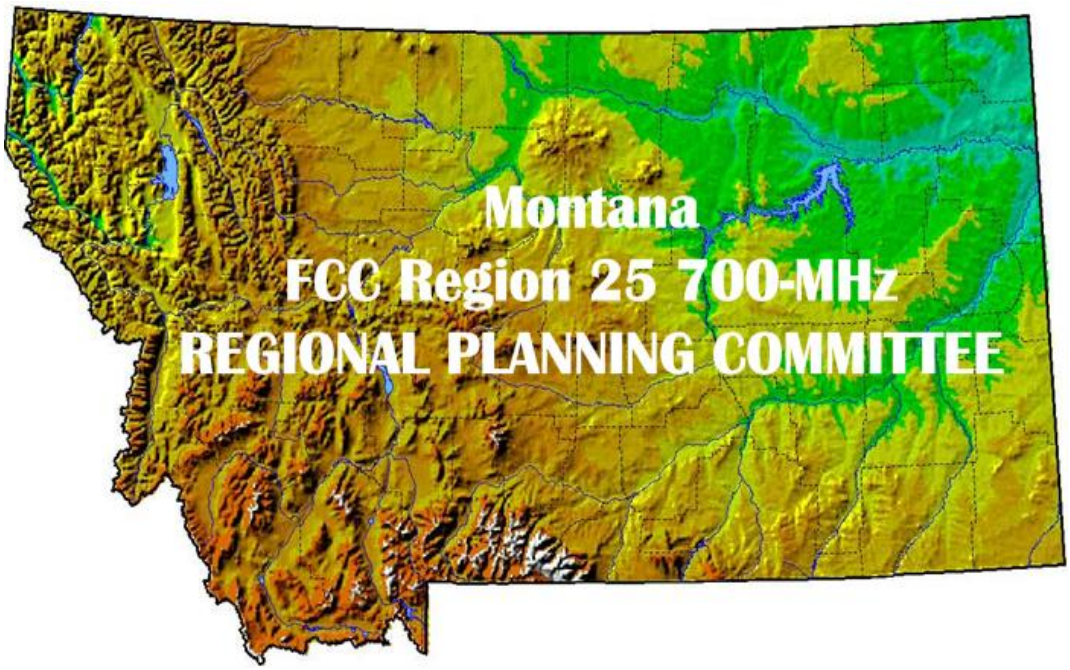
700 MHz Regional Plan for Region 25



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Scope

1.1 Introduction

This document is the 700 MHz Plan for Region 25 (Montana). The purpose of the Regional Plan is to ensure that eligible entities derive maximum public benefit from use of the 700 MHz spectrum. Furthermore, the plan was developed to guide eligible entities through the application process and provide an equitable means of settling disputes concerning frequency allocations should they arise.

1.2 Regional Plan Summary

First, Region 25 is defined as the entire State of Montana. The broad classification of entities eligible to apply for spectrum is defined in accordance with Federal Communications Commission (FCC) rules and definitions found in 47 CFR Part 90. Next, to garner the participation in and support of the planning process, an attempt was made to contact all eligible agencies. These attempts are documented. A discussion follows about the process by which initial spectrum allocations were made. Finally, a detailed discussion of the application process is given, which includes guidelines for spectrum use, application requirements, the application review process and dispute resolution. Also included is a discussion of the future planning process.

The Region 25 Committee accepts the Computer Assisted Pre-Coordination Resource and Database (CAPRAD) database initial allocation based on population density and call volume by county. It has been noted by the committee that this allocation closely matches the US Office of Management and Budget (OMB) Bulletin description of Designated Statistical Areas. The Committee will use the CAPRAD database when allocating frequency resources in Region 25.

Interoperability guidelines and usage must be consistent with the Montana SCIP Plan. If any conflicts arise between the interoperability rules for National Calling and Tactical channels and Montana SCIP Plan, SCIP guidelines will prevail.

After the initial Region 25 meeting, a Writing Group was established. The Writing Group developed a draft 700 MHz Regional Plan using resources developed by the National Coordination Committee (NCC) and by reviewing other FCC-approved 700 MHz Regional Plans. The draft 700 MHz Plan was presented to the membership at a meeting held in Helena, Montana on Aug. 31, 2010. Members reviewed and discussed the draft Plan. Suggested changes were noted and incorporated into the Plan.

The draft 700 MHz Plan was then posted onto the State of Montana PSSB website @ pssb.mt.gov. Members of Region 25 were notified via the *Heard Across Montana* e-mail newsletter that the draft Plan was available for review and comment. Any comments or suggestions were to be shared with the entire Region 25 list serve. No comments or suggestions were received.

The draft was formally adopted at a meeting in Bozeman, MT held on Oct. 12, 2010. The Plan was then circulated to all adjacent 700 MHz Regional Planning Committees for review and written consent.

2.0 Regional Planning Committee Leadership

At the time of the transmittal of this Plan to the FCC, the following individuals serve in leadership roles in the Region 25 Regional Planning Committee (RPC):

Regional Chairperson:	Scott Bradford Public Safety Services Bureau State of Montana P.O. Box 200113 Helena, MT 59620-0113 Phone: (406) 444-2782 sbradford@mt.gov
Vice Chairperson:	Dale Osborne Montana Highway Patrol 2550 Prospect Helena, MT (406)444-4274 dosborne@mt.gov
Secretary:	Dan Sullivan Public Safety Services Bureau State of Montana P.O. Box 200113 Helena, MT 59620 (406) 444-3581 dsullivan@mt.gov

From time to time, as described in the RPC Bylaws (Appendix A), these positions will be subject to re-election. At any such time that one of these three positions changes, the Chair will be responsible for taking the following actions:

- Providing notice to the FCC of the changes
- Providing notice to the National Regional Planning Council (NRPC) of the changes
- Providing notice to the NPSTC Support Office of the changes

Such changes will not be considered Plan modifications and will not require that this document be reissued to the FCC for public notice and comment cycles.

3.0 Regional Planning Committee Membership

Membership in the Region 25 Regional Planning Committee is open to any interested party. Committee Officers, voting procedures, and membership attendance requirements are listed in the Regional Planning Committee's Bylaws, which can be found in Appendix A. Appendix B of this Plan lists all of Region 25's initial members, their agency/affiliation and voting status. While Region 25's membership is not large, it is representative of public safety entities within the state.

4.0 Regional Profile

The State of Montana is a single planning region (Region 25) for both the 700 MHz and 800 MHz public safety bands. Region 25 is bordered by Canada on the north and shares borders with neighboring Region 12 (Idaho) to the west, Region 46 (Wyoming) to the south, and Regions 38 (South Dakota) and 32 (North Dakota) to the east.
Topography and land use vary, from the forests and mountains of Western Montana to the high plains areas of east. Despite having the nation's fourth largest land area, Montana has low population density, ranking 44th in the nation. Primary industries are agriculture, government, tourism and mining. The climate ranges from moist forestland of the Northwest to the semi-arid valleys of Central Montana to the plains of Eastern Montana.

There are 56 counties and seven recognized tribal reservations in Montana (See Appendix C for counties and population figures). Billings (Yellowstone County) is the largest city in this region. Other significant population areas include Missoula (Missoula County), Great Falls (Cascade County), Bozeman (Gallatin County), Helena (Lewis and Clark County), and Kalispell (Flathead County). The population of Region 25 is estimated by the US Census Bureau to be 974,989 (July, 2010). Over 80 percent of this population is concentrated in the seven counties listed above. The eastern portion of the state is predominately rural and agricultural in nature.

Region 25 will coordinate channel allocations with all bordering regions for those channels established for statewide use. Region 25 will provide data to the National Public Safety Telecommunications Council (NPSTC) Pre-coordination Data Base to assist with adjacent region coordination. Region 25 also will provide data to the Pre-Coordination Data Base (CAPRAD) to assist with adjacent region coordination.
County allotments for 700 MHz frequencies have been developed based on population densities within the region and using comparisons to adjacent Regions.

5.0 Notification Process

Region 25 held its first 700 MHz meeting on July 17, 2002. Sixty days notice was given prior to the first meeting. Notice of the first meeting was accomplished via e-mail to fire, police, emergency management and federal agencies within the state.

There are seven federally recognized Native American Reservations in Montana:

- Assiniboine and Sioux (Fort Peck)
- Blackfeet Tribe
- Chippewa-Cree (Rocky Boy)
- Confederated Salish and Kootenai
- Crow Tribe
- Fort Belknap Indian Community of the Fort Belknap Reservation of Montana
- Northern Cheyenne Tribe

Representatives of these Tribal Nations were notified via the Heard Across Montana electronic newsletter of and invited to participate in the 700 MHz Regional Planning process.

6.0 Regional Plan Administration

6.1 Operations of the Regional Planning Committee

This Committee will use Robert's Rules of Order to conduct meetings. All decisions will be by clear consensus vote with each public safety agency having one vote. Meetings are open to all persons and a public input time shall be included on the meeting agenda for anyone to express a viewpoint or to have input into the planning.

Workgroups may be formed as needed to work on specific issues. For the initial planning, a writing and spectrum planning group were formed. Workgroups are intended to work on details of specific issues and make recommendations to the full Committee. Any changes to the Regional Plan must be voted on and approved by the full Regional Planning Committee. Workgroups are open to anyone who wants to participate. The Chair of the Regional Plan Committee appoints a Chair for each workgroup.

A minimum of one meeting per year will be held by the full Committee. This meeting will be announced and advertised by the Committee Chair. Normal time for this meeting will be in conjunction with the Montana APCO/NENA conference.

Beginning two years after 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 to serve for two years. 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 their full terms, one or the other should strive to call a special meeting of the Committee to elect replacements. If for some reason neither the Chair nor the Vice Chair can call the special meeting, the Region 25 RPC membership may call for a special meeting to elect replacements.

6.2 Technical and Interoperability Subcommittee

The primary responsibility of the Technical and Interoperability Subcommittee will be to review applications from agencies within the region for conformance to Plan requirements. The Technical and Interoperability Subcommittee will have access to the Computer Assisted Pre-coordination and Resource Database System (CAPRAD) pre-coordination database system, and will review and recommend approval of applications as they are received in the system. Applications approved by the Region 25 RPC will be forwarded to the selected coordinator and then to the FCC. Membership of this committee will consist of the Technical and Interoperability Subcommittee Chairperson and three members of the Region 25 RPC selected by the Chairperson. Membership of the Technical and Interoperability Subcommittee will be determined at the annual meeting by members volunteering to serve and/or by appointment by the Chairperson.

The Technical and Interoperability Subcommittee duties are as follows:

- Review applications for compliance to the Region 25 Plan
- Review appeals, applicant clarifications and applicant presentations
- Recommend approval or denial to the Region 25 RPC Chairperson

- Maintain coordination with FCC certified frequency coordinators and advisors
- Update CAPRAD
- Work with the SCIP Plan Governance Committee on development of the Montana SCIP Plan
- Load interoperability channel assignments in CAPRAD

6.3 Administrative Subcommittee

The Administrative Subcommittee is responsible for monitoring adherence to the Region 25 Plan. Membership of this committee shall consist of the Interoperability Subcommittee chairperson and three other members of the RPC selected by the RPC Chairperson. Committee membership will be determined at the annual meeting. The Committee will remain in place permanently to resolve inter-regional issues and recommend Region 25 Plan changes to the FCC.

Administrative Subcommittee duties are as follows:

- Annually review and update the Region 25 Plan as necessary
- Monitor various system(s) implementation progress
- Communicate with applicants to determine if implementation of their systems is in accordance with provisions of their applications
- Make recommendations to the Region 25 RPC on applicants that fail to implement systems
- Make recommendations to resolve inter-regional issues
- Maintain coordination with neighboring RPC's

6.4 Procedure for Requesting Spectrum Allotments

Upon FCC approval of this Plan, Region 25 will announce to the Region that 700 MHz public safety channels are available in the Region and that channels have been assigned to county pool allotments within the Region. All available methods will be used to notify public safety entities of channel availability in the Region. All requests will be considered on a first-come, first-served basis. Region 25 supports the National Coordination Committee Pre-Assignment Rules and Recommendations and will use these guidelines as a template to determine if applications submitted to the Region 25 RPC meet regional planning standards. It is recommended that applicants familiarize themselves with Regional planning standards prior to submitting applications for Region 25 700 MHz frequencies.

