

Region 19 4.9 GHz Frequency Plan

States of

**Connecticut, Maine, Massachusetts, New
Hampshire,
Rhode Island and Vermont**

Final

March 14, 2006

Table of Contents

1. Regional Committee Positions.....	3
2. RPC Membership.....	4
3. Region Description.....	5
4. Notification Process.....	7
5. Regional Plan Administration.....	8
5.1 Operations of the Regional Plan Committee.....	8
5.2 Procedure for Frequency Coordination.....	9
5.3 Adjacent Region Coordination.....	9
5.4 Dispute Resolution.....	9
6. Interference Protection.....	10
7. Allocation of Spectrum.....	11
7.1 Permission To Use Frequency / Frequency Assignments.....	11
7.2 Mobile Operations.....	11
7.3 Temporary Fixed Links.....	12
7.4 Fixed Point-to-Point.....	12
7.5 System Implementation.....	12
7.6 Priority Matrix.....	12

Appendices

Appendix A – Committee Membership.....	13
Appendix B – Technical Reference.....	14
Appendix C - Listing of Region’s States and Counties.....	15

1. Region 19 4.9 GHz Regional Planning Committee

The 4.9GHz Planning Committee is a subcommittee of the Region 19 – 700MHz Regional Planning Committee (RPC). A 4.9 GHz subcommittee was established to prepare a plan in compliance with the FCC directive in Docket WT00-32.

The Regional Planning Committee Officers are:

Chairperson: George Pohorilak
1111 Country Club Road
Middletown, CT 06457-9294
Phone: 860-685-8080
FAX: 860-685-8363
Email: george.pohorilak@po.state.ct.us

Vice-Chairperson Jerry Zarwanski
1111 Country Club Road
Middletown, CT 06457-9294
Phone: 860-685-8080
FAX: 860-685-8363
Email: jerry.zarwanski@po.state.ct.us

Secretary James Warakois
Boston, Mass
2626 Centre Street
West Roxbury, MA 02132
Phone: 617-343-4214
FAX: 617-343-5343
Email: warakoisj@attglobal.net

2. Regional Planning Committee Membership

Appendix A contains the membership list for Region 19. Membership is open to any interested party. Voting and operating procedures are described in Section 5 of this plan.

The Regional Planning Committee shall have two classes of members, "voting members" and "non-voting members." New members may be added at annual, special, or regular meetings.

Voting Members. Voting members shall consist of one representative from any single agency engaged in public safety eligible to hold a license under 47 CFR 90.20, 47 CFR 90.523 or 47 CFR 2.103.

A single agency shall be allowed no more than one vote for each distinct eligibility, category (e.g. police, fire, EMS, highway) within the agency's organization or political jurisdiction. In voting on any issue, the individual must identify himself/herself and the agency and eligibility category which he or she represents. Members must be representative of eligible organizations from the member states.

Non-Voting Members. Non-voting members are all others interested in furthering the goals of public safety communications.

3. Region Description

New England Region 19 comprises six states: Maine, New Hampshire and Vermont to the north, Massachusetts, Connecticut and Rhode Island to the south. The three northern states border Canada. The western regional border is adjacent to New York state. The eastern and southern borders meet the Atlantic Ocean and Long Island Sound.

The region's topography is diverse. "The key topographic influence are the Appalachian mountains, which run north from western Connecticut and Massachusetts, into the Green Mountains of Vermont, and the White Mountains of New Hampshire, terminating in Maine. The trademark rocky coastline of Maine, sandy beaches and dunes of New Hampshire, Massachusetts, and Rhode Island, and Connecticut, offer the interface between the land mass of New England and the waters of the Atlantic Ocean and Long Island Sound. Bridging the gap between the ocean and mountains" are coastal plain and rolling hills.¹ The highest point is Mount Washington in New Hampshire which rises 6,288 feet above sea level. The lowest elevation is sea level for the states bordering the Atlantic Ocean and Long Island Sound. The region encompasses 62,810 square miles with a population of 13,562,517.² Population characteristics vary considerably.

