the loss of 700 MHz that is felt by many Canadian border states, as well as to bridge the gap to fulfilling the spectral needs of Public Safety during the US DTV transition process. See Appendix J for additional information and reference material.

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[23] Other states implementing or operating these systems include Ohio, Michigan, Pennsylvania, and Florida.

[24] Information is the key component to combating terrorism, and an integrated multi-agency network is one of the most effective ways to providing information agility to the Public Safety community - which represents the primary component of our homeland defense efforts.

[25] Appendix J documents the methodology that New York State used to model the capacity requirements for its statewide public safety wireless communications system. The approach taken is most likely one of the most thorough, accurate, and advanced approaches to modeling traffic distributions and determining statewide public safety capacity requirements that have been applied to date.