The initial filing window is 60 days following FCC Plan approval. All applications after this time period will be considered on a first-come first-served basis.

Other elements taken into consideration for determination of priority of application will be:

- Users who are involved in the protection of life and property
- Multi-agency shared systems where multiple agencies agree to construct a common infrastructure (i.e. state, city, county, and others)
- Large agencies with multiple divisions constructing a common system for all to use (i.e. a large city or county with multiple divisions)
- Trunked use of the frequencies
- Approved funding to construct the system using the 700 MHz frequencies

- A statement of future intended actions of any currently licensed channels that will be replaced by a new 700 MHz system and how those actions may benefit other agencies in Region 25 by releasing channels back into the Public Safety pool

Agencies will need to fully document technical information, sites, tower heights, area of coverage, and ERP of transmitter sites, along with any other technical information required for Region 25 RPC Technical Subcommittee review and subsequent frequency coordinator review. Agencies are expected to construct systems with maximum signal levels in their coverage area and minimum signal levels in co-channel user's coverage areas. The 700 MHz coverage area in the context of this Plan will be defined as the geographical boundaries of an agency(s) served plus eight miles. The Region 25 RPC realizes that radio signals do not stop at political borders. Our attempt is to maximize the use of the frequencies by "packing" as many users as possible per channel.

In order to maintain accurate records in the CAPRAD database, applicants will provide Region 25 with copies of their application along with associated documentation for review. In general and unless otherwise noted, the Region 25 Regional Planning Committee will adhere to the published National Coordination Committee Implementation Guidelines for 700 MHz Public Safety Regional Planning Committees.

6.5.1 Application Requirements

To request frequencies from Region 25, a full application package must be submitted to the Region 25 RPC Chairperson in electronic format for entry into the CAPRAD database http://caprad.org.

The application must include:

- FCC Form 601
- Brief description of the proposed system
- A justification for use of the additional spectrum
- An explanation of the system's future growth for all agencies involved in the system, including how the system will be loaded and what equipment type and quantity is planned to be purchased to load the system
- An interference prediction map using the current version of TIA/EIA TSB 88 guidelines
- Maps showing all interference predicted for the proposed system
- Explanation of the budget commitment for the proposed system including documents indicating agency-funding commitments sufficient to fund the development of the proposed system(s)
- Statement that the applicant agency will conform with interoperability requirements of the Montana SCIP Plan
- Any documentation that identifies the radio channels the applicant agency/entity will be abandoning after full implementation of the 700 MHz system, if applicable

6.5.2 Application Distribution/Coordination

The Chairperson will distribute the application request to the Technical Sub-committee for review. The Technical Sub-committee must provide recommendations to the Region 25

Chairperson within 10 working days of application receipt. If recommended by the Technical Sub-committee and absent a protest, the RPC Chairperson will approve the application and submit it, via the CAPRAD database, to the applicant's preferred FCC-certified frequency coordinator for processing.

The CAPRAD database will record the approved application and place the channels for the proposed system in "pre-license" status.

6.5.3 Dispute Resolution

In the event an agency disputes the implementation of this Plan after FCC approval, the agency must notify the Chairperson of the dispute in writing. The Chairperson will attempt to resolve the dispute on an informal basis. If a party to the dispute employs the Chairperson, then the Vice Chairperson will attempt resolution. In such cases, the Chairperson shall be deemed to have a conflict of interest and will be precluded from voting on dispute settlement. Section 6.5.3 does not apply to protests over new spectrum allocations.

If after 30 days the dispute is not resolved, the Chairperson (or Vice Chairperson) will appoint an ad-hoc Dispute Resolution Committee. The Committee shall be comprised of a member from the State of Montana and members selected from representatives of counties in the region. No member selected may be from an agency involved in the dispute. The Committee will select a chairperson to head the committee. The Region 25 RPC Chairperson (or Vice-Chairperson) will represent the Region in presentations to the ad-hoc Dispute Resolution Committee. The ad-hoc Dispute Resolution Committee will hear input from the disputing agency, any effected agencies and the Regional Chair or Vice-Chair. The ad-hoc Dispute Resolution Committee will meet in executive session to prepare a recommendation to resolve the dispute. Should this recommendation not be acceptable to the disputing party or parties, the dispute and all written documentation will be forwarded to the Federal Communications Commission for final resolution.

6.5.4 Lower Power "Campus Eligible" General Use Frequencies

In the implementation of 700 MHz public safety spectrum throughout Region 25, opportunities may arise for increased channel re-use when developing radio systems for "campus-type" operations. Examples of those who may capitalize on this opportunity include hospitals, stadiums, malls or places of public gathering, public universities, transit systems and ports of entry. While these channels have been designated in county pool allotments with proper designations, they do not enjoy the benefits of county-wide channels in that they are not cleared for usage over a wide area. In many instances, facilities require a smaller or more specific geographical coverage area than assumed in the initial channel packing plan and may be able to be reused more efficiently. These "campus"-type systems, in many cases, require in-building or confined space/tunnel radio coverage or communications along a linear pathway, such as a maintenance or right-of-way. Public safety channels can be allotted to this type of operation in a region and can lead to effective system development, along with increased spectral efficiency, if power levels and Area of Protection (AOP) are taken into account in system planning. These parameters must be established appropriate to the area of coverage. In order to facilitate this effective method of system implementation, channels have been identified in certain areas of Region 25 that may be utilized in a smaller service area. These channels are NOT eligible to be utilized throughout the county to which they are allotted. The following criteria must be adhered to when requesting channels from Region 25 for operations of this type:

- The 50 dBu service contour must not exceed more than 2 miles from the proposed service area
- When this 2-mile distance extends to an adjacent region, the applicant must obtain concurrence from the adjacent region
- Reduced external antenna height along with reduced ERP, directional antennae, distributed antenna systems, and radiating "leaky coax," are all tools that should be utilized in the development of "campus-type" system

Region 25 will ensure that the development of these systems will in no way interfere with co-channel or adjacent channel users within Region 25 or adjacent regions. The Chairperson, or a majority of the Region 25 RPC members, has the authority to require engineering studies from the applicant for the purpose of demonstrating that no harmful interference will be introduced to any co-channel or adjacent channel of an existing user. Such studies must be evaluated prior to application approval by the Region 25 RPC. For 12.5/25 kHz co-channel assignments, the 50 dBμ service contour of the proposed stations will be allowed to extend beyond the defined service area for a distance no greater than 2 miles. An adjacent/alternate 12.5/25 kHz channel shall be allowed to have 10 of its 60 dBμ (50,50) contour touch, but not overlap the 40 dBμ service (50,50) contour of an adjacent/alternate system being protected. Evaluations should be made in both directions to ensure compliance. The approval of systems utilizing county allotment channels labeled "Campus" are subject to approval by the Region 25 RPC, which is the final authority on parameters associated with "campus"-type operations.

If Region 25 receives an application for low power fixed use and the proposed service contour encroaches into an adjacent Region, the application must be modified so the service contour does not encroach into the adjacent Region or the applicant must supply the Region 25 RPC with written concurrence from the adjacent Region permitting the applicant's design.

6.5.5 Procedure for Frequency Coordination

Before applicants submit an application to one of the FCC recognized frequency coordinators, the application must be reviewed by the Technical Subcommittee. The Subcommittee will review the application to ensure it complies with all elements of the Region 25 Plan. This review will NOT ensure the application form meets FCC requirements for filing.

The applicants must submit a copy of the FCC application and supporting documents to the Region 25 RPC Chairperson. An interference prediction map must be included in the documentation. TIA/EIA TSB88-A (or latest version) guidelines will be used to produce the interference map. The map must show all interference predicted using TSB88-A guidelines. Any agency with co-channel or adjacent channel allotments may request field tests to ascertain interference signal levels. Agencies must be prepared to conduct field tests if a request is made.

6.5.6 Adjacent Region Spectrum Allocation and Coordination

Region 25 shares borders with four adjacent Regions:

Region 12 (Idaho)
Region 32 (North Dakota)
Region 37 (South Dakota)
Region 46 (Wyoming)

Region 25 will coordinate channel allocations with adjacent Regions by using the CAPRAD database. This tool will ensure adjacent Region notification as well as FCC Certified Frequency Coordinator notification.

The Region 25 Chairperson has sent final draft copies of this Plan to the Chairs of adjacent RPC Regions. Adjacent Regions should be able to satisfy voice and narrowband data requests along their border areas with Region 25. If any Region has problems satisfying requests in an adjacent area, the Region 25 RPC pledges to work with that Region or any of the other surrounding Regions to resolve any issues on a caseby case basis.

Concurrences from adjacent Regions can be found in Appendix D. Signed Inter-Regional Dispute Resolution Agreements are located in Appendix J.

7.0 Canadian Border Issues

Region 25 shares 545 miles of border with Canada. The Counties of Blaine, Daniels, Flathead, Glacier, Hill, Liberty, Lincoln, Phillips, Toole, Roosevelt, Sheridan, and Valley in addition to the Blackfeet, Fort Belknap, Fort Peck, Rocky Boy and Salish-Kootenai tribal reservations may be impacted by Canadian use of the 700 MHz spectrum. The Province of Alberta is currently deploying a 700 MHz digital trunked voice radio system. The Region 25 RPC will provide input to the FCC for any spectrum sharing agreements with Canada.

Any agreement that impacts allotments to the above referenced counties or tribal reservations will impact the entire allotment list for Region 25. Agencies located in the border area with Canada should note the following conditions:

- Public safety licenses are granted subject to the conditions as set forth in 47 C.F.R. § 90.533
- Public safety transmitters operating within 120 km or 75 miles of the Canadian border must accept any interference that may be caused by operations of UHF television broadcast transmitters in Canada and that conditions may be added during the term of the license if required by the terms of the international agreements between the United States and Canada, as applicable, regarding the non-broadcast use of the 769-774 MHz and 799-804 MHz bands

8.0 System Design/Efficiency Requirements

8.1 Interference Protection

The frequency allotment list will be based on an assumption that systems will be engineered on an interference-limited basis--not a noise floor-limited basis. Agencies are expected to design their systems for maximum signal levels within their coverage area and minimum levels in the coverage area of other co-channel users. Coverage areas are normally the geographical boundaries of the agency(s) served plus a three to five-mile area beyond.

Systems should be designed for a minimum signal strength of 40 dBμ in the system coverage area while minimizing signal power out of the coverage area. TIA/EIA TSB88-A (or latest version) will be used to determine harmful interference assuming a 40 dBμ or greater signal in the

coverage area. This signal footprint may require patterned antennas and extra sites compared to a design that assumes noise limited coverage.

8.2 Spectrum Efficiency Standards

Initial county pool allotments have been made on the basis of 25 kHz channels. To maximize spectrum utilization, prudent engineering practices and receivers of the highest quality must be used. Given a choice of radios in a given technology family, agencies should use the units with the best specifications. This Plan will not protect agencies from interference if their systems are under-constructed (i.e. areas with the established service area having a minimum signal strength below 40 dBμ); or, if the systems utilize low quality receivers. The applicant's implementation of prudent engineering practices will be encouraged by the Region 25 RPC.