The northern states - Maine, New Hampshire, Vermont - are sparsely populated relative to the region as a whole. While these states comprise 78% of the geographical region (49,080 square miles), they account for 23% of the region's population (3,119,536). The average population density for these three states combined is 64 persons per square mile. Within these states, the population density ranges from four persons per square mile (Piscataquis County, Maine) to 435 persons per square mile (Hillsborough County, New Hampshire). There is one city with a population of over 100,000, Manchester, New Hampshire (population 107,006).

The population of the region's southern states - Massachusetts, Connecticut and Rhode Island - reflect a more urban nature. This remaining geographic area comprises 22% of the geographic area (13,730 square miles) but 77% of the population (10,442,981) with an average density of 761 persons per square mile. However, within these states, there is a wide range in population density ranging from 102 persons per square mile (Franklin County, Massachusetts) to 11,788 persons per square mile (Suffolk County, Massachusetts). There are 11 cities with populations of over 100,000 in these states, the most populous being Boston, Massachusetts (population 589,141).

A complete listing of the region's states and counties is found in Appendix C.

Clearly, the geographic and demographic diversity within Region 19 presents both operational and structural challenges in the development and administration of the comprehensive management plan.

1. "The New England Weather Network: A Shared 21st Century Vision For Environmental Monitoring and Science Education In The New England States," University of Maine Robust Instrumentation Laboratory website

<http://www.eece.maine.edu/EE/RIL/> updated 08-04-00.

2. County population data taken from:

U.S. Census Bureau, Census 2000 Summary file 1, Matrices PCT 12 and 13.

Population density data taken from:

U.S. Census Bureau, Census 2000 QuickFacts state and county tables.

Cities with population over 100,000 data taken from:

U.S. Census Bureau, Table SUB-EST2002-01, City and Town Population

Estimates: April 1, 2000 to July 1, 2002.

4. Notification Process

The First Regional 4.9GHz Plan Meeting was held on March 9, 2004 at Massachusetts State Police Headquarters in Framingham, Massachusetts. The FCC issued a Public Notice of the meeting concurrently with the 700MHz meeting. The Public Notice was issued more than 30 days in advance of the meeting date. The Meeting Notice was posted on the FCC website (<http://www.fcc.gov>) and found in the FCC daily digest.

The second meeting was held on June 8, 2004. The FCC issued a Public notice for this meeting concurrently with the 700MHz meeting. The Public Notice was issued more than 30 days in advance of the meeting date and posted on the FCC website.

The third meeting was held on September 14, 2004. An FCC Public Notice was issued for this meeting concurrently with the 700MHz meeting. FCC Public Notices have been issued concurrently with 700Mhz meeting notices for all subsequent meetings.

A copy of the Public Notices have been mailed to the Tribal Nations in New England/Region 19 in advance of the meeting dates.

All 4.9 GHz meetings are open to the public. The Meeting minutes are taken by the Secretary, maintained by the Regional Chairperson and are available on the Region 19 New England 700 MHz website at <http://www.ner700mhz.org>. The 4.9 GHz meeting minutes are included in with the 700 MHz meeting minutes in most cases.

5. Regional Plan Administration

5.1 Operations of the Regional Planning Committee (RPC)

The Region 19 Regional Planning Committee (RPC) will use Robert's Rules of Order to conduct meetings.

Within the committee, one person shall represent each member state from each of the following categories: police, fire, emergency medical services, emergency management, highway, Association of Public Safety Officials, American Association of State Highway Transportation Officials, International Municipal Signal Association, Forest Conservation Communications Association and an at-large representative. At any meeting of the members, nine eligible members representing no less than three states shall constitute a quorum. All decisions will be by clear consensus vote. No single agency shall be allowed more than one vote for each distinct eligibility category within the agency's organization or political jurisdiction.

Quarterly meetings will be held including the full Regional Planning Committee. Meetings will be held concurrent with or immediately after Region 19 700 MHz meetings. Meetings will be announced and advertised 90 days in advance by the Committee Chair.

