Interoperability Comments of Hanford C. Thomas
Hearing: “First responder Interoperability: Look Who’s Talking Now”
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Subcommittee on National Security, Emerging Threats, and International Relations
Committee on Government Reform
U.S. House of Representatives
2154 Rayburn House Office Building
Washington, D.C. 20515

1. Introduction

Good Afternoon, Chairman Christopher Shays and distinguished members of the Subcommittee.

I want to thank the Subcommittee Chair for the opportunity to testify before you today regarding the New York State Statewide Wireless Network (SWN), an integrated statewide land mobile radio (LMR) network for both state and local first responders.

My name is Hanford C. Thomas. I am the Director of the Statewide Wireless Network Project under the NYS Office for Technology. I was appointed in January 2000 and am responsible for the development and implementation of an integrated (public safety) wireless land mobile radio network with statewide coverage which will provide a common communications platform for New York State's public safety and public service agencies. The project is one of the largest technology projects ever undertaken in the State and the first comprehensive upgrade of statewide radio communications in more than 30 years.

Prior to joining the NYS Office for Technology, I served as the Deputy Superintendent (Colonel) for Administration for the New York State Police. I am a 35 year veteran of the State Police, and have served on numerous workforce and strategic planning workgroups at both the State and Federal level and have an extensive background in law enforcement, public safety, communications, finance and public administration.

2. Interoperability

Interoperability involves both technical and operational aspects. The technical aspect involves equipment and operating channels, single frequency(ies) or frequency paired channel(s), on which agencies communicate.

The operational aspect involves operational protocols, including channel nomenclature, usage, operational sharing and use agreements, and memoranda of understandings.

Operational issues may include the shared use of FCC or NTIA licensed agency channels, or may include common channels that are designated by FCC or NTIA rule for interoperability use. A very important operational issue is the common nomenclature that these channels will be identified by. A common nomenclature plan[1] has been recommended by the FCC's Public Safety National Coordination Committee (NCC), and is awaiting regulatory action to include this in the FCC's Public Safety rules.

[1] See Appendix A for a table of designated interoperability channels, their usage, and recommended nomenclature

Interoperability can take different forms:

- Multi-jurisdictional: Wireless communications involving two or more similar agencies having different areas of responsibility. Some examples include a fire agency from one city communicating with a fire agency from another city and the Federal Bureau of Investigation (FBI) communicating with a County Sheriff.

- Multi-disciplinary: Wireless communications involving two or more different agencies. Some examples include a police agency communicating with a fire agency and a parks agency communicating with an emergency medical services agency.

An interoperability communication link can be either of the following types:

- Infrastructure independent: The communications link occurs between subscriber units over a direct RF path.

    - An example is portable-to-portable tactical communications at the scene of an incident.

- Infrastructure dependent: The communications link requires the use of some items(s) of equipment, other than a subscriber unit, for establishment of the link and for complete subscriber operation. Some examples include:

    - a communications link for which a repeater station is required;
    - a communications link which provides full system coverage for a visiting subscriber unit within a host conventional or trunked radio system; and
    - a communications link which provides interconnectivity between two or more otherwise incompatible radio systems by cross-connecting the audio signals and/or appropriate signaling functions at some central point.
        - This capability may be provided by a central infrastructure capability; or
        - This capability may be provided by a field deployed unit, e.g. an Emergency Communications Vehicle (ECV).

According to the Public Safety Wireless Advisory Committee final report, section 4.3.2.5, interoperability is defined as:

> An essential communication link within Public Safety and public service wireless communications systems which permits units from two or more different agencies to interact with one another and to exchange information according to a prescribed method in order to achieve predictable results.

Obviously, a large scale, multi-agency trunked radio system, in and of itself can provide ultimate interoperability between all system users, and whether the system is based on proprietary or standard technology does not impact those users. However, to accommodate supporting units from outside that multi-agency user community, dedicated equipment must be provided that can

link the incoming units with the system users. This can involve linking a specific system with a multi-agency system or it can involve base stations and/or repeater stations operating on designated interoperability channels that operate with standards based technology and are capable of communicating with units responding from anywhere in the country. The statewide system being constructed in New York State incorporates all these concepts.

3. Spectrum Issues

The Federal Communications Commission and the NTIA have designated certain channels for Interoperability use. These channels are distributed across the range of Public Safety bands. Some are allocated for specific service categories, e.g., Police Radio Service, Fire Radio Service. These dedicated-use channels are important for ordered communications protocols. However, over time these separations of use in the face of severely limited public safety spectrum in the lower bands have tended to result in parochial attitudes that must be overcome. How to overcome these attitudes is going to require service representatives to come together and develop operational plans that will produce the best collective practices for Public Safety. The "Statewide Interoperability Executive Committee" concept presented by the FCC's Public Safety National Coordination Committee (NCC) is now an FCC Rule (47 C.F.R §90.525) for the 700 MHz Public Safety band. The authority given by this rule to the States, to manage 700 MHz FCC-designated interoperability channels, should be extended to include the interoperability channels in all Public Safety bands.

a. FCC- and NTIA-designated interoperability channels

As can be seen from the following listing, interoperability channels have been made available in all Public Safety bands. The ability to operate on all of these interoperability channels would require a formidable quantity of radios using presently available equipment. In the future, it may be possible to facilitate this broad spread of channels using Software Defined Radio (SDR) mobile and portable units. However, in order to implement such broad capability, cost is a major issue.