It is the eventual goal of the FCC and the public safety community for radio equipment to meet the requirement of one voice channel per 6.25 KHz of spectrum. When applying for channels within Region 25, applicants should acknowledge the deadline for converting all equipment to 6.25 kHz or 6.25 kHz- equivalent technology by 12/31/2016. For narrowband mobile data requests, one mobile data channel will consist of four (4) 6.25 kHz channels/two (2) 12.5 kHz channels or one (1) 25 kHz channel. Narrowband 6.25 kHz channels can be aggregated for data use to a maximum bandwidth of 25 kHz. As 6.25 kHz migration evolves, an agency that creates any "orphaned" 6.25 kHz channels should realize that these channels would be allocated to nearby agencies requesting channels in order to maintain a consistent grouping and utilization of 25 kHz blocks within Region 25.

The Region 25 RPC encourages small agencies to partner with other agencies in multi-agency or regional systems. Partnering enhances spectrum efficiency. Loading criteria can be achieved in multi-agency systems that will allow greater throughput for all participating agencies.

8.3 Orphaned Channels

Region 25 narrowband pool allotments will have a channel bandwidth of 25 kHz. These 25 kHz allotments have been characterized as "technology neutral" and flexible enough to accommodate multiple technologies utilizing multiple bandwidths. If agencies choose a technology that requires less than 25 kHz channel bandwidth for their system, the potential exists for residual, "orphaned channels" of 6.25 kHz or 12.5 kHz bandwidth immediately adjacent to the assigned channel.

An orphan channel may be used at another location within the county area where it was originally approved--if it meets co-channel and adjacent channel interference criteria. Region 25 will utilize "county areas" as guidelines for Region 25 channel implementation. The definition of "county area" in this Plan is the geographical/political boundary of a given county plus a distance of up to 10 miles outside of the county.

If the channel or a portion of a channel is being moved into a "county area" that is within 30 miles of an adjacent region, the Region 25 RPC will request concurrence from the affected Region. Extending the "county area" will increase the possibility that orphaned channel remainders will be utilized. Such extension will reduce the potential for channel remainders to lay dormant within a county channel allotment. Channel movements will be documented on the CAPRAD database.

If the "orphaned channel" remainder does not meet co-channel and adjacent channel interference criteria by moving it within the "county area", and it is determined by the Region 25 RPC that the "orphaned channel" cannot be utilized without exceeding the distance described in the "county area", Region 25 will submit a plan amendment to the FCC to repack the channel to a location where its potential use will maintain maximum spectral efficiency. A Region 25 RPC Plan amendment will require affected adjacent Region concurrence.

When it is in the best interest of public safety for efficient spectrum use, the Region 25 RPC shall have the authority to move orphan channel allotments and/or co-adjacent channel allotments within its "county areas". The goal is to retain spectrum efficiency and/or minimize co-channel or adjacent channel interference between existing allotments.

9.0 Allocation of Narrowband General Use Spectrum

9.1 Introduction

The Region 25 Technical Subcommittee recommends that allotments be made on the basis of one 12.5 kHz channel for every voice channel request and one 25 kHz channel for each narrowband data channel request. This recommendation is approved by the full Committee and is part of this Plan. All agencies requesting spectrum during the initial filing window (see Section 6.5) will be allocated channels if Plan requirements are met. Agencies using Frequency Division Multiplexing (FDMA) will be expected to maintain 12.5 kHz equivalency when developing systems and will be required to utilize BOTH 12.5 kHz portions of the 25 kHz block. In most cases, this expectation will require the geographic separation of each 12.5 kHz adjacent channel. In order to promote spectrum efficiency, the Region 25 RPC will ensure that systems allocated 25 kHz channel blocks will utilize the entire channel and not "orphan" any portions of a system designated channel.

9.2 Low Power Secondary Operations

To facilitate portable operation by any licensee and to provide channels for such operation without impacting the use of primary channels, certain low-power secondary channels will be permitted. Any public safety entity otherwise licensed to use one or more channels under this Plan may receive authorization to license additional channels for secondary use subject to the following criteria:

- All operation of units on authorized channels will be considered secondary to other licenses on both co-channel and adjacent channels
- No channels on or adjacent to those designated in the Plan for wide area operation and/or mutual aid use will be authorized
- Channels will be authorized for use in specific areas only; such areas are to be within the licensees authorized operational area
- Maximum power will be limited to 6 watts ERP
- Channel use aboard aircraft is prohibited
- Applications for channels may be submitted to the Region 25 RPC for consideration at any time and must be accompanied by a demonstration of need. The Committee may select and authorize licensing of these secondary use channels after consideration of potential interference to co-channel and adjacent channel allotments,

allocations and licensees. Authorization may be granted for use of any suitable channel without prior allotment or allocation to the requesting agency

In the event the channels authorized for low power secondary operation are needed by others during any window opening for reassignment, no protection will be afforded to the licensed secondary user. The secondary user may be required to change frequencies or surrender licenses to prevent interference to primary use channels.

9.3 Low-Power Channels

The FCC 700 MHz band plan sets aside channels 1 – 8, paired with 961 – 968; and, 949 – 958, paired with 1909 – 1918, for low power use for on-scene incident response using mobiles and portables. Usage is subject to Commission approved RPC regional plans. Transmitter power must not exceed 2 watts (ERP).

Channels 9 –12, paired with 969 – 972; and, 959 – 960, paired with 1919 – 1920, are licensed nationwide for itinerant operation. Transmitter power must not exceed 2 watts (ERP).

These channels may operate using analog operation. To facilitate analog modulation, this Plan will allow aggregation of two channels for 12.5 kHz bandwidth. On scene temporary base and mobile relay stations are allowed with an antenna height limit of 6.1 meters (20 feet) above the ground. However, users are encouraged to operate in simplex mode whenever possible. This Plan does not limit channel use to analog operations; these channels are intended for use in a wide variety of applications that may require digital modulation types.

In CFR Part 90.531, the FCC allocates twenty-four low power 6.25 kHz frequency pairs (of which eighteen fall under RPC jurisdiction). The Federal Communications Commission (FCC) states there is a potential for multiple low power applications, and, absent a compelling argument, a sharing approach be employed rather than making exclusive assignments for each specific application. Low power operations can co-exist on the same frequencies with minimal potential for interference due to the 2 watt power restriction.

Whereas advantages exist in not making assignments, the reverse is also true. If, for example, firefighters operate on a specific frequency or set of frequencies in one area, that template may be replicated throughout the Region for firefighters. If there are no assignments, such a replication is unlikely.

In seeking the middle ground with positive attributes showing up both for assignments and no assignments, Region 25 will use the following assignments associated with the eighteen narrowband channels:

- Channel #'s 1-4 and 949-952 are set aside as generic channels for use by public safety agencies. The complementary channel #'s 961-964 and 1909-1912 are set aside as generic public safety channels. This includes GPS differential correction telemetry for channels 961-964 and 1909-1912.

- Channel #'s 5-8 are designated as Fire Protection channels for licensing and exclusive use by the Fire Protection discipline. The complementary channel #'s 965-

968 are set aside as Law Enforcement channels for licensing and exclusive use by the Law Enforcement discipline.

- Channel #'s 955-956 are set aside as Fire Protection channels for licensing and exclusive use by the Fire Protection discipline. The complementary channel #'s 1915-1916 are set aside as Law Enforcement channels also for licensing and exclusive use by the Law Enforcement discipline.

- Channel #'s 957-958 are set aside as Fire Protection/Law Enforcement channels for licensing and use by the Fire Protection and Law Enforcement disciplines. The complementary channel #'s 1917-1918 are set aside as Fire Protection/Law Enforcement channels.

Simplex operations may occur on either the base or mobile channels. Users are cautioned to coordinate on scene use with all agencies involved. Users should license multiple channels and be prepared to operate on alternate channels in operational areas.

9.4 System Implementation

When an application has been approved, a written notification from the applicant will be sent to secondary television station operators / licensees explaining the intended use of 700 MHz spectrum in Region 25. This allows affected low power TV stations enough time to prepare to move to TV channels outside the 700 MHz band.

After allocation of channels, the applicant agency must release a System RFP and sign a contract with a vendor within one year of the channel allocation. If an agency does not implement channel use within the timeframes specified, that agency's allocation may be removed from the allocation list. An agency may file a request with the Region 25 Chair for an extension of time to implement. The request should include details describing why the agency has not used the channel allocation and include a new implementation schedule. The Region 25 Committee Chair will advertise this request and set a date for a full Committee vote on the request. If a request for extension is not received or the Committee votes not to extend implementation, the Committee Chair will advertise this action and set a filing window to give other agencies a chance to request the spectrum allotment.

Should system implementation not begin within two (2) years or if projected planned channel loading is not attained within four (4) years of license, the channels will be returned for re-allocation. A one (1) year extension may be supported by the Region 25 RPC if the applicant can demonstrate that delaying circumstances are beyond the control of the applicant. The applicant will be responsible for contacting the FCC to request an extension and notify the Region 25 RPC of the request.

System implementation will be monitored by the RPC Administrative Subcommittee. The Subcommittee is responsible for determining if progress is being made on system implementation. Monitoring of system(s) implementation by the Subcommittee will take place at one (1) year intervals. If progress is made and the system is ultimately implemented, the system can be determined "complete". If progress is not made, the licensee will be advised in writing that they are in default of their plan, the consequences of lack of progress and the appeal procedures under the Region 25 Plan. The Administrative Subcommittee will inform the Region 25 RPC and

appropriate public safety frequency coordinator(s) of the situation. The Administrative Subcommittee will continue to monitor the progress of any system determined in default. If progress is not forthcoming, the Subcommittee will recommend that the Region 25 RPC inform the FCC of the lack of progress. The licensee in default can appeal this action or can allow the license to be withdrawn. If the authorized frequencies are withdrawn they will be returned to the frequency allotment pool for future use.

9.5 Priority for Receiving Spectrum Allocations

After the initial filing window, priority for channel allocations will be made on a first come first served basis. Cooperative multi-agency systems will be given priority over non-shared single agency systems.

When applying for the new 700 MHz channels, the Region 25 RPC expects applicants to relinquish any amount of currently used spectrum and make that spectrum available for use by other agencies within Region 25 upon beneficial use of an implemented 700 MHz radio system. This currently licensed spectrum may be in any public safety band.

With a primary voice communication system operating under a NPSPAC band 800 MHz license and, coupled with a request for additional 700 MHz channels , agencies, are not asked to relinquish the 800 spectrum. These agencies will be asked to include spectrum that is already licensed into the loading requirements as defined in this Plan. The reason for the inclusion is that most, if not all, radio equipment developed for the 700 MHz band is capable of operation on an 800 MHz NPSPAC licensed system. Without this inclusion, it would theoretically be possible for an agency to double its frequency spectrum allocations by applying for an equivalent number of 700 MHz channels for each 800 MHz channel that it has already licensed. Although separated in FCC rules and regulations, the Region 25 700 MHz RPC will coordinate with Region 25 800 MHz Planning Committee to achieve the most efficient use of spectrum for Public Safety in the Region.

Agencies are encouraged to relinquish frequencies that will no longer be used as soon as possible in accordance with FCC rules and regulations.

The number of channels an applicant should retain is predicated on the number required to provide minimum interoperable communications to surrounding jurisdictions. In order to promote the interests of agencies that will benefit from an applicant submitting a request for 700 MHz spectrum, it is requested that the applicant submit a list of all channels and licenses held on existing public safety channels. This includes channels that will be expected to be unlicensed when full beneficial use of 700 MHz channels is realized. The Region 25 RPC will disseminate this information but not decide if it is sufficient or not. It must be stressed that the Region 25 RPC encourages multi-agency systems that allow for regional and wide area coverage within Region 25.