After the Federal Communications Commission approval of this Regional Plan, the Chair shall call a meeting of the Committee to elect a Chair, Vice Chair and Secretary that will serve one-year terms. There is no limit to the number of terms that may be served. If the Chair is unable to serve a complete term the Vice Chair will serve as Chair until the next election meeting. If both the Chair and Vice-Chair are unable to serve full terms, the Secretary will call a special meeting of the Committee to elect replacements. If for any reason the Secretary is unable to call a special meeting, the State or any County within the region may call for a special meeting, giving at least 90 days notice, to elect replacements.

Subcommittees may be formed as needed to work on specific issues.

Meetings are open to all persons. A public comment time is given for anyone to express a viewpoint or to have input to the planning process.

5.2 Procedure for Frequency Coordination

Prior to making application for new 4.9 GHz systems from the Federal Communications Commission, eligible entities will contact the Regional Planning Committee, in writing, and advise the committee of the intended systems in the 4.9 GHz Spectrum. Licensed systems not already on record with the Regional Planning Committee will be secondary to coordinated frequencies until the licensee contacts the Regional Planning Committee, in writing, and provides information about existing and intended systems in the 4.9 GHz spectrum.

Requests for frequency coordination must be submitted to the Regional Planning Committee in writing. The Regional Planning Committee will appoint a frequency coordinator and alternate coordinator who will review the request and make a recommendation to the RPC Chair within 30 days from the date the request is received. Coordination documentation will be provided to the applicant and existing licensees within twenty miles of the proposed area of operation upon request.

The Regional Planning Committee will create and maintain a regional database for the purpose of coordinating 4.9 GHz spectrum resources in areas where multiple 4.9 GHz operations are proposed.

The Regional Planning Committee will act as a clearinghouse for public safety agencies providing information and facilitating resource sharing where feasible.

5.3 Adjacent Region Coordination

Region 19 shares borders with Regions 8 and 30. Region 19 will obtain adjacent regions' concurrences on the Region 19 4.9 Ghz Plan prior to submission to the Federal Communications Commission. Region 19 will coordinate 4.9 GHz mobile and fixed operations with adjacent regions within twenty miles of any border.

5.4 Dispute Resolution

In the event an agency disputes the implementation of this plan after FCC approval, the agency must notify the Chair of the dispute in writing. The Chair will attempt to resolve the dispute on an informal basis. If a party to the dispute employs the Chair, then the Vice Chair will attempt resolution. In such cases, the Chair shall be deemed to have a conflict of interest and will be precluded from voting on such matters. If the Chair and the Vice Chair are employed by a party to the dispute, then the committee will appoint a member not party to the dispute to mediate the dispute.

If after 30 days the dispute is not resolved, the Chair (or Vice Chair) will appoint an ad-hoc Dispute Resolution Committee. No member selected may be from an agency involved in the dispute. The Dispute Resolution committee will select a Chair to head the committee. The Regional Plan Chair (or Vice Chair) will represent the Region in presentations to the Dispute Resolution Committee. The Committee will hear input from the disputing agency, any effected agencies and the Region Chair. The Committee will then meet in executive session to prepare a recommendation to resolve the dispute. Should this recommendation not be acceptable to the disputing agency or agencies, the dispute and all written documentation will be forwarded to the Federal Communications Commission for final resolution.

6. Interference Protection

The Regional Planning Committee does not guarantee interference protection in the 4.9 GHz spectrum. Systems should be engineered to facilitate resource sharing where feasible. 1 MHz channels (1 – 5, and 14 – 18) will generally be allocated for permanent Fixed Point to Point operations. Mobile operations on channels 1 – 5, and 14 – 18 will require special coordination. 5 MHz channels (6 – 13) will generally be allocated for Mobile WAN, PAN, VAN, and Mobile Mesh operations. Aggregation of channels to achieve greater operational bandwidths will require special coordination.