Inland VHF Public Coast Service Areas (VPCAs) preclude use of a sizeable number of channels in the Southern NYS areas, e.g. Greater NYC Metropolitan Area. (in fact not anywhere in the eastern US) FCC 47 C.F.R. §90.20(g)(2)

i. Low – Band VHF (30-50 MHz)

39.46 Base/Mobile Police
39.48 Base/Mobile Fire Proposed
45.86 Base/Mobile Police
45.88 Base/Mobile Fire

ii. High – Band VHF State & Local (150-174 MHz)

151.1375 Base/Mobile Any Public Safety
152.0075 Base/Mobile Special Emergency

154.265 Mobile Fire]
154.2725 Base/Mobile Fire
154.28 Base/Mobile Fire
154.2875 Base/Mobile Fire
154.295 Mobile Fire
154.3025 Base/Mobile Fire
154.4525 Base/Mobile Any Public Safety Eligible
155.34 Base/Mobile EMS
155.3475 Base/Mobile EMS
155.475 Base/Mobile Police
155.4825 Base/Mobile Police
155.7525 Base/Mobile Any Public Safety Eligible
157.25 Mobile Allocated for Public Safety Use in 33 inland VPCSAs/EAs
157.275 Mobile Allocated for Public Safety Use in 33 inland VPCSAs/EAs
157.225 Mobile Allocated for Public Safety Use in 33 inland VPCSAs/EAs
158.7375 Base/Mobile Any Public Safety Eligible
159.4725 Base/Mobile Any Public Safety Eligible
161.85 Base/Mobile Allocated for Public Safety Use in 33 inland VPCSAs/EAs
161.825 Base/Mobile Allocated for Public Safety Use in 33 inland VPCSAs/EAs
161.875 Base/Mobile Allocated for Public Safety Use in 33 inland VPCSAs/EAs

iii. High – Band VHF Federal (150-174 MHz)

167.0875 Base/Mobile NTIA Law Enforcement
162.0875 Mobile NTIA Law Enforcement
162.2625 Mobile NTIA Law Enforcement
167.25 Base/Mobile NTIA Law Enforcement
162.8375 Mobile NTIA Law Enforcement
167.75 Base/Mobile NTIA Law Enforcement
163.2875 Mobile NTIA Law Enforcement
168.1125 Base/Mobile NTIA Law Enforcement
163.425 Mobile NTIA Law Enforcement
168.4625 Base/Mobile NTIA Law Enforcement
164.7125 Mobile NTIA Incident Response
169.5375 Base/Mobile NTIA Incident Response
165.25 Mobile NTIA Incident Response
170.0125 Base/Mobile NTIA Incident Response
165.9625 Mobile NTIA Incident Response
170.4125 Base/Mobile NTIA Incident Response
165.575 Mobile NTIA Incident Response
170.6875 Base/Mobile NTIA Incident Response
167.325 Mobile NTIA Incident Response
173.0375 Base/Mobile NTIA Incident Response

iv. UHF Federal (406-450 MHz)

414.0375 Base/Mobile NTIA Law Enforcement
418.9875 Mobile NTIA Law Enforcement
409.9875 Base/Mobile NTIA Law Enforcement
419.1875 Mobile NTIA Law Enforcement
410.1875 Base/Mobile NTIA Law Enforcement
419.6125 Mobile NTIA Law Enforcement
410.6125 Base/Mobile NTIA Law Enforcement
414.0625 Mobile NTIA Law Enforcement
414.3125 Base/Mobile NTIA Law Enforcement
414.3375 Base/Mobile NTIA Law Enforcement
419.2375 Base/Mobile NTIA Incident Response
410.2375 Mobile NTIA Incident Response
419.4375 Base/Mobile NTIA Incident Response
410.4375 Mobile NTIA Incident Response
419.6375 Base/Mobile NTIA Incident Response
410.6375 Mobile NTIA Incident Response
419.8375 Base/Mobile NTIA Incident Response
410.8375 Base/Mobile NTIA Incident Response
413.1875 Base/Mobile NTIA Incident Response
413.2125 Base/Mobile NTIA Incident Response

v. UHF State & Local (450-470 MHz)

453.2125 * Base/Mobile Any Public Safety Eligible
453.4625 * Base/Mobile Any Public Safety Eligible
453.7125 * Base/Mobile Any Public Safety Eligible
453.8625 * Base/Mobile Any Public Safety Eligible
458.2125 * Mobile Any Public Safety Eligible
458.4625 * Mobile Any Public Safety Eligible
458.7125 * Mobile Any Public Safety Eligible
458.8625 * Mobile Any Public Safety Eligible

vi. UHF (470 – 512 MHz)

NONE

vii. 700 MHz Public Safety Narrow Band

These are paired channels, only the low frequency side is listed
Channel 23 & 24 Base/Mobile General Public Safety Service (secondary trunked)
Channel 103 & 104 Base/Mobile General Public Safety Service (secondary trunked)
Channel 183 & 184 Base/Mobile General Public Safety Service (secondary trunked)
Channel 263 & 264 Base/Mobile General Public Safety Service (secondary trunked)