9.6 Channel Loading

The goal of the RPC is to encourage efficient utilization with the following loading requirements:

- Each applicant for a trunked system should design their system for a minimum of 50 mobile and portable radios for each 12.5 kHz voice channel that will be placed in service within five (5) years of the initial plan approval date

- Single conventional channels should be designed for a minimum load of 50 radios per 12.5 kHz channel. Mobile, portable, data, and control stations are included within this count

- Consideration will also be given to potential loading by radio operators other than those of the agencies applying for spectrum such as state or federal units responding during an emergency or in conjunction with a planned event

Loading will eventually be required to change to 50 units per 6.25 kHz channel when further narrowband technologies are available and when the FCC requires 6.25 kHz efficiencies currently slated for January 1, 2017.

9.7 Dispute Resolution – Inter-Regional

In the event an agency disputes the implementation of this Plan or the Federal Communications Commission approval of this Plan or parts of this Plan, the agency must notify the Region 25 RPC Chairperson of the dispute in writing. This section does not apply to protests over new spectrum allocations. The Chairperson will attempt to resolve the dispute on an informal basis. If a party to the dispute employs the Chairperson, then the Vice Chairperson will attempt resolution. In such cases, the Chairperson shall be deemed to have a conflict of interest and will be precluded from voting on such matters. If after 30 days the dispute is not resolved, the Chairperson (or Vice Chairperson) will appoint a Dispute Resolution Committee consisting of two members from State of Montana agencies and at least five members from various counties in Region 25. The Committee will select a Chairperson and a Secretary to document the proceedings.

The Region 25 Chairperson (or Vice Chairperson) will represent the Region in presentations to the Dispute Resolution Committee. The Committee will hear input from the disputing agency, effected agencies and the Region 25 Chair. Next, the Committee will meet in executive session to prepare a recommendation to resolve the dispute. Should this recommendation not be acceptable to the disputing agency/agencies, the dispute and all written documentation from the dispute will be forwarded to the National Regional Planning Council (NRPC) for review. As a last resort, the dispute will be forwarded to the Federal Communications Commission for final resolution.

10.0 Interoperability Channels

10.1 Introduction

The ability of agencies to effectively respond to mutual aid requests relies on cross agency communication. Region 25 is subject to many natural disasters; mutual aid is a common element of disaster response. This Plan seeks to facilitate the communications necessary for effective mutual aid. The Montana Mutual Aid Manual is located at: HTTP://

The state of Montana will administer the 700 MHz interoperability channels via the State Interoperability Executive Committee (SIEC) and the Department of Administration, Public

Safety Services Bureau in accordance with National Coordination Committee's (NCC) guidelines. The Region 25 700 MHz RPC will work with the Montana SIEC, Interoperability Montana and other appropriate communications policy and governing bodies in Region 25.

10.2 Tactical Channels

The Region 25 RPC will not set aside additional channels for interoperability use. It is anticipated the sixty-four FCC designated interoperability channels (6.25 KHz) will be sufficient to provide interoperability (voice and data) within Region 25.

All mobile and portable units operating under this Plan and utilizing 700 MHz channels must be programmed with the minimum number of channels pursuant to National Coordinating Committee guidelines. The channel display in these radios will also be in accordance with the NCC guidelines. Channels will employ a common alphanumeric nomenclature to avoid any misinterpretation of use. Subject to appeal to the FCC, the Region 25 RPC is the authority on the interpretation of the distribution of the 700 MHz interoperability channels. Appendix D lists the 700 MHz Interoperability frequencies and the NCC-approved common nomenclature.

10.3. Deployable Systems

This Plan strongly supports use of deployable systems, both conventional and trunked. Deployable systems are pre-packaged systems that can deploy by ground or air to an incident to provide additional coverage and capacity on interoperability channels. This will minimize the expense of installing extensive fixed infrastructure and recognizes the difficulty of providing complete coverage of the region due to environmental constraints.

Agencies should have conventional deployable systems capable of being tuned to any of the interoperability tactical channels. Agencies that are part of a multi-agency trunked system and commonly provide mutual aid are encouraged to have trunked deployable systems that operate on the tactical channels designated by the FCC for this use. The Technical and Interoperability Subcommittee, in consultation with the State of Montana Public Safety Services Bureau (PSSB), will develop the operational details for deploying these systems.

It is expected that the tactical channels set aside for trunked operation will be heavily used by deployable systems. Therefore, the tactical channels cannot be assigned to augment general use trunked systems.

10.4 Monitoring of Calling Channels

Licensees of 700 MHz frequencies will be responsible for monitoring the interoperability calling channels. The Region 25 RPC Technical and Interoperability Subcommittee, in consultation with the State of Montana Public Safety Services Bureau (PSSB), will develop operational guidelines for this function.

11.0 Application Requirements and Evaluation

11.1 Introduction

The National Coordination Committee has defined applicant evaluation criteria. NCC application criteria will be followed under the Region 25 Plan. After the initial filing window, all requests will be considered on a first come, first served basis. In cases where specific frequency allotments are requested simultaneously by applicants, the applicant evaluation matrix point system will be utilized to determine the successful applicant. The same criteria--area of coverage, technical requirements, and channel loading--will be applied equally to all applications. Exceptions to the criteria may be considered upon unique circumstances. Deviations from FCC rules are not to be approved unless the applicant has filed and been granted a waiver from the FCC. The Region 25 Technical and Interoperability Subcommittee will evaluate and process applications within thirty (30) days after notified of receipt by CAPRAD.

The application matrix has been prepared to enable consistent evaluation. Application variations within the parameters of this Plan may require extensive scrutiny. Therefore, it shall be responsibility of the Region 25 RPC to evaluate each application on its own merit.

Each applicant for a trunked system shall certify that a minimum of 50 field radios for each 12.5 kHz channel will be placed in service within five (5) years of initial plan approval date. If that is not the case, less than fully loaded channels shall be returned to the allotment pool and the licensee shall modify their license accordingly. Conventional channels shall be loaded to 50 mobile units per 12.5 kHz channel. Where an applicant does not load a channel to 50 radio/subscriber units, the frequency will be available for assignment to other licensees. Mobile, portable and control stations will be considered as mobile units.

11.2 Evaluation Matrix Point System

Region 25 will use the following point system to determine approval priority of competing applications. The maximum number of points that can be awarded is 800. The applications receiving the highest point total will receive approval for channels. Seven criteria will be evaluated:

1. Service and Use (Maximum score 300 points)

Service	Points
Local	10
County	10
State	10
Federal	10

Use	Points
Criminal Justice/Law Enforcement/Crisis Mgmt	50
Fire/EMS	50
Special Emergency	40
Emergency Management	40
Forestry Conservation	30
Highway Maintenance	30

General Government 20

Maximum Total 300

Environmental protection will fall in the "Special Emergency" category and shall be considered for tasks that directly reduce contamination to the air, water or ground by chemicals or waste materials.

2. Interoperability Communications (Maximum score 100 points)

The application is scored on the degree of interoperability that is demonstrated with a range of points from 0 to 100. This category will not rate the application on the inclusion of interoperability channels but on its proposed actual ability to communicate with different levels of government and services during a time of emergency.

Each applicant is encouraged to have direct mobile-to-mobile communications among the following radio type functions: local, state and federal criminal justice; fire/EMS; special emergency/emergency management; forestry; highway maintenance and general government. All applicants will start with 100 points and points will be deducted based upon their lack of intersystem communications. No points will be deducted if a plan or system has not yet been developed within their areas of service.

- Ten (10) points will be deducted for each radio service type function in which the applicant lacks intersystem communication, if direct mobile-to-mobile does not exist.

- Five (5) points will be deducted for each radio service the applicant lacks for direct mobile-to-mobile communications.

3. Loading (Maximum score 150 points)

Applicants who can demonstrate they are part of or are in the process of developing cooperative, multi-agency systems will be scored on a range from 0 to 150 points , depending upon the extent of the cooperative system.

Multi-agency trunked, fully loaded, system	101 – 150 points
Trunked system, fully loaded, single agency	76 – 100 points
Mobile data channel fully loaded/channel	76 – 100 points
Conventional system fully loaded/channel	0 – 75 points

Expansion of existing systems will be evaluated as to the categories listed in #3, Loading. Any system less than fully loaded will have its score multiplied by the proportions in the following formula:

A fully loaded/channel is a 12.5 kHz channel with 50 radio units. Control channels shall be considered as data channels. Plans submitted to the Region 25 RPC shall stipulate the number of voice communication channels and the number of data channel(s). These points will only be assigned to fully loaded systems that are planned and identified with the application package submittal.

4. Spectrum Efficiency (Maximum score 50 points)

The applicant will be scored on the degree of spectrum efficient technology that the system demonstrates. A trunked system will be considered a spectrum efficient technology as well as any technological systems feature that is designed to enhance the efficiency of the system and improve the efficient use of spectrum.

Spectrum efficiency points

Trunked or equally high efficient technology	50 points
Conventional system using data	50 points
Technologies that increases system throughput	50 points

5. System Implementation Factors (Maximum score 100 points)

This category scores the applicant on two factors: budgetary commitment and plan completeness. The degree of budgetary commitment is scored on a range from 0 to 50 points based on the Region 25 RPC's evaluation of commitment demonstrated through documentation by the applicant and its funding source entity. A high degree of funding commitment will receive a higher score. Applicants will also be scored on the degree of plan completeness on a range from 0 to 50 points. Applicants must submit a timetable for the implementation of the system. Applicants should be aware of the FCC requirements related to slow growth.

Multi phase project with funds committed to all phases 50 points
Multi phase project plan completed for all phases 50 points

Applicants with less than complete funding commitment and/or incomplete plans will have their point score reduced accordingly. Resolutions, legislation, or other such documentation from governing entities shall be submitted with applications to support financial commitment.

6. System Density (Maximum score 100 points)

Each applicant's System will be scored on the level of geographic efficiency for requisite communications coverage, for the applicant's jurisdictional area served or regional area served under agreement with other agencies and/or defined communication requirements. Scoring will be based upon the defined radio coverage area of the application, and the entity's jurisdictional area or required communication support areas. Region 25 recognizes that each entity may not be required (by system or network users) to provide radio system communication support for all jurisdictional boundaries or areas that are supported by that Entity. This evaluation is to only weigh the efficiency of the system being applied for, against the required areas for communication support based on system user requirements or other entity systems licensed or applied for. Scores are based on the ratio multiplied by 100 with the maximum not to exceed 100 points.

Percentage of System operational area for applicant's jurisdictional area of responsibility for communications support x 100 = _____

11.3 Application Processing

All applications will be processed in the most expeditious manner possible by the Region 25 RPC. After Region 25 approval, the applications will be sent to the coordinator requested by the applicant. All documentation required by the designated coordinator selected in this process will be available through the CAPRAD system.

11.4 Future Planning

The Region 25 RPC will continuously work with local, tribal, state and federal agencies and other state-wide coordination groups to update this Plan based on Responder needs.

11.5 Database Maintenance

Region 25 will continue to use and update the CAPRAD database as 700 MHz spectrum within the Region is assigned and licensed by eligible entities.

11.6 Inter-Regional Dispute Resolution Process

Signed Inter-Regional Dispute Resolution Agreements from all four adjacent Regions are included in Appendix I.

11.7 Amendment Process

Amendments to the Region 25 Plan will be made at Region 25 RPC meetings. All amendments will be voted on and passed or rejected by a simple majority vote. The Chairperson or his/her designee will make appropriate changes to the Plan and notify adjacent Regions for their concurrence. Once the concurrences are received from adjacent Regions, the Chair will file the Plan with the FCC for approval. Electronic filing will be the preferred method.

11.8 Meeting Announcements

Meeting announcements will be made per the Region 25 Bylaws. Region 25 will utilize its membership list, Public Notices issued by the FCC, fax notification, e-mail to individuals, associations, agencies and vendors as well as verbal announcements at meetings and/or appropriate publications.

12. 0 Certification

I hereby certify that all planning committee meetings, including subcommittee or executive committee meetings were open to the public.