7. Allocation of Spectrum

The FCC permits aggregated channel bandwidths of 5, 10, 15, or 20 MHz. Channel numbers 1-5 (yellow) and 14-18 (blue) are 1 MHz channels. Channel numbers 6-13 (green) are 5 MHz channels.

Center Frequency (MHz) Channel Nos.

1 Mhz Channels

4940.5	1
4941.5	2
4942.5	3
4943.5	4
4944.5	5

5 Mhz Channels

4947.5	6
4952.5	7
4957.5	8
4962.5	9
4967.5	10
4972.5	11
4977.5	12
4982.5	13

1 Mhz Channels

4985.5	14
4986.5	15
4987.5	16
4988.5	17
4989.5	18

7.1 Permission To Use Frequency / Frequency Assignments

Responsibility to coordinate 4.9 GHz frequency usage falls to the Regional Planning Committee. The committee will appoint a frequency coordinator who will maintain a database of frequency usage and will coordinate usage to favor the sharing of infrastructure and technologies among multiple licensees operating in the same geographical area.

7.2 Mobile Operations

Mobile operations will be allocated with a minimum of one 5MHz channel up to an aggregation of four 5MHz channels. Channels 6 – 13 are allocated for mobile operations.

7.3 Temporary Fixed Links

Mobile operations can be extended to include a temporary fixed application for up to one year on a secondary basis. Temporary Fixed operations will require special coordination. Channels 6 – 13 are allocated for mobile and temporary fixed operations.

7.4 Fixed Point-to-Point

Fixed Point-to-Point operations require an FCC license at each specific location. Applicants will be required to contact the 4.9GHz subcommittee within the Regional Planning Committee, in writing, with a request for coordination of Fixed Point to Point operations prior to filing an application with the Federal Communications Commission.

7.5 System Implementation

Public safety entities are encouraged to partner regarding system infrastructure where geographical boundaries of jurisdiction overlap. To date, no technical equipment standards have been adopted by the Federal Communications Commission for operations in the 4.9 GHz spectrum.

7.6 Priority Matrix

Incident commanders will have authority to establish user priority and temporary rules of operation on all 4.9 GHz systems operating within five miles of the incident command. Incident commanders will make reasonable attempts to coordinate frequency usage with other existing users of frequency that has been approved through the 4.9 GHz subcommittee.

Priority	Definitions
<u>Level 1</u> Protection of Human Life	<ul style="list-style-type: none"> • Prevents/minimized the expected loss of life • Prevents/minimizes expected permanent disabilities • Prevents/minimizes expected recoverable injury/disease, reduce pain and suffering.
<u>Level 2</u> Protection of Human Needs	<ul style="list-style-type: none"> • Reduces/prevents loss of critical infrastructure • Reduces/prevents loss of food, clothing, shelter, or provides emergency replacements • Reduces/prevents loss of economically critical property
<u>Level 3</u> Protection of Quality of Life	<ul style="list-style-type: none"> • Reduces/prevents loss of personal property • Reduces/prevents loss of plaes for performing arts, public sites, wilderness areas, etc. • Provides public inforamtion to Information Officers, or from Information Officers to media
<u>Level 4</u> Administration	All non-emergency public safety tasks such as record keeping/transfer, recovery cost accounting, etc.

Appendix A. Committee Membership

Name	Agency
Aiken, Douglas	Lakes Region Mutual Fire Aid
Brown, Stephan	Connecticut Department of Transportation, Aviation
Bardwell, Thomas	New Hampshire Department of Safety
Carbonell, George	Connecticut Department of Transportation
Chase, David	New Hampshire Department of Transportation - AASHTO
Crotty Thomas	Rhode Island State Police
Derdak, Elliot	Boston Emergency Medical Services
Dobbins, Caleb	New Hampshire Department of Transportation
Herrick, H. Meade	New Hampshire Office of Emergency Management
Kowalik, James	New Hampshire State Police
Leary, Paul	New Hampshire Department of Resource & Economic Development
Mansfield, William	Nashua Police Department
Muise, Tom	Massachusetts Office of Emergency Management
O'Brien, Arthur	Massachusetts Highway Department
O'Rourke, Patrick M.	Boston Fire Department
Plante, William	Maine Department of Transportation
Pohorilak, George	Connecticut Department of Public Safety, Office of Statewide Emergency Telecommunications
Poole, Mark	Maine State Police
Shand, Gordon	Connecticut Department of Public Health
Stemmler, Michael	Connecticut State Police
Sutherland, Blair	Massachusetts State Police
Walsh, Thomas	Connecticut Military Department, Emergency Management
Warakois, James	Boston Police Department
Wood, Bill	New Hampshire Bureau of Emergency Management Services
Zarwanski, Jerry	Connecticut Department of Public Safety, Office of Statewide Emergency Telecommunications