Channel 39 & 40 Base/Mobile Calling Channel
Channel 119 & 120 Base/Mobile General Public Safety Service
Channel 199 & 200 Base/Mobile General Public Safety Service
Channel 279 & 280 Base/Mobile Mobile Data
Channel 63 & 64 Base/Mobile EMS
Channel 143 & 144 Base/Mobile Fire
Channel 223 & 224 Base/Mobile Police
Channel 303 & 304 Base/Mobile Mobile Repeater
Channel 79& 80 Base/Mobile EMS
Channel 159 & 160 Base/Mobile Fire
Channel 239 & 240 Base/Mobile Police
Channel 319 & 320 Base/Mobile Other Public Service
Channel 657 & 658 Base/Mobile General Public Safety Service (secondary trunked)
Channel 737 & 738 Base/Mobile General Public Safety Service (secondary trunked)
Channel 817 & 818 Base/Mobile General Public Safety Service (secondary trunked)
Channel 897 & 898 Base/Mobile General Public Safety Service (secondary trunked)
Channel 681 & 682 Base/Mobile Calling Channel
Channel 761 & 762 Base/Mobile General Public Safety Service
Channel 841 & 842 Base/Mobile General Public Safety Service
Channel 921 & 922 Base/Mobile Mobile Data
Channel 641 & 642 Base/Mobile EMS
Channel 721 & 722 Base/Mobile Fire
Channel 801 & 802 Base/Mobile Police
Channel 881 & 882 Base/Mobile Mobile Repeater
Channel 697 & 698 Base/Mobile EMS
Channel 777 & 778 Base/Mobile Fire
Channel 857 & 858 Base/Mobile Police
Channel 937 & 938 Base/Mobile Other Public Service

viii. 700 MHz Public Safety Wide Band

These are paired channels, only the low frequency side is listed
Channel 28 768.4 **50 KHz use with aggregation to 150 kHz**
Channel 29 768.45 **50 KHz use with aggregation to 150 kHz**
Channel 30 768.5 **50 KHz use with aggregation to 150 kHz**
Channels 28,29 768.4 + 768.45
Channels 29,30 768.45 + 768.5
Channels 28,29,30 768.4 + 768.45 + 768.5
Channel 37 768.85 **50 KHz use with aggregation to 150 kHz**
Channel 38 768.9 **50 KHz use with aggregation to 150 kHz**
Channel 39 768.95 **50 KHz use with aggregation to 150 kHz**
Channels 37,38 768.85 +768.90

Channels 38,39 768.90 + 768.95
Channels 37,38,39 768.85 + 768.90 + 768.95
Channel 82 771.05 **50 KHz use with aggregation to 150 kHz**
Channel 83 771.1 **50 KHz use with aggregation to 150 kHz**
Channel 84 771.15 **50 KHz use with aggregation to 150 kHz**
Channels 82,83 771.05 + 771.1
Channels 83,84 7771.1 + 771.15
Channels 82,83,84 771.05 + 771.1 + 771.15
Channel 91 771.5 **50 KHz use with aggregation to 150 kHz**
Channel 92 771.55 **50 KHz use with aggregation to 150 kHz**
Channel 93 771.6 **50 KHz use with aggregation to 150 kHz**
Channels 91,92 771.5 + 771.55
Channels 92,93 771.55 + 771.6
Channels 91,92,93 771.5 + 771.55 + 771.6
Channel 46 769.3 **50 KHz use with no aggregation**
Channel 47 769.35 **50 KHz use with no aggregation**
Channel 48 769.4 **50 KHz use with no aggregation**
Channel 73 770.6 **50 KHz use with no aggregation**
Channel 74 770.65 **50 KHz use with no aggregation**
Channel 75 770.7 **50 KHz use with no aggregation**

Note: Channels 46 & 48 and 73 & 75 are reserved as 50 KHz Nationwide Common Channels

ix. 806-821/851-866 MHz Band

NONE

x. 821-824/866-869 MHz (NPSPAC) band

821.0125 Mobile Any Public Safety Eligible
821.5125 Mobile Any Public Safety Eligible
822.0125 Mobile Any Public Safety Eligible
822.5125 Mobile Any Public Safety Eligible
823.0125 Mobile Any Public Safety Eligible
866.0125 Base/Mobile Any Public Safety Eligible
866.5125 Base/Mobile Any Public Safety Eligible
867.0125 Base/Mobile Any Public Safety Eligible
867.5125 Base/Mobile Any Public Safety Eligible
868.0125 Base/Mobile Any Public Safety Eligible

4. Past State Level Activity

a. Police

i. NYSLETC

The New York Statewide Law Enforcement Telecommunication Committee originally formed in the 1970s. The committee is composed of representatives from the State Police, the New York City Police Department and regional representatives from the Police Chiefs and Sheriffs, with ex-officio membership from the NYS Division of Criminal Justice Services.

NYSLETC filed a State Plan: "NY Statewide Law Enforcement Emergency Communications Plan" for the use of frequencies 39.46 MHz, 155.370 MHz and 155.475 MHz with the Federal Communications Commission in February of 1979, which is still in place today.

ii. Division of State Police

The NYS Division of State Police (NYSP) supports the NYSLETC "NY Statewide Law Enforcement Emergency Communications Plan" throughout New York State on their VHF system. The VHF system also supports other law enforcement agencies, both state and local.

In the New York City Metropolitan Area, NYSP operates a 5 channel, multi-site, simulcast trunking system, which also supports other state agency users. This system incorporates automatic interfaces to one of the NYC Police Department (NYPD) Citywide Channels and to the NYSP VHF Statewide Emergency Channel. Included in the system are the 5 international mutual aid channels (I-Call, I-TAC1 thru I-TAC4). The system radio sites are linked by a hot standby, loop protected microwave system, which also supports the Port Authority of NY and NJ's trunking system and their 5 international mutual aid channels.