Scott Bradford
Chair, Region 25
January 29, 2011

Appendix A – Region Bylaws

THE BYLAWS OF REGION 25 MONTANA
[Date]

ARTICLE 1

NAME & PURPOSE

The name of this Region shall be Region 25. Its primary purpose is to foster cooperation, planning, development of regional plans and the implementation of these plans in the 700 MHz Public Safety Band.

ARTICLE II

MEMBERS

For purposes of this Article, the term "member," unless otherwise specified, refers to both voting and non-voting members.

2.1 Number, Election and Qualification: The Regional 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. Except that 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. Voting members may not vote on issues involving their entity.

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

2.2 Tenure: In general, each member shall hold MEMBERSHIP from the date of acceptance until resignation or removal.

2.3 Powers and Rights: In addition to such powers and rights as are vested in them by law, or these bylaws, the members shall have such other powers and rights as the membership may determine.

2.4 Suspension and Removal: A representative may be suspended or removed with cause by vote of a majority of members after reasonable notice and opportunity to be heard. Failure to attend 50% of meetings held in a calendar year shall be a specific cause for removal from the membership.

2.5 Resignation: A member may resign by delivering written resignation to the chairman, vice-chairman, treasurer or secretary of the Regional Committee or to a meeting of the members.

2.6 Annual Meetings: The annual meeting of the members shall be held at Helena on the 1st Tuesday of February each year ; or if that date is a legal holiday in the place where the meeting is to be held, then at the same hour on the next succeeding day not a legal holiday. If an annual meeting is not held as herein provided, a special meeting of the members may be held in place thereof with the same force and effect as the annual meeting, and in such case all references in these bylaws, except in this Section 2.6, to the annual meeting of the members shall be deemed to refer to such special meeting. Any such special meeting shall be called and notice shall be given as provided in Section 2.7 and 2.8.

2.7 Special Meetings: Special meetings of the members may be held at any time and at any place within the Regional Committee area. Special meetings of the members may be called by the chairman or by the vice-chairman, or in case of death, absence, incapacity, by any other officer or, upon written application of two or more members.

2.8 Call and Notice:

A. Annual meetings: Reasonable notice of the time and place of special meetings of the members shall be given to each member. Such notice need not specify the purposes of a meeting, unless otherwise required by law or these bylaws or unless there is to be considered at the meeting (i) amendments to these bylaws, (ii) an increase or decrease in the number of members, or (iii) removal or suspension of a member who is an officer.

B. Reasonable and sufficient notice: Except as otherwise expressly provided, it shall be reasonable and sufficient notice to a member to send notice by mail at least five days or by e-mail/facsimile at least three days before the meeting, addressed to such member at this or her usual or last known business address, or, to give notice to such member in person or by telephone at least three days before the meeting.

2.9 Quorum: At any meeting of the members, a majority of the officers and {either a minimum number of members or a minimum percentage of members} of the voting members shall constitute a quorum. Any meeting may be adjourned to such date or dates not more than ninety days after the first session of the meeting by a majority of the votes cast upon the question, whether or not a quorum is present, and the meeting may be held as adjourned without further notice.

2.10 Action by Vote: Each voting member, representing a particular agency (one vote per agency) shall have one vote; non-voting members have no right to vote. When a quorum is present at any meeting, a majority of the votes properly cast by voting members present shall decide any question, including election to any office, unless otherwise provided by law or these bylaws.

2.11 Action by Writing: Any action required or permitted to be taken at any meeting of the members may be taken without a meeting if all members entitled to vote on the matter consent to the action in writing and the written consents are filed with the records of the meetings of the members. Such consents shall be treated for all purposes as a vote at a meeting.

2.12 Proxies: Voting members may vote either in person or by written proxy dated not more than one month before the meeting named therein, which proxies shall be filed before being noted with the secretary or other person responsible for recording the proceedings of the meeting. Unless otherwise specifically limited by their terms, such proxies shall entitle the

holders thereof to vote at any adjournment of the meeting by the proxy shall terminate after the final adjournment of such meeting.

2.13 Voting on One's Own Application: At no time can a voting member vote on his/her application.

2.14 Special Interest Voting: A voting member cannot have a commercial interest in any of his/her region and/or adjacent regions application(s) on which he/she is reviewing, approving and/or voting.

ARTICLE III

OFFICERS AND AGENTS

3.1 Number and qualification: The officers of the Regional Committee shall be a chairman, vice-chairman, secretary and such other officers, if any, as the voting members may determine. All officers must be voting members of the Regional Committee.

3.2 Election: The officers shall be elected by the voting members at their first meeting and, thereafter, at the annual meeting of the members.

3.3 Tenure: The officers shall each hold office until the annual meeting of the members held within one year from the adoption of these bylaws, or until their successor, if any, is chosen, or in each case until he or she sooner dies, resigns, is removed or becomes disqualified.

3.4 Chairman and Vice Chairman: The Chairman shall be the chief executive officer of the Regional Committee and, subject to the control of the voting members, shall have general charge and supervision of the affairs of the Regional Committee. The chairman shall preside at all meetings of the Regional Committee. The Chairman may define standing or ad hoc committees to conduct Region business as needed. An ad hoc committee may be formed to review and approve adjacent Regions Plans.

The Vice Chairman, if any, shall have such duties and powers as the voting members shall determine. The vice-chairman shall have and may exercise all the powers and duties of the chairman during the absence of the chairman or in the event of his or her inability to act.

3.5 Secretary: The Secretary shall record and maintain records of all proceedings of the members in a file or series of files kept for that purpose, which file or files shall be kept within the Region and shall be open at all reasonable times to the inspection of any member. Such file or files shall also contain records of all meetings and the original, or attested copies, of bylaws and names of all members and the address (including e-mail address, if available) of each. If the secretary is absent from any meeting of members, a temporary secretary chosen at the meeting shall exercise the duties of the secretary at the meeting.

3.6 Suspension or Removal: An officer may be suspended with cause by vote of a majority of the voting members.

3.7 Resignation: An officer may resign by delivering his or her written resignation to the chairman, vice-chairman, treasurer, or secretary of the Regional Committee. Such resignation shall be effective upon receipt (unless specified to be effective at some other time), and acceptance thereof shall not be necessary to make it effective unless it so states.

3.8 Vacancies: If the office of any officer becomes vacant, the voting members may elect a successor. Each such successor shall hold office for the remainder terms, and in the case of the chairman, vice chairman, and secretary until his or her successor is elected and qualified, or in each case until he or she sooner dies, resigns, is removed or become disqualified.

ARTICLE IV

AMENDMENTS

These bylaws may be altered, amended or repealed in whole or in part by vote. The voting members may by a two-thirds vote, alter, amend, or repeal any bylaws adopted by the Regional Committee members or otherwise adopt, alter, amend or repeal any provision which FCC regulation or these bylaws requires action by the voting members.

ARTICLE V

DISSOLUTION

This Regional Committee may be dissolved by the consent of two-thirds plus one of the members in good standing at a special meeting called for such purpose. The FCC shall be notified.

ARTICLE VI

RULES OF PROCEDURES

The Conduct of Regional Meetings including without limitation, debate and voting, shall be governed by Robert's Rules of Order, newly revised 1990 edition, ninth edition, Sarah Corbin Robert, Henry M. Robert III, and William J. Evans.

Appendix B

Membership List

Montana 700 Plan Committee Members:

Bill Jameson
Professor, Ret. IEEE Life Senior Member
Montana State University
406-994-5970
Jamesonwj@aol.com

Kevin Bruski
Executive Director
Interoperability Montana
406-441-5417
Kbruski@interopmtproject.org

Jerry Dupler,
President
Timberline Communications
406-225-3795
Timberline@mt.net

Daniel Hawkins, Region 8
Coordinator
DHS-OEC
406-443-0170
Daniel.hawkins@dhs.gov

Dave McGinnis
Deputy Sheriff, Missoula County
406-829-4277
dmcginni@missoula.mt.us

Roger Smith
Radio System Administrator
Interoperability Montana
406-441-5416
rsmith@interopmtproject.org

Sean Gallagher
Fire Suppression Section/DNRC
406-542-4213
sgallagher@mt.gov

Jack Spillman
Administrator
Flathead County Radio System
406-758-2117
Jack.Spillman@flatheadoes.mt.gov

Steve Keller
Chief, Communications Bureau
MDOT
406-444-6305

E. Wing Spooner
Special Projects Coordinator
Public Safety Services Bureau
406-444-2491
Espooner@mt.gov

Dan Sullivan
Special Projects Coordinator
Public Safety Services Bureau
406-444-3581
dsullivan@mt.gov

Scott Bradford
Communications Manager
Public Safety Services Bureau
406-444-2782
sbradford@mt.gov

Dale Osborne
Montana Highway Patrol
PO Box 201419
Helena, Montana 59620-1419
406-444-4274
dosborne@mt.gov

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Appendix C

Adjacent Region Concurrence Contacts and Letters

Mike Sanders, Chairman
Region 12-Idaho
P.O.Box 4666
Pocatello, ID 83205
mikes@co.bannock.id.us

Mark Joiner, Chairperson
Region 46-Wyoming
Bureau of Land Management/Wyoming
1335 Main St.
Lander, WY 82520
Mark_joiner@blm.gov
(307) 332-8460

Region 32-North Dakota
(no convener)

Todd Dravland
Region 38—South Dakota
State of South Dakota, Radio Communications
500 E. Capitol
Pierre, South Dakota 57501
Todd.dravland@state.sd.us

Concurrence letters sent to adjacent Regions February 2, 2011.

Dear Adjacent State 700 MHz Committee Chairpersons:

The Montana Region 25 Planning Committee is in the process of filing a 700 MHz Plan with the Federal Communications Commission (FCC). Enclosed please find a draft Plan for your review. Also attached you will find an Inter-Regional Dispute Resolution Agreement and a suggested Letter of Concurrence.

I am requesting that you complete your review and return the Inter-Regional Dispute Resolution Agreement and Letter of Concurrence by March 15, 2011. If you have any questions or need additional time for review, please contact me at your earliest convenience.

Sincerely,

Scott Bradford, Chairman
Region 25 Planning Committee
(406) 444-2782
sbradford@mt.gov

Cc: Jeannie Benfaida, FCC
Region 25 Planning File

Appendix D

Interoperability Frequencies/Common Nomenclature

Table of 700 MHz Interoperability Channels

16 Channel Sets	Description	Label
Channel 23 & 24	General Public Safety Services (secondary trunked)	7TAC51
Channel 103 & 104	General Public Safety Services (secondary trunked)	7TAC52
Channel 183 & 184	General Public Safety Services (secondary trunked)	7TAC53
Channel 263 & 264	General Public Safety Services (secondary trunked)	7TAC54
Channel 39 & 40	Calling Channel	7CALL50
Channel 119 & 120	General Public Safety Service	7TAC55
Channel 199 & 200	General Public Safety Service	7TAC56
Channel 279 & 280	Mobile Data	7DATA69
Channel 63 & 64	Emergency Medical Service	7MED65
Channel 143 & 144	Fire Service	7FIRE63
Channel 223 & 224	Law Enforcement Service	7LAW61
Channel 303 & 304	Mobile Repeater	7MOB59
Channel 79 & 80	Emergency Medical Service	7MED66
Channel 159 & 160	Fire Service	7FIRE64
Channel 239 & 240	Law Enforcement Service	7LAW62
Channel 319 & 320	Other Public Service	7GTAC57
Channel 657 & 658	General Public Safety Services (secondary trunked)	7TAC71
Channel 737 & 738	General Public Safety Services (secondary trunked)	7TAC72
Channel 817 & 818	General Public Safety Services (secondary trunked)	7TAC73
Channel 897 & 898	General Public Safety Services (secondary trunked)	7TAC74
Channel 681 & 682	Calling Channel	7CALL70
Channel 761 & 762	General Public Safety Service	7TAC75
Channel 841 & 842	General Public Safety Service	7TAC76
Channel 921 & 922	Mobile Data	7DATA89
Channel 641 & 642	Emergency Medical Service	7MED86
Channel 721 & 722	Fire Service	7FIRE83
Channel 801 & 802	Law Enforcement Service	7LAW81
Channel 881 & 882	Mobile Repeater	7MOB79

Channel 697 & 698	Emergency Medical Service	7MED87
Channel 777 & 778	Fire Service	7FIRE84
Channel 857 & 858	Law Enforcement Service	7LAW82
Channel 937 & 938	Other Public Services	7GTAC77

Project 25 Common Air Interface
Interoperability Channel Technical Parameters

Certain common P25 parameters need to be defined to ensure digital radios operating on the 700 MHz Interoperability Channels can communicate. This is analogous to defining the common CTCSS tone used on NPSPAC analog Interoperability channels.

Network Access Code

In the Project 25 Common Air Interface definition, the Network Access Code (NAC) is analogous to the use of CTCSS and CDCSS signals in analog radio systems. It is a code transmitted in the pre-amble of the P25 signal and repeated periodically throughout the transmission. Its purpose is to provide selective access to and maintain access to a receiver. It is also used to block nuisance and other co-channel signals. There are up to 4096 of these NAC codes. For ease of migration in other frequency bands, a NAC code table was developed which shows a mapping of CTCSS and CDCSS signals into corresponding NAC codes. Document TIA/EIA TSB102.BAAC contains NAC code table and other Project 25 Common Air Interface Reserve Values.

The use of NAC code $293 is required for the 700 MHz Interoperability Channel NAC code.

Talk group ID

In the Project 25 Common Air Interface definition, the Talk group ID on conventional channels is analogous to the use of talk groups in trunking. In order to ensure that all users can communicate, all units should use a common Talk group ID.

Recommendation: Use P25 default value for Talk group ID = $0001

Manufacturer's ID

The Project 25 Common Air Interface allows the ability to define manufacturer specific functions. In order to ensure that all users can communicate, all units should not use a specific Manufacturer's ID, but should use the default value of $00.

Message ID

The Project 25 Common Air Interface allows the ability to define specific message functions. In order to ensure that all users can communicate, all units should use the default Message ID for unencrypted messages of $0000000000000000000.

Encryption Algorithm ID and Key ID

The Project 25 Common Air Interface allows the ability to define specific encryption algorithms and encryption keys. In order to ensure that all users can communicate, encryption should not be used on the Interoperability Calling Channels, all units should use the default Algorithm ID for defaults may be used for the other Interoperability channels when encryption is not used.

Use of encryption is allowed on the other Interoperability channels. Regional Planning Committees need to define appropriate Message ID, Encryption Algorithm ID, and Encryption Key ID to be used in the encrypted mode on Interoperability channels.

Appendix E

Sample Memorandum of Understanding Template

To be Placed on State Interoperability Executive Committee Letterhead

TO: (signer of application and title)
(agency name)

FROM: (name), Chairman

DATE: (mm/dd/yyyy)

SUBJECT: Memorandum of Understanding for Operating the 700 MHz Interoperability Channels

This memorandum of understanding (hereafter referred to as MOU) shall be attached to the application when submitting it. By virtue of signing and submitting the application and this MOU, (agency name) (hereafter referred to as APPLICANT) affirms its willingness to comply with the proper operation of the Interoperability (interoperability) channels as dictated by the Region 25 Planning Committee (here after referred to as RPC) as approved by the Federal Communications Commission (hereafter referred to as FCC) and by the conditions of this MOU.

The APPLICANT shall abide by the conditions of this MOU which are as follows:

- To operate by all applicable State, County, and City laws/ordinances.
- To utilize "plain language" for all transmissions.
- To monitor the Calling Channel(s) and coordinate the use of the Tactical Channels.
- To identify inappropriate use and mitigate the same from occurring in the future.
- To limit secondary Trunked operation to the interoperability channels specifically approved on the application and limited to channels listed below.
- To relinquish secondary Trunked operation of approved interoperability channels to requests for primary conventional access with same or higher priority.
- To mitigate contention for channels by exercising the Priority Levels identified in this MOU.

The preceding conditions are the primary, though not complete, requirements for operating in the interoperability channels. Refer to the Region Plan for the complete requirements list.

Priority Levels:

1. Disaster or extreme emergency operation for mutual aid and interagency communications;
2. Emergency or urgent operation involving imminent danger to life or property;
3. Special event control, generally of a preplanned nature (including Task Force operations);
4. Single agency secondary communications.

To resolve contention within the same priority, the channel should go to the organization with the wider span of control/authority. This shall be determined by the State Interoperability Executive Committee or RPC for the operation or by the levels of authority/government identified in the contention.

For clarification purposes and an aid to operate as authorized, any fixed base or mobile relay stations identified on the license for temporary locations (FCC station class FBT or FB2T, respectively) shall remain within the licensed area of operation. Similarly, vehicular/mobile repeater stations (FCC station class MO3) shall remain within the licensed area of operation. Federal agencies are permitted access to interoperability channels only as authorized by 47 CFR 2.102 (c) & 2.103 and Part 7.12 of the NTIA Manual.

Any violation of this MOU, the Region Plan, or FCC Rule shall be addressed immediately. The first level of resolution shall be between the parties involved, next the State Interoperability Executive Committee or RPC, and finally the FCC.

Secondary Trunked Channels

7TAC51 - Channel 23 & 24	7TMED65 - Channel 63 & 64
7TAC52 - Channel 103 & 104	7FIRE63 - Channel 143 & 144
7TAC53 - Channel 183 & 184	7LAW61 - Channel 223 & 224
7TAC54 - Channel 263 & 264	7MOB59 - Channel 303 & 304

_____ (typed or printed name of authorized signer)
_____ (authorized signer identified above and consistent with application)
_____ (date)
_____ (agency name)
_____ (agency address)
_____ (agency address)
_____ (agency address)
_____ (signer's phone)
_____ (signer's email address, if available)

Appendix F

Region 25 700 MHz Regional Planning Meeting to Take Place
By Dan Sullivan
There will be a 700 MHz Regional Planning Committee meeting on August 31 , 2010 at 1-4 pm, Room 160, Mitchell Building, 125 N. Roberts, Helena. In 1998, the Federal Communications Commission (FCC) established a structure to allow Regional Planning Committees (RPCs) optimal flexibility to meet state and local needs, encourage innovative use of the spectrum, and accommodate new and unanticipated developments in technology and equipment. There are fifty-five RPCs, and each committee is required to submit its plan for the General Use spectrum. The entire State of Montana makes up Region 25.
Although planning for the700 MHz spectrum began in 2002, Region 25 has not yet submitted a 700 MHz Plan to the FCC. Montana public safety does not utilize the 700 MHz spectrum at this time, however, the advent of multi-band and software defined radios will make this spectrum valuable in the future, and a comprehensive plan must prepare for that.
Anyone is interested in 700 MHz planning is encouraged to attend. Attendees will be briefed on the draft Plan and asked for comments and recommendations. A copy of the draft 700 MHz Plan and meeting agenda can be found at http://pssb.mt.gov/default.mcpx.
For questions or comments, contact PSSB representative Scott Bradford (sbradford@mt.gov), Region 25 Chairman Kevin Bruski (kbruski@interopmtproject.org) or Vice Chairman Jerry Dupler (timberline@jeffbb.net).

PUBLIC NOTICE

Federal Communications Commission
445 12th St., S.W.
Washington, D.C. 20554

DA

July 27, 2010

PUBLIC SAFETY AND HOMELAND SECURITY BUREAU ACTION

REGION 25 (MONTANA) PUBLIC SAFETY REGIONAL PLANNING COMMITTEE TO HOLD 700 MHz REGIONAL PUBLIC SAFETY PLANNING MEETING

The Region 25 (Montana) 700 MHz Public Safety Regional Planning Committee will hold its next meeting on Tuesday, August 31, 2010, beginning at 1:00 p.m., at the Montana Department of Administration, Mitchell Building, 125 N. Roberts, Room 160, Helena, Montana.

The agenda for this meeting includes:

- Review of Old business
- Election of 700 MHz Regional Planning Committee Officers
- Status of 700 MHz plan structure, preparation and submission
- Establish subcommittees
- All other related matters

The Region 25 700 MHz Public Safety Regional Planning Committee meetings are open to the public. All eligible public safety providers whose sole or principal purpose is to protect the safety of life, health, or property in Region 25 may utilize these frequencies. It is essential that public safety agencies in all areas of government, including state, municipality, county, and Native American Tribal, and non-governmental organizations eligible under Section 90.523 of the Commission's rules, be represented in order to ensure that each agency's future spectrum needs are considered in the allocation process. Administrators who are not oriented in the communications field should delegate someone with this knowledge to attend, participate, and represent their agency's needs.

All interested parties wishing to participate in planning for the use of public safety spectrum in the 700 MHz and 4.9 GHz bands within Region 25 should plan to attend. For further information, please contact:

Kevin Bruski, Chairman
Region 25 700 MHz Public Safety Regional Planning Committee
Interoperability Montana Project
2715 Skyway Dr.
Helena, MT 59602-1213
(406)441-5417
kbruski@interopmtproject.org

Jerry Dupler, Vice Chairman
Region 25 700 MHz Public Safety Regional Planning Committee
Timberline Communications Inc.
P.O. Box 1116
Boulder, Montana 59632-0116
(406) 225-3795
timberline@jeffbb.net

From:	Bradford, Scott
Sent:	Monday, November 29, 2010 10:12 AM
To:	'Jeannie Benfaida'
Cc:	Kevin Bruski; Spooner, Wing (Elizabeth); Sullivan, Dan (ITSD); Osborne, Dale
Subject:	Region 25 Committee
Attachments:	2010_10_12 700 MHz Regional Planning Meeting.doc

Jeannie,

Attached are the minutes from the October 12th Region 25 700 MHz Planning Committee meeting held in conjunction with the Montana APCO meeting. The new elected Chairman is Scott Bradford (contact information below) and Vice-Chairman is Dale Osborne (contact information below).

Originally, the election of a new chairperson was scheduled for August, but was delayed due to poor attendance. In spite of more aggressive advertizing of the meeting, we still had poor attendance at the October meeting but needed to move forward with the Regional Process.

Our plan is to forward the draft plan to the FCC and neighboring regions in December to begin the review process. Please advice on the proper procedures and contacts you would like us to use to make this process more efficient.

Region 25 Chairman
Scott Bradford
State of Montana
Public Safety Services Bureau
PO Box 200113
Helena, Montana 59620-0113
sbradford@mt.gov
406-444-2782

Region 25 Vice-Chairman
Dale Osborne
Montana Highway Patrol
PO Box 201419
Helena, Montana 59620-1419
dosborne@mt.gov
406-444-4274

700 MHz Regional Planning Meeting
Oct. 12, 2010
Holiday Inn, Bozeman, MT 59701

Meeting Called to Order at 2:15 pm

OLD BUSINESS

Bylaws and other Historic Information: Participants spoke about the location of the committee's bylaws and other historic information. Dale Osborne phoned Steve Keller to determine if he knew the whereabouts of the files, which Kevin Bruski is unable to locate. A draft version of the by-laws is located in Appendix A of the plan. These will be approved following approval of the Region 25 plan.

Election of Officers: Kevin Bruski wishes to step down as chair.

Motion: Wing Spooner nominated Scott Bradford as Chair, and Dale Osborne seconded. The motion carried.

Motion: Wing Spooner nominated Dale Osborne as vice chair and Scott Bradford seconded. The motion passed.

Motion: Wing Spooner made a motion to nominate Dan Sullivan as secretary. Dale Osborne seconded. The motion was approved.

Review of the Plan: Scott Bradford sent the draft plan to the chairman in Idaho (Region 12) as a courtesy prior to official release, but has not heard anything. No other comments or recommendations have been received in the last month and a half since the draft plan was posted to the PSSB website, advertised in the Heard Across Montana newsletter and noticed on the FCC website.

Wyoming is working on its draft plan, and North and South Dakota both are in the process of drafting theirs.

- Channel Allotment Plan (Appendix G) – Discussion took place. Scott added new channel tables to the plan.
- Draft bylaws – Appendix A contains a draft set of bylaws
- Common Labels – The national naming scheme is noted in the appendix, but not the text. This information should be added to the 800 MHz plan, too.

Motion: Dale Osborne made a motion to request approval of the plan through the FCC and to request approval from adjacent regions using the published FCC process. Wing Spooner seconded. The motion carried.

Sub-Committee Updates: None.

Related Matters: Discussion ensued as to how to build interest and participation. Dale spoke about the use of the 700 MHz spectrum for data transfer.

Public Comment: None

Adjournment: Dale Osborne made a motion to adjourn. Scott seconded. The motion carried, and the meeting adjourned at 3:10 pm.

Appendix G

Frequency Allotments:

Jurisdiction	Channel	Class	Category	General	Base Freq	Mobile Freq	COMMENTS
	101-102	Trunked	National	Secondary	769.6313	799.63125	
	103-104	Voice	National	Interop	769.6438	799.64375	
	105-108	Voice	State	License	769.6625	799.6625	
	105-108	Voice	State	License	769.6625	799.6625	
	105-108	Voice	State	License	769.6625	799.6625	
	109-112	Voice	State	License	769.6875	799.6875	
	109-112	Voice	State	License	769.6875	799.6875	
	11-12	Voice	National	LP	769.0688	799.06875	
	113-116	Voice	State	License	769.7125	799.7125	
	113-116	Voice	State	License	769.7125	799.7125	
	113-116	Voice	State	License	769.7125	799.7125	
	117-118	Voice	National	Reserved	769.7313	799.73125	
	119-120	Voice	National	Interop	769.7438	799.74375	
	1-2	Voice	National	LP	769.0063	799.00625	
Lincoln	121-124	Voice	General	Use	769.7625	799.7625	
Fergus	121-124	Voice	General	Use	769.7625	799.7625	
Carter	121-124	Voice	General	Use	769.7625	799.7625	
Ravalli	125-128	Voice	General	Use	769.7875	799.7875	
Gallatin	125-128	Voice	General	Use	769.7875	799.7875	
Hill	125-128	Voice	General	Use	769.7875	799.7875	
Reserved	129-132	Voice	General	Use	769.8125	799.8125	
Garfield	13-16	Voice	General	Use	769.0875	799.0875	
Glacier	13-16	Voice	General	Use	769.0875	799.0875	
Powell	13-16	Voice	General	Use	769.0875	799.0875	
Custer	133-136	Voice	General	Use	769.8375	799.8375	

Meagher	133-136	Voice	General	Use	769.8375	799.8375	
Phillips	133-136	Voice	General	Use	769.8375	799.8375	
Sanders	133-136	Voice	General	Use	769.8375	799.8375	
Petroleum	137-140	Voice	General	Use	769.8625	799.8625	
Silver Bow	137-140	Voice	General	Use	769.8625	799.8625	
Sweetgrass	137-140	Voice	General	Use	769.8625	799.8625	
	141-142	Voice	National	Reserved	769.8813	799.88125	
	143-144	Voice	National	Interop	769.8938	799.89375	
	145-148	Voice	State	License	769.9125	799.9125	
	145-148	Voice	State	License	769.9125	799.9125	
	145-148	Voice	State	License	769.9125	799.9125	
	145-148	Voice	State	License	769.9125	799.9125	
	149-152	Voice	State	License	769.9375	799.9375	
	149-152	Voice	State	License	769.9375	799.9375	
	153-156	Voice	State	License	769.9625	799.9625	
	153-156	Voice	State	License	769.9625	799.9625	
	157-158	Voice	National	Reserved	769.9813	799.98125	
	159-160	Voice	National	Interop	769.9938	799.99375	
Carter	161-164	Voice	General	Use	770.0125	800.0125	
Fergus	161-164	Voice	General	Use	770.0125	800.0125	
Gallatin	161-164	Voice	General	Use	770.0125	800.0125	
Lincoln	161-164	Voice	General	Use	770.0125	800.0125	
Phillips	161-164	Voice	General	Use	770.0125	800.0125	
Glacier	165-168	Voice	General	Use	770.0375	800.0375	
Custer	165-168	Voice	General	Use	770.0375	800.0375	
Yellowstone	169-172	Voice	General	Use	770.0625	800.0625	
Gallatin	169-172	Voice	General	Use	770.0625	800.0625	
Ravalli	17-20	Voice	General	Use	769.1125	799.1125	
Sweetgrass	17-20	Voice	General	Use	769.1125	799.1125	
Carter	173-176	Voice	General	Use	770.0875	800.0875	
Fergus	173-176	Voice	General	Use	770.0875	800.0875	
Lincoln	173-176	Voice	General	Use	770.0875	800.0875	
McCone	177-180	Voice	General	Use	770.1125	800.1125	

Ravalli	177-180	Voice	General	Use	770.1125	800.1125	
	181-182	Trunked	National	Secondary	770.1313	800.13125	
	183-184	Voice	National	Interop	770.1438	800.14375	
	185-188	Voice	State	License	770.1625	800.1625	
	185-188	Voice	State	License	770.1625	800.1625	
	189-192	Voice	State	License	770.1875	800.1875	
	189-192	Voice	State	License	770.1875	800.1875	
	193-196	Voice	State	License	770.2125	800.2125	
	193-196	Voice	State	License	770.2125	800.2125	
	193-196	Voice	State	License	770.2125	800.2125	
	193-196	Voice	State	License	770.2125	800.2125	
	197-198	Voice	National	Reserved	770.2313	800.23125	
	199-200	Voice	National	Interop	770.2438	800.24375	
Petroleum	201-204	Voice	General	Use	770.2625	800.2625	
Sanders	201-204	Voice	General	Use	770.2625	800.2625	
Silver Bow	205-208	Voice	General	Use	770.2875	800.2875	
Yellowstone	205-208	Voice	General	Use	770.2875	800.2875	
Flathead	209-212	Voice	General	Use	770.3125	800.3125	
Garlield	209-212	Voice	General	Use	770.3125	800.3125	
Hill	209-212	Voice	General	Use	770.3125	800.3125	
	21-22	Trunked	National	Secondary	769.1313	799.13125	
Custer	213-216	Voice	General	Use	770.3375	800.3375	
Deer Lodge	213-216	Voice	General	Use	770.3375	800.3375	
Glacier	213-216	Voice	General	Use	770.3375	800.3375	
Meagher	217-220	Voice	General	Use	770.3625	800.3625	
McCone	217-220	Voice	General	Use	770.3625	800.3625	
Powder River	217-220	Voice	General	Use	770.3625	800.3625	
	221-222	Voice	National	Reserved	770.3813	800.38125	
	223-224	Voice	National	Interop	770.3938	800.39375	
	225-228	Voice	State	License	770.4125	800.4125	
	225-228	Voice	State	License	770.4125	800.4125	
	229-232	Voice	State	License	770.4375	800.4375	
	229-232	Voice	State	License	770.4375	800.4375	
	23-24	Voice	National	Interop	769.1438	799.14375	
	233-236	Voice	State	License	770.4625	800.4625	
	233-236	Voice	State	License	770.4625	800.4625	

	233-236	Voice	State	License	770.4625	800.4625
	237-238	Voice	National	Reserved	770.4813	800.48125
	239-240	Voice	National	Interop	770.4938	800.49375
Beaverhead	241-244	Voice	General	Use	770.5125	800.5125
Chouteau	241-244	Voice	General	Use	770.5125	800.5125
Garfield	245-248	Voice	General	Use	770.5375	800.5375
Powell	245-248	Voice	General	Use	770.5375	800.5375
Deer Lodge	249-252	Voice	General	Use	770.5625	800.5625
Sweet Grass	249-252	Voice	General	Use	770.5625	800.5625
	25-28	Voice	State	License	769.1625	799.1625
	25-28	Voice	State	License	769.1625	799.1625
Flathead	253-256	Voice	General	Use	770.5875	800.5875
Gallatin	253-256	Voice	General	Use	770.5875	800.5875
Phillips	253-256	Voice	General	Use	770.5875	800.5875
Custer	257-260	Voice	General	Use	770.6125	800.6125
Hill	257-260	Voice	General	Use	770.6125	800.6125
Silver Bow	257-260	Voice	General	Use	770.6125	800.6125
	261-262	Trunked	National	Secondary	770.6313	800.63125
	263-264	Voice	National	Interop	770.6438	800.64375
	265-268	Voice	State	License	770.6625	800.6625
	265-268	Voice	State	License	770.6625	800.6625
	265-268	Voice	State	License	770.6625	800.6625
	265-268	Voice	State	License	770.6625	800.6625
	269-272	Voice	State	License	770.6875	800.6875
	269-272	Voice	State	License	770.6875	800.6875
	273-276	Voice	State	License	770.7125	800.7125
	273-276	Voice	State	License	770.7125	800.7125
	277-278	Voice	National	Reserved	770.7313	800.73125
	279-280	DATA	National	Low Speed	770.7438	800.74375
Beaverhead	281-284	Voice	General	Use	770.7625	800.7625
Chouteau	281-284	Voice	General	Use	770.7625	800.7625
Phillips	281-284	Voice	General	Use	770.7625	800.7625
Hill	285-288	Voice	General	Use	770.7875	800.7875
Jefferson	285-288	Voice	General	Use	770.7875	800.7875

Petroleum	285-288	Voice	General	Use	770.7875	800.7875	
Reserved	289-292	Voice	General	Use	770.8125	800.8125	
	29-32	Voice	State	License	769.1875	799.1875	
	29-32	Voice	State	License	769.1875	799.1875	
Meagher	293-296	Voice	General	Use	770.8375	800.8375	
Wibaux	293-296	Voice	General	Use	770.8375	800.8375	
Big Horn	293-296	Voice	General	Use	770.8375	800.8375	
Fallon	297-300	Voice	General	Use	770.8625	800.8625	
Garfield	297-300	Voice	General	Use	770.8625	800.8625	
Sweet Grass	297-300	Voice	General	Use	770.8625	800.8625	
	301-302	Voice	National	Reserved	770.8813	800.88125	
	303-304	Voice	National	Interop	770.8938	800.89375	
	305-308	Voice	State	License	770.9125	800.9125	
	305-308	Voice	State	License	770.9125	800.9125	
	305-308	Voice	State	License	770.9125	800.9125	
	309-312	Voice	State	License	770.9375	800.9375	
	309-312	Voice	State	License	770.9375	800.9375	
	313-316	Voice	State	License	770.9625	800.9625	
	313-316	Voice	State	License	770.9625	800.9625	
	313-316	Voice	State	License	770.9625	800.9625	
	313-316	Voice	State	License	770.9625	800.9625	
	317-318	Voice	National	Reserved	770.9813	800.98125	
	319-320	Voice	National	Interop	770.9938	800.99375	
Flathead	321-324	Voice	General	Use	771.0125	801.0125	
Fallon	321-324	Voice	General	Use	771.0125	801.0125	
Jefferson	321-324	Voice	General	Use	771.0125	801.0125	
Valley	325-328	Voice	General	Use	771.0375	801.0375	
Yellowstone	325-328	Voice	General	Use	771.0375	801.0375	
Rosebud	329-332	Voice	General	Use	771.0625	801.0625	
Broadwater	329-332	Voice	General	Use	771.0625	801.0625	
Glacier	333-336	Voice	General	Use	771.0875	801.0875	
Granite	333-336	Voice	General	Use	771.0875	801.0875	
Petroleum	333-336	Voice	General	Use	771.0875	801.0875	
Roosevelt	333-336	Voice	General	Use	771.0875	801.0875	

	33-36	Voice	State	License	769.2125	799.2125
	33-36	Voice	State	License	769.2125	799.2125
	33-36	Voice	State	License	769.2125	799.2125
McCone	337-340	Voice	General	Use	771.1125	801.1125
Meagher	337-340	Voice	General	Use	771.1125	801.1125
	3-4	Voice	National	LP	769.0188	799.01875
Reserved	341-344	Voice	General	Use	771.1375	801.1375
Custer	345-348	Voice	General	Use	771.1625	801.1625
Sanders	345-348	Voice	General	Use	771.1625	801.1625
Yellowstone	349-352	Voice	General	Use	771.1875	801.1875
Cascade	349-352	Voice	General	Use	771.1875	801.1875
Chouteau	353-356	Voice	General	Use	771.2125	801.2125
Golden Valley	353-356	Voice	General	Use	771.2125	801.2125
Pondera	357-360	Voice	General	Use	771.2375	801.2375
Powell	357-360	Voice	General	Use	771.2375	801.2375
Valley	361-364	Voice	General	Use	771.2625	801.2625
Wibaux	361-364	Voice	General	Use	771.2625	801.2625
Reserved	365-368	Voice	General	Use	771.2875	801.2875
Reserved	369-372	Voice	General	Use	771.3125	801.3125
Mineral	373-376	Voice	General	Use	771.3375	801.3375
Stillwater	373-376	Voice	General	Use	771.3375	801.3375
	37-38	Voice	National	Reserved	769.2313	799.23125
Powell	377-380	Voice	General	Use	771.3625	801.3625
Rosebud	377-380	Voice	General	Use	771.3625	801.3625
Reserved	381-384	Voice	General	Use	771.3875	801.3875
Roosevelt	385-388	Voice	General	Use	771.4125	801.4125
Yellowstone	385-388	Voice	General	Use	771.4125	801.4125
McCone	389-392	Voice	General	Use	771.4375	801.4375
Pondera	389-392	Voice	General	Use	771.4375	801.4375

Broadwater	393-396	Voice	General	Use	771.4625	801.4625	
Golden Valley	393-396	Voice	General	Use	771.4625	801.4625	
	39-40	Voice	National	Call-In	769.2438	799.24375	
Flathead	397-400	Voice	General	Use	771.4875	801.4875	
Wibaux	397-400	Voice	General	Use	771.4875	801.4875	
Fallon	401-404	Voice	General	Use	771.5125	801.5125	
Granite	401-404	Voice	General	Use	771.5125	801.5125	
Yellowstone	401-404	Voice	General	Use	771.5125	801.5125	
Chouteau	405-408	Voice	General	Use	771.5375	801.5375	
Powder River	405-408	Voice	General	Use	771.5375	801.5375	
Stillwater	405-408	Voice	General	Use	771.5375	801.5375	
Jefferson	409-412	Voice	General	Use	771.5625	801.5625	
Sanders	409-412	Voice	General	Use	771.5625	801.5625	
Valley	409-412	Voice	General	Use	771.5625	801.5625	
Reserved	413-416	Voice	General	Use	771.5875	801.5875	
Broadwater	41-44	Voice	General	Use	769.2625	799.2625	
Hill	41-44	Voice	General	Use	769.2625	799.2625	
Mineral	41-44	Voice	General	Use	769.2625	799.2625	
Wibaux	41-44	Voice	General	Use	769.2625	799.2625	
Reserved	417-420	Voice	General	Use	771.6125	801.6125	
Pondera	421-424	Voice	General	Use	771.6375	801.6375	
Rosebud	421-424	Voice	General	Use	771.6375	801.6375	
Flathead	425-428	Voice	General	Use	771.6625	801.6625	
Gallatin	425-428	Voice	General	Use	771.6625	801.6625	
Fallon	429-432	Voice	General	Use	771.6875	801.6875	
Judith Basin	429-432	Voice	General	Use	771.6875	801.6875	
Roosevelt	429-432	Voice	General	Use	771.6875	801.6875	
Park	433-436	Voice	General	Use	771.7125	801.7125	

Yellowstone	433-436	Voice	General	Use	771.7125	801.7125	
Reserved	437-440	Voice	General	Use	771.7375	801.7375	
Reserved	441-444	Voice	General	Use	771.7625	801.7625	
Madison	445-448	Voice	General	Use	771.7875	801.7875	
Valley	445-448	Voice	General	Use	771.7875	801.7875	
Reserved	449-452	Voice	General	Use	771.8125	801.8125	
Reserved	453-456	Voice	General	Use	771.8375	801.8375	
Lake	45-48	Voice	General	Use	769.2875	799.2875	
Rosebud	45-48	Voice	General	Use	769.2875	799.2875	
Jefferson	457-460	Voice	General	Use	771.8625	801.8625	
Flathead	457-460	Voice	General	Use	771.8625	801.8625	
Reserved	461-464	Voice	General	Use	771.8875	801.8875	
Fallan	465-468	Voice	General	Use	771.9125	801.9125	
Gallatin	465-468	Voice	General	Use	771.9125	801.9125	
Golden Valley	465-468	Voice	General	Use	771.9125	801.9125	
Cascade	469-472	Voice	General	Use	771.9375	801.9375	
Powder River	469-472	Voice	General	Use	771.9375	801.9375	
Yellowstone	469-472	Voice	General	Use	771.9375	801.9375	
Reserved	473-476	Voice	General	Use	771.9625	801.9625	
Lewis and Clark	477-480	Voice	General	Use	771.9875	801.9875	
Park	477-480	Voice	General	Use	771.9875	801.9875	
Judith Basin	485-488	Voice	General	Use	772.0375	802.0375	
Powder River	485-488	Voice	General	Use	772.0375	802.0375	
Valley	485-488	Voice	General	Use	772.0375	802.0375	
Reserved	489-492	Voice	General	Use	772.0625	802.0625	

Reserved	493-496	Voice	General	Use	772.0875	802.0875	
Roosevelt	49-52	Voice	General	Use	769.3125	799.3125	
Rosebud	49-52	Voice	General	Use	769.3125	799.3125	
Reserved	497-500	Voice	General	Use	772.1125	802.1125	
Park	501-504	Voice	General	Use	772.1375	802.1375	
Prairie	501-504	Voice	General	Use	772.1375	802.1375	
Deer Lodge	505-508	Voice	General	Use	772.1625	802.1625	
Mussleshell	505-508	Voice	General	Use	772.1625	802.1625	
Pondera	505-508	Voice	General	Use	772.1625	802.1625	
Reserved	509-512	Voice	General	Use	772.1875	802.1875	
Daniels	513-516	Voice	General	Use	772.2125	802.2125	
Golden Valley	513-516	Voice	General	Use	772.2125	802.2125	
Lewis and Clark	513-516	Voice	General	Use	772.2125	802.2125	
Prairie	517-520	Voice	General	Use	772.2375	802.2375	
Yellowstone	517-520	Voice	General	Use	772.2375	802.2375	
Reserved	521-524	Voice	General	Use	772.2625	802.2625	
Roosevelt	525-528	Voice	General	Use	772.2875	802.2875	
Treasure	525-528	Voice	General	Use	772.2875	802.2875	
Reserved	529-532	Voice	General	Use	772.3125	802.3125	
Mineral	533-536	Voice	General	Use	772.3375	802.3375	
Stillwater	533-536	Voice	General	Use	772.3375	802.3375	
Cascade	53-56	Voice	General	Use	769.3375	799.3375	
Treasure	53-56	Voice	General	Use	769.3375	799.3375	
Reserved	537-540	Voice	General	Use	772.3625	802.3625	

Big Horn	541-544	Voice	General	Use	772.3875	802.3875	
Lake	541-544	Voice	General	Use	772.3875	802.3875	
Teton	541-544	Voice	General	Use	772.3875	802.3875	
Reserved	545-548	Voice	General	Use	772.4125	802.4125	
Broadwater	549-552	Voice	General	Use	772.4375	802.4375	
Prairie	549-552	Voice	General	Use	772.4375	802.4375	
Yellowstone	553-556	Voice	General	Use	772.4625	802.4625	
Reserved	557-560	Voice	General	Use	772.4875	802.4875	
	5-6	Voice	National	LP	769.0313	799.03125	
Reserved	561-564	Voice	General	Use	772.5125	802.5125	
Daniels	565-568	Voice	General	Use	772.5375	802.5375	
Flathead	565-568	Voice	General	Use	772.5375	802.5375	
Judith Basin	565-568	Voice	General	Use	772.5375	802.5375	
Park	569-572	Voice	General	Use	772.5625	802.5625	
Cascade	569-572	Voice	General	Use	772.5625	802.5625	
Beaverhead	573-576	Voice	General	Use	772.5875	802.5875	
Stillwater	573-576	Voice	General	Use	772.5875	802.5875	
Reserved	57-60	Voice	General	Use	769.3625	799.3625	
Lake	577-580	Voice	General	Use	772.6125	802.6125	
Madison	577-580	Voice	General	Use	772.6125	802.6125	
Roosevelt	577-580	Voice	General	Use	772.6125	802.6125	
Reserved	581-584	Voice	General	Use	772.6375	802.6375	
Big Horn	585-588	Voice	General	Use	772.6625	802.6625	
Lewis and Clark	585-588	Voice	General	Use	772.6625	802.6625	
Reserved	589-592	Voice	General	Use	772.6875	802.6875	

Dawson	593-596	Voice	General	Use	772.7125	802.7125	
Yellowstone	593-596	Voice	General	Use	772.7125	802.7125	
Reserved	597-600	Voice	General	Use	772.7375	802.7375	
Cascade	601-604	Voice	General	Use	772.7625	802.7625	
Deer Lodge	601-604	Voice	General	Use	772.7625	802.7625	
Treasure	601-604	Voice	General	Use	772.7625	802.7625	
Reserved	605-608	Voice	General	Use	772.7875	802.7875	
Musselshell	609-612	Voice	General	Use	772.8125	802.8125	
Missoula	609-612	Voice	General	Use	772.8125	802.8125	
Reserved	613-616	Voice	General	Use	772.8375	802.8375	
	61-62	Voice	National	Reserved	769.3813	799.38125	
Gallatin	617-620	Voice	General	Use	772.8625	802.8625	
Teton	617-620	Voice	General	Use	772.8625	802.8625	
Prairie	621-624	Voice	General	Use	772.8875	802.8875	
Wheatland	621-624	Voice	General	Use	772.8875	802.8875	
Reserved	625-628	Voice	General	Use	772.9125	802.9125	
Daniels	629-632	Voice	General	Use	772.9375	802.9375	
Yellowstone	629-632	Voice	General	Use	772.9375	802.9375	
Reserved	633-636	Voice	General	Use	772.9625	802.9625	
	63-64	Voice	National	Interop	769.3938	799.39375	
Beaverhead	637-640	Voice	General	Use	772.9875	802.9875	
Judith Basin	637-640	Voice	General	Use	772.9875	802.9875	
Lake	637-640	Voice	General	Use	772.9875	802.9875	
	641-642	Voice	National	Interop	773.0063	803.00625	
	643-644	Voice	National	Reserved	773.0188	803.01875	
	645-648	Voice	State	License	773.0375	803.0375	
	645-648	Voice	State	License	773.0375	803.0375	
	645-648	Voice	State	License	773.0375	803.0375	
	649-652	Voice	State	License	773.0625	803.0625	

	649-652	Voice	State	License	773.0625	803.0625
	653-656	Voice	State	License	773.0875	803.0875
	653-656	Voice	State	License	773.0875	803.0875
	653-656	Voice	State	License	773.0875	803.0875
	653-656	Voice	State	License	773.0875	803.0875
	65-68	Voice	State	License	769.4125	799.4125
	65-68	Voice	State	License	769.4125	799.4125
	657-658	Voice	National	Interop	773.1063	803.10625
	659-660	Trunked