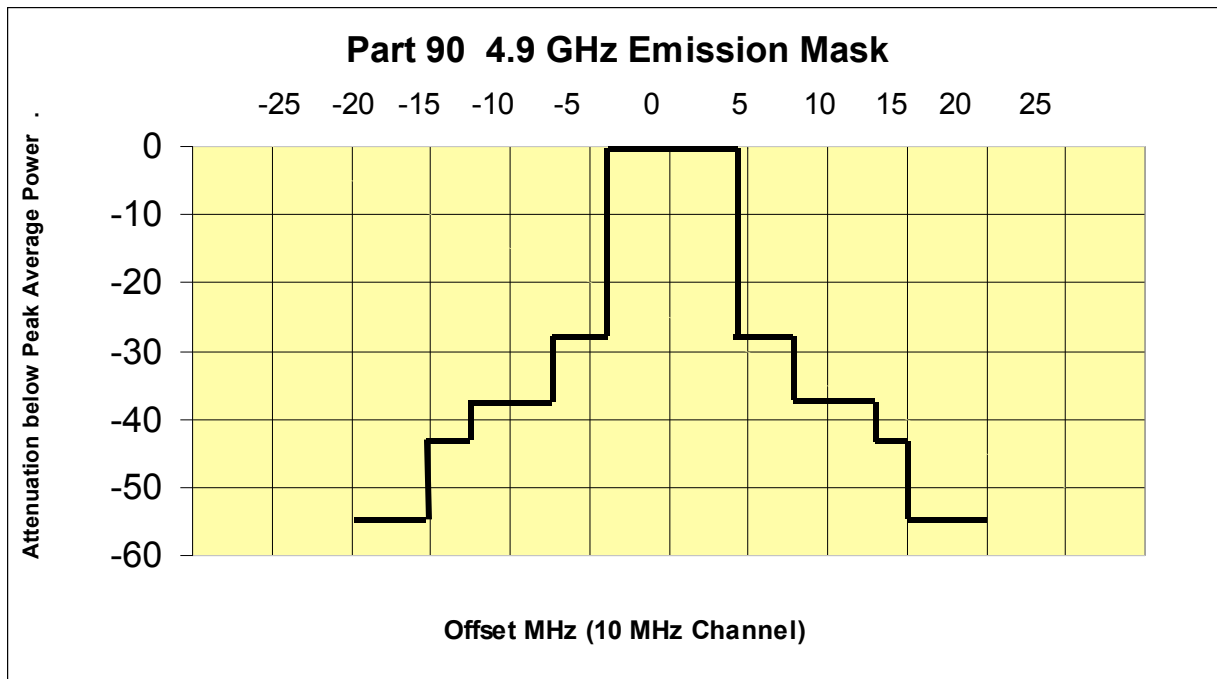
Appendix B. Technical Reference

Power Limits

1 MHz Channel - 20 dBm	(100 mW)
5 MHz Channel - 27 dBm	(500 mW)
10 MHz Channel - 30 dBm	(1 Watt)
15 MHz Channel - 31.8 dBm	(1.5 Watt)
20 MHz Channel - 33 dBm	(2 Watt)

If transmitting antennas greater than 9 dBi are used, the peak transmit power must be reduced by the amount in decibels that the directional gain of the antenna exceeds 9 dBi. Fixed Point to Point operations are allowed up to 26 dBi antenna gain.