5. Current State Activity

The State of New York is working on many fronts involving enhanced interoperability. With the Canadian border to the North, and New York City in the South, we are working to develop operational plans and technical capability to address all issues.

The Canadian border activity brings together NYSP, Federal Agencies, and the Canadian Royal Canadian Mounted Police (RCMP) to control border crossings and apprehend terrorists. This activity requires shared, secure radio communications.

Statewide Wireless Network

Currently, New York State is engaged in the development of a Statewide Wireless Network (SWN). We are near the end of an extensive procurement process. We have selected a prime contractor for the proposed award, and are currently in final contract negotiations. SWN will be used by all State Agencies and will also be available for use by other governmental entities, including Authorities, Counties and other Local Government, and the Federal government.

Statewide Coverage

The systems that exist today do not provide adequate coverage throughout the State. As a matter of fact, there are areas where coverage is spotty or non-existent. It is currently possible in some areas of the State that an Emergency Medical Services (EMS) team in route to a medical facility with a critically ill patient might at times be unable to communicate, or a police officer would be unable to relay vital information regarding a pursuit.

To address these issues, which place both the public and the public safety community at risk, the SWN specifications require that the network provide 97 percent coverage on-road and navigable waterways and 95 percent area coverage in each county in order to eliminate any potential for lost communications. In addition, SWN requirements call for 97 percent on-hip in-street coverage in New York City.

Digital Voice and Data

Just as standard voice communications have given way to electronic transfer of data in the office environment, the need for data transport to supplement voice in mobile communication is equally important. One need only think of the value to a police officer of having access to a suspect's photos; firefighters able to arrive with building floor plans or emergency medical crews able to remotely connect their monitors directly to hospitals on a real time basis, with little fear of loss of signal, to understand the value of a ubiquitous, integrated voice and data wireless communication system for use not only every day but during catastrophic events as well.

Communications' Interoperability

Now, add to the above the ability for multiple disciplines such as fire, police, and medical teams to be connected into one seamless communications/talk group for the duration of a specific emergency. For example, it could tie together all public safety first responders in a small community, or it could connect various communities' public safety responders to a group seeking mutual aid assistance for a limited period of time. In the case of a catastrophic event, multiple communications groups could be created to include police, fire, medical, federal, military and other authorities as needed.

The issue of interoperability is not whether government agencies can communicate, but whether or not they can communicate in a way that enhances their ability to respond effectively in a public safety crisis. Today that capability is severely constrained by outmoded technology and disparate radio systems operating in different frequency bands. Individual agencies in New York State have a basic ability to communicate, but their capability to communicate between agencies in real-time over wide areas is extremely limited.

The most robust form of interoperability today is achieved by having all or a large number of agencies operating on the same or similar communications networks. Interoperability is seamless, with no technological or geographical limitations. For those agencies whose current communications systems require replacement, joining a multi-agency shared network such as SWN is the most cost effective way to achieve the highest level of interoperability.

During normal operations, the SWN would provide support ranging from basic voice communication to other capabilities such as data communications and more flexible talk group control. In the event of a natural or man made disaster, the SWN could be reconfigured on the fly to interconnect various agencies and departments assigned to deal with the specific event. Local police, fire, EMS would work within a coordinated communications system that would connect them to other organizations such as the State Emergency Management Office (SEMO), the Federal Emergency Management Agency (FEMA) and the National Guard when necessary.

For those agencies that elect to maintain their own networks, SWN will offer them the option of linking to the statewide network. This will allow these agencies to communicate to other public safety agencies which they otherwise would not be able to do easily or on an expansive basis.

Interoperability with other agency systems will be facilitated via SWN. State and FCC designated interoperability channels will be supported according to area usage. This will permit interoperability with units not on SWN and with units from other States.

The Office for Technology, through the SWN Project Office, is chairing the Statewide Interoperability Executive Committee and bringing together a broad group of Public Safety radio service representatives to develop the necessary interoperability protocols and procedures for a Statewide Plan.

Similarly, the local agencies in the New York Metropolitan Area have formed a committee to develop interoperability plans that are unique to the New York City Metropolitan Area.

Fostering State and Local Partnerships

An important public policy goal is fostering State and local partnerships. The Statewide Wireless Network (SWN) encourages voluntary partnerships with local governments. The SWN Advisory Council and other outreach activities have been and will continue to be used to identify and address local government needs.

We envision a network that would include police; sheriffs; conservation officers and rangers; parole, probation and correction officers; full time and volunteer Fire Departments; Emergency Medical Services and Homeland Security Personnel and Border Patrol Officers, as needed.

In addition to helping public protection agencies, we also see the opportunity for the needs of public service entities to be met by SWN. As the need for coordinating public safety response increases during times of natural disasters, so does the need to coordinate the use of our public service providers. Catastrophic snow and ice storms that frequently occur in parts of our State require mobilization and redirection of massive amounts of equipment used by agencies such as the NYS Department of Transportation (NYSDOT) and the NYS Thruway Authority. These units are brought into areas to provide additional support to local DOT personnel as well as local government units normally responsible for day-to-day activities. In many cases, NYS National Guard personnel are deployed, and seamless communications between all is a necessity.