Emission Mask



- **Mask scales to bandwidth**
- **1 and 5 MHz channels available, can combine up to 20 MHz**

Appendix C. Listing of Region's States and Counties

County and State	Population	% of Population	Square Miles	Persons per Square Mile	County and State	Population	% of Population	Square Miles	Persons per Square Mile
Connecticut	3,405,565	100%	4,845	703	Massachusetts	6,349,097	100%	7,840	810
Fairfield	882,567	25.9%	626	1,410	Norfolk	650,308	10.2%	400	1,628
Hartford	857,183	25.2%	735	1,166	Plymouth	472,822	7.4%	661	716
Litchfield	182,193	5.3%	920	198	Suffolk	689,807	10.9%	59	11,788
Middlesex	155,071	4.6%	369	420	Worcester	750,963	11.8%	1,513	496
New Haven	824,008	24.2%	606	1,361					
New London	259,088	7.6%	666	389	New Hampshire	1,235,786	100%	8,968	138
Tolland	136,364	4.0%	410	333	Belknap	56,325	4.6%	401	140
Windham	109,091	3.2%	513	213	Carroll	43,666	3.5%	934	47
					Cheshire	73,825	6.0%	707	104
Maine	1,274,923	100%	30,862	41	Coos	33,111	2.7%	1,800	18
Androscoggin	103,793	8.1%	470	221	Grafton	81,743	6.6%	1,713	48
Aroostook	73,938	5.8%	6,672	11	Hillsborough	380,841	30.8%	876	435
Cumberland	265,612	20.8%	836	318	Merrimack	136,225	11.0%	934	146
Franklin	29,467	2.3%	1,698	17	Rockingham	277,359	22.4%	695	399
Hancock	51,791	4.1%	1,588	33	Strafford	112,233	9.1%	369	304
Kennebec	117,114	9.2%	868	135	Sullivan	40,458	3.3%	537	75
Knox	39,618	3.1%	366	108					
Lincoln	33,616	2.6%	456	74	Rhode Island	1,048,319	100%	1,045	1,003
Oxford	54,755	4.3%	2,078	26	Bristol	50,648	4.8%	25	2,052
Penobscot	144,919	11.4%	3,396	43	Kent	167,090	15.9%	170	982
Piscataquis	17,235	1.4%	3,966	4	Newport	85,433	8.1%	104	821
Sagadahoc	35,214	2.8%	254	139	Providence	621,602	59.3%	413	1,504
Somerset	50,888	4.0%	3,926	13	Washington	123,546	11.8%	333	371
Waldo	36,280	2.8%	730	50					
Washington	33,941	2.7%	2,568	13	Vermont	608,827	100%	9,250	66
York	186,742	14.6%	991	189	Addison	35,974	5.9%	770	47
					Bennington	36,994	6.1%	676	55
Massachusetts	6,349,097	100%	7,840	810	Caledoonia	29,702	4.9%	651	46
Barnstable	222,230	3.5%	396	562	Chittenden	146,571	24.1%	539	272
Berkshire	134,953	2.1%	931	145	Essex	6,459	1.1%	665	10
Bristol	534,678	8.4%	556	962	Franklin	45,417	7.5%	637	71
Dukes	14,987	0.2%	104	144	Grand Isle	6,901	1.1%	83	84
Essex	723,419	11.4%	501	1,445	Lamoille	23,233	3.8%	461	50
Franklin	71,535	1.1%	702	102	Orange	28,226	4.6%	689	41
Hampden	456,228	7.2%	618	738	Orleans	26,277	4.3%	698	38
Hampshire	152,251	2.4%	529	288	Rutland	63,400	10.4%	933	68
Middlesex	1,465,396	23.1%	823	1,780	Washington	58,039	9.5%	689	84
Nantucket	9,520	0.1%	48	199	Windham	44,216	7.3%	789	56
					Windsor	57,418	9.4%	971	59
					Total	13,922,517		62,810	222