Today that communications is fractured at best, with each unit having its own system, and individuals forced to carry multiple radios or use runners or telephone lines (if available) between dispatch centers in order to communicate.

6. Current Activity – Federal Funding Grants and Related Programs

a. Byrne Grant

Currently, the State of New York has received a State and Local Emergency Preparedness Grant. Among the communications items covered by this grant are the Rapid Mobile Emergency Response (RAMER) project, secure in-building and disadvantaged locations (underground, in-tunnel) communications, and a Public Safety radio paging prototype.

The RAMER project provides a complete emergency on-scene radio equipment response program for locations that have experienced communications failure or that need temporary expansion in coverage and levels of functionality.

b. UASI

The NY State point of contact for the UASI program has been assigned to the Office for Technology and its Statewide Wireless Network Project Office.

7. Summary

SWN will replace the outdated stand-alone State agency systems and will be used for both day-to-day operations, as well as disaster and crisis situations. The new radio network will make it easier for all agencies to communicate in both day-to-day and crisis situations and allow agency-to-agency communications where none exists today.

New York State's Statewide Wireless Network will bring public safety communications in NYS into the 21st Century by bringing as many as 65,000 federal, state and local government users onto one modern communications network and providing links into other existing federal and local government communications and data networks.

SWN will facilitate full, seamless interoperability between SWN participating agencies, anytime, anyplace in New York State. At the same time it will permit network based:

- Interoperability with non-SWN participating agencies through network gateways.
- Fully integrated voice and data communications over 97% of the State's roadways and 95% of its geographic area, eliminating many of the communications dead spots that plague public safety responders today.

- The capability for a wide array of mobile data applications, e.g. – automatic vehicle location, mug-shot images, computer aided dispatching, report generation and transmission directly from the field, etc.
- Direct communications between police, fire, EMS, transportation, public works and other governmental responders for day-to-day or emergency operations.

Spectrum – 700 MHz Issues

New York State continues to seek use of public safety communications spectrum promised under the 1997 Balanced Budget Act in the 700 MHz bandwidth as part of crucial homeland security planning. To gain useful access to the spectrum two actions must occur:

- Commercial television broadcasters must be compelled to vacate the spectrum no later than the current 2006 deadline.
- The FCC must facilitate frequency harmonization with Canada.

The Office for Technology (OFT) continues to work through the Governor's Office and the Washington Congressional Delegation to focus the FCC's attention on resolving these and other issues.

To date the FCC continues to license use of 700 MHz public safety spectrum to low power television stations in the New York City area, even though SWN is already licensed to operate on those same frequencies. This will only create additional obstacles which must be overcome as we begin the build-out of SWN.

The FCC is currently negotiating with Industry Canada to harmonize use of the 700 MHz public safety band frequencies across the U.S. - Canadian border. It is critical that these negotiations be completed as soon as possible. At the same time, resolution of this issue alone will not allow New York State public safety agencies access to the new spectrum. Commercial television broadcasters must be compelled to vacate the spectrum no later than the current 2006 deadline if emergency first responders are to have the tools they need.

Consensus Plan

The Office For Technology has supported the development of the "Consensus Plan" and anxiously awaits the final details. SWN holds approximately 450 licenses that will be affected by the Plan and is one of the major public safety license holders in the country. As was accommodated within the FCC's 700 MHz Plan, New York State would like the FCC to issue SWN's 800 MHz replacement frequencies in a block for statewide use.

a. Multiplicity of Operational Bands

There is a significant quantity of interoperability channels spread over 8 Public Safety radio bands. It is interesting to note that PSWAC in their final report had recommended the use of a single 6 MHz VHF band (at the present TV channel 7) in order to develop a uniform nationwide interoperability channel system. Unfortunately that did not materialize. We did, however, get

additional channels in the Federal and non-Federal VHF and UHF spectrum, and additional channels in the 700 MHz Public Safety band.

To fully implement the multiplicity of operational bands of FCC- and NTIA-designated interoperability channels will require significant dedicated equipment for base stations and control equipment.

b. Overcoming Parochial Attitudes

The Statewide Interoperability Executive Committee provides an environment to bring representatives of all the radio services together to work out procedures and protocols. The authority given to States to manage the 700 MHz FCC-designated interoperability channels in 47C.F.R. § 90.525 should be expanded to encompass the designated interoperability channels in all Public Safety bands. In addition, the NCC recommendation for standard nomenclature to be applied to all of these designated interoperability channels should be accepted by the FCC.

c. Benefits of Common, Shared-Use Systems

Large scale shared-use systems provide optimum efficiency in the use of spectrum. Trunking systems provide better spectrum utilization. In addition, the system can be designed and built for the future, which presently includes established bench marks for mandatory conversion to narrow-band channels. By participating in a single, large scale system, interoperability between the multiple agencies' system users is inherently optimized.

d. Need for Further Funding Support

Interoperability systems to date have been constructed on a limited basis to meet minimal requirements. Systems that have been implemented for mobile coverage will be inadequate for portable coverage inside buildings. However, this limited deployment does not ensure that units arriving from distant areas will be equipped for operation on the implemented channels. In order to acquire the significant quantities of equipment necessary to build large area radio coverage on the FCC- and NTIA-designated interoperability channels, funding support will be required.

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Appendix A

FREQUENCY (MHz) OR CHANNEL SET		BASE/MOBILE	RADIO SERVICE	CHANNEL LABEL	USE/MISC NOTES
			FCC 30-512 MHz Public Safety		
Bands					
39.46		Base/Mobile	Police	**3LAW1**	90.20(c) [FN 15]
39.48		Base/Mobile	Fire Proposed	**3FIR2**	90.20(c) [FN 19]
45.86		Base/Mobile	Police	**3LAW3**	90.20(c) [FN 15]
45.88		Base/Mobile	Fire	**3FIR4**	90.20(c) [FN 19]
151.1375		Base/Mobile	Any Public Safety Eligible	**1TAC5**	90.20(c) [FN 80]
152.0075		Base/Mobile	Special Emergency	**1EMS6**	25 kHz BW PAGING 90.20(c) [FN 19]
154.265		Mobile	Fire	**1FIR7**	90.20(c) [FN 19]
154.2725		Base/Mobile	Fire	**1FIR8**	90.20(c) [FN 19]
154.28		Base/Mobile	Fire	**1FIR9**	90.20(c) [FN 19]
154.2875		Base/Mobile	Fire	**1FIR10**	90.20(c) [FN 19]
154.295		Mobile	Fire	**1FIR11**	90.20(c) [FN 19]
154.3025		Base/Mobile	Fire	**1FIR12**	90.20(c) [FN 19]
154.4525		Base/Mobile	Any Public Safety Eligible	**1TAC13**	90.20(c) [FN 80]
155.34		Base/Mobile	EMS	**1EMS14**	90.20(c) [FN 40]
155.3475		Base/Mobile	EMS	**1EMS15**	90.20(c) [FN 40]
155.475		Base/Mobile	Police	**1LAW16**	90.20(c) [FN 41]
155.4825		Base/Mobile	Police	**1LAW17**	90.20(c) [FN 41]
155.7525		Base/Mobile	Any Public Safety Eligible	**1CAL18**	CALLING CHANNEL 90.20(c) [FN 80]
157.25		Mobile	Allocated for Public Safety Use in 33 inland VPCAs/Eas	**1TAC19D**	90.20 Tables A and B
157.275		Mobile	Allocated for Public Safety Use in 33 inland VPCAs/Eas	**1TAC20D**	90.20 Tables A and B
157.225		Mobile	Allocated for Public Safety Use in 33 inland VPCAs/Eas	**1TAC21D**	90.20 Tables A and B
158.7375		Base/Mobile	Any Public Safety Eligible	**1TAC22**	90.20(c) {FN 80]
159.4725		Base/Mobile	Any Public Safety Eligible	**1TAC23**	90.20(c) {FN 80]
161.85		Base/Mobile	Allocated for Public Safety Use in 33 inland VPCAs/Eas	**1TAC24**	90.20 Tables A and B
161.825		Base/Mobile	Allocated for Public Safety Use in 33 inland VPCAs/Eas	**1TAC25**	90.20 Tables A and B
161.875		Base/Mobile	Allocated for Public Safety Use in 33 inland VPCAs/Eas	**1TAC26**	90.20 Tables A and B
453.2125	*	Base/Mobile	Any Public Safety Eligible	**4CAL27D**	CALLING CHANNEL 90.20(c) [FN 80]
453.4625	*	Base/Mobile	Any Public Safety Eligible	**4TAC28D**	90.20(c) [FN 80]
453.7125	*	Base/Mobile	Any Public Safety Eligible	**4TAC29D**	90.20(c) [FN 80]
453.8625	*	Base/Mobile	Any Public Safety Eligible	**4TAC30D**	90.20(c) [FN 80]
458.2125	*	Mobile	Any Public Safety Eligible	**4CAL31**	CALLING CHANNEL 90.20(c) [FN 80]
458.4625	*	Mobile	Any Public Safety Eligible	**4TAC32**	90.20(c) [FN 80]
458.7125	*	Mobile	Any Public Safety Eligible	**4TAC33**	90.20(c) [FN 80]
458.8625	*	Mobile	Any Public Safety Eligible	**4TAC34**	90.20(c) [FN 80]

Note: VPC channels pairs 25,84 and 85 used in VPC service area 10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42

NTIA VHF Law Enforcement

channels				
167.0875	Base/Mobile	NTIA Law Enforcement	**1FTAC35D**	FCC Public Notice DA 01-1621
162.0875	Mobile	NTIA Law Enforcement	**1FCAL35**	FCC Public Notice DA 01-1621
162.2625	Mobile	NTIA Law Enforcement	**1FTAC36**	FCC Public Notice DA 01-1621
167.25	Base/Mobile	NTIA Law Enforcement	**1FTAC36D**	FCC Public Notice DA 01-1621
162.8375	Mobile	NTIA Law Enforcement	**1FTAC37**	FCC Public Notice DA 01-1621
167.75	Base/Mobile	NTIA Law Enforcement	**1FTAC37D**	FCC Public Notice DA 01-1621
163.2875	Mobile	NTIA Law Enforcement	**1FTAC38**	FCC Public Notice DA 01-1621
168.1125	Base/Mobile	NTIA Law Enforcement	**1FTAC38D**	FCC Public Notice DA 01-1621
163.425	Mobile	NTIA Law Enforcement	**1FTAC39**	FCC Public Notice DA 01-1621
168.4625	Base/Mobile	NTIA Law Enforcement	**1FTAC39D**	FCC Public Notice DA 01-1621

NTIA VHF Incident Response

channels				
164.7125	Mobile	NTIA Incident Response	**1FCAL40**	FCC Public Notice DA 01-1621
169.5375	Base/Mobile	NTIA Incident Response	**1FCAL40D**	FCC Public Notice DA 01-1621
165.25	Mobile	NTIA Incident Response	**1FTAC41**	FCC Public Notice DA 01-1621
170.0125	Base/Mobile	NTIA Incident Response	**1FTAC41D**	FCC Public Notice DA 01-1621
165.9625	Mobile	NTIA Incident Response	**1FTAC42**	FCC Public Notice DA 01-1621
170.4125	Base/Mobile	NTIA Incident Response	**1FTAC42D**	FCC Public Notice DA 01-1621
165.575	Mobile	NTIA Incident Response	**1FTAC43**	FCC Public Notice DA 01-1621
170.6875	Base/Mobile	NTIA Incident Response	**1FTAC43D**	FCC Public Notice DA 01-1621
167.325	Mobile	NTIA Incident Response	**1FTAC44**	FCC Public Notice DA 01-1621
173.0375	Base/Mobile	NTIA Incident Response	**1FTAC44D**	FCC Public Notice DA 01-1621

NTIA UHF Law Enforcement

channels				
414.0375	Base/Mobile	NTIA Law Enforcement	**1FCAL45**	FCC Public Notice DA 01-1621
418.9875	Mobile	NTIA Law Enforcement	**1FTAC46**	FCC Public Notice DA 01-1621
409.9875	Base/Mobile	NTIA Law Enforcement	**1FTAC46D**	FCC Public Notice DA 01-1621
419.1875	Mobile	NTIA Law Enforcement	**1FTAC47**	FCC Public Notice DA 01-1621
410.1875	Base/Mobile	NTIA Law Enforcement	**1FTAC47D**	FCC Public Notice DA 01-1621
419.6125	Mobile	NTIA Law Enforcement	**1FTAC48**	FCC Public Notice DA 01-1621
410.6125	Base/Mobile	NTIA Law Enforcement	**1FTAC48D**	FCC Public Notice DA 01-1621
414.0625	Mobile	NTIA Law Enforcement	**1FTAC49**	FCC Public Notice DA 01-1621
414.3125	Base/Mobile	NTIA Law Enforcement	**1FTAC50**	FCC Public Notice DA 01-1621
414.3375	Base/Mobile	NTIA Law Enforcement	**1FTAC51**	FCC Public Notice DA 01-1621

NTIA UHF Incident Response

channels				
419.2375	Base/Mobile	NTIA Incident Response	**1FCAL52**	FCC Public Notice DA 01-1621
410.2375	Mobile	NTIA Incident Response	**1FCAL52D**	FCC Public Notice DA 01-1621
419.4375	Base/Mobile	NTIA Incident Response	**1FTAC53**	FCC Public Notice DA 01-1621
410.4375	Mobile	NTIA Incident Response	**1FTAC53D**	FCC Public Notice DA 01-1621
419.6375	Base/Mobile	NTIA Incident Response	**1FTAC54**	FCC Public Notice DA 01-1621
410.6375	Mobile	NTIA Incident Response	**1FTAC54D**	FCC Public Notice DA 01-1621
419.8375	Base/Mobile	NTIA Incident Response	**1FTAC55**	FCC Public Notice DA 01-1621
410.8375	Base/Mobile	NTIA Incident Response	**1FTAC55D**	FCC Public Notice DA 01-1621
413.1875	Base/Mobile	NTIA Incident Response	**1FTAC56**	FCC Public Notice DA 01-1621
413.2125	Base/Mobile	NTIA Incident Response	**1FTAC57**	FCC Public Notice DA 01-1621

FCC 700 MHz Public Safety Band

Channel 23 & 24	Base/Mobile	General Public Safety Service (secondary trunked)	**7TAC58**
Channel 103 & 104	Base/Mobile	General Public Safety Service (secondary trunked)	**7TAC62**
Channel 183 & 184	Base/Mobile	General Public Safety Service (secondary trunked)	**7TAC66**
Channel 263 & 264	Base/Mobile	General Public Safety Service (secondary trunked)	**7TAC70**
Channel 39 & 40	Base/Mobile	Calling Channel	**7CAL59**
Channel 119 & 120	Base/Mobile	General Public Safety Service	**7TAC63**
Channel 199 & 200	Base/Mobile	General Public Safety Service	**7TAC67**
Channel 279 & 280	Base/Mobile	Mobile Data	**7DAT71**
Channel 63 & 64	Base/Mobile	EMS	**7EMS60**
Channel 143 & 144	Base/Mobile	Fire	**7FIR64**
Channel 223 & 224	Base/Mobile	Police	**7LAW68**
Channel 303 & 304	Base/Mobile	Mobile Repeater	**7MOB72**
Channel 79& 80	Base/Mobile	EMS	**7EMS61**
Channel 159 & 160	Base/Mobile	Fire	**7FIR65**
Channel 239 & 240	Base/Mobile	Police	**7LAW69**
Channel 319 & 320	Base/Mobile	Other Public Service	**7TAC73**
Channel 657 & 658	Base/Mobile	General Public Safety Service (secondary trunked)	**7TAC74**
Channel 737 & 738	Base/Mobile	General Public Safety Service (secondary trunked)	**7TAC78**
Channel 817 & 818	Base/Mobile	General Public Safety Service (secondary trunked)	**7TAC82**
Channel 897 & 898	Base/Mobile	General Public Safety Service (secondary trunked)	**7TAC86**

Channel 681 & 682	Base/Mobile	Calling Channel	**7CAL75**
Channel 761 & 762	Base/Mobile	General Public Safety Service	**7TAC79**
Channel 841 & 842	Base/Mobile	General Public Safety Service	**7TAC83**
Channel 921 & 922	Base/Mobile	Mobile Data	**7DAT87**
Channel 641 & 642	Base/Mobile	EMS	**7EMS76**
Channel 721 & 722	Base/Mobile	Fire	**7FIR80**
Channel 801 & 802	Base/Mobile	Police	**7LAW84**
Channel 881 & 882	Base/Mobile	Mobile Repeater	**7MOB88**
Channel 697 & 698	Base/Mobile	EMS	**7EMS77**
Channel 777 & 778	Base/Mobile	Fire	**7FIR81**
Channel 857 & 858	Base/Mobile	Police	**7LAW85**
Channel 937 & 938	Base/Mobile	Other Public Service	**7TAC89**

Note: Pairs 319/320 (7TAC73) and 937/938 (7TAC89) are available nationwide for coordination with non-public safety entities (utilities etc.)

FCC 800 MHz NPSPAC Band

821.0125	Mobile	Any Public Safety Eligible	**8CAL90**	CALLING CHANNEL Docket 87-112 90.617(a)(1) and 90.619(c)(1)
821.5125	Mobile	Any Public Safety Eligible	**8TAC91**	Docket 87-112 90.617(a)(1) and 90.619(c)(1)
822.0125	Mobile	Any Public Safety Eligible	**8TAC92**	Docket 87-112 90.617(a)(1) and 90.619(c)(1)
822.5125	Mobile	Any Public Safety Eligible	**8TAC93**	Docket 87-112 90.617(a)(1) and 90.619(c)(1)
823.0125	Mobile	Any Public Safety Eligible	**8TAC94**	Docket 87-112 90.617(a)(1) and 90.619(c)(1)
866.0125	Base/Mobile	Any Public Safety Eligible	**8CAL90D**	CALLING CHANNEL Docket 87-112 90.617(a)(1) and 90.619(c)(1)
866.5125	Base/Mobile	Any Public Safety Eligible	**8TAC91D**	Docket 87-112 90.617(a)(1) and 90.619(c)(1)
867.0125	Base/Mobile	Any Public Safety Eligible	**8TAC92D**	Docket 87-112 90.617(a)(1) and 90.619(c)(1)
867.5125	Base/Mobile	Any Public Safety Eligible	**8TAC93D**	Docket 87-112 90.617(a)(1) and 90.619(c)(1)
868.0125	Base/Mobile	Any Public Safety Eligible	**8TAC94D**	Docket 87-112 90.617(a)(1) and 90.619(c)(1)

FCC 700 MHz Wideband Data

Channels CHANNEL SET(S)	CHANNEL LABEL	FREQUENCY		**USAGE PARAMETERS**
28	7WDAT1A		768.4	**50 KHz use with aggregation to 150 kHz**
29	7WDAT1B		768.45	**50 KHz use with aggregation to 150 kHz**
30	7WDAT1C		768.5	**50 KHz use with aggregation to 150 kHz**
28,29	7WDAT1E	768.4 + 768.45		
29,30	7WDAT1F	768.45 + 768.5		
28,29,30	7WDAT1G	768.4 + 768.45 + 768.5		
37	7WDAT2A		768.85	**50 KHz use with aggregation to 150 kHz**

38	7WDAT2B		768.9	**50 KHz use with aggregation to 150 kHz**
39	7WDAT2C		768.95	**50 KHz use with aggregation to 150 kHz**
37,38	7WDAT2E	768.85 +768.90		
38,39	7WDAT2F	768.90 + 768.95		
37,38,39	7WDAT2G	768.85 + 768.90 + 768.95		
82	7WDAT5A		771.05	**50 KHz use with aggregation to 150 kHz**
83	7WDAT5B		771.1	**50 KHz use with aggregation to 150 kHz**
84	7WDAT5C		771.15	**50 KHz use with aggregation to 150 kHz**
82,83	7WDAT5E	771.05 + 771.1		
83,84	7WDAT5F	7771.1 + 771.15		
82,83,84	7WDAT5G	771.05 + 771.1 + 771.15		
91	7WDAT6A		771.5	**50 KHz use with aggregation to 150 kHz**
92	7WDAT6B		771.55	**50 KHz use with aggregation to 150 kHz**
93	7WDAT6C		771.6	**50 KHz use with aggregation to 150 kHz**
91,92	7WDAT6E	771.5 + 771.55		
92,93	7WDAT6F	771.55 + 771.6		
91,92,93	7WDAT6G	771.5 + 771.55 + 771.6		
46	7WDAT3A		769.3	**50 KHz use with no aggregation**
47	7WDAT3B		769.35	**50 KHz use with no aggregation**
48	7WDAT3C		769.4	**50 KHz use with no aggregation**
73	7WDAT4A		770.6	**50 KHz use with no aggregation**
74	7WDAT4B		770.65	**50 KHz use with no aggregation**
75	7WDAT4C		770.7	**50 KHz use with no aggregation**

Note: Channels 46 & 48 and 73 & 75 are reserved as 50 KHz Nationwide Common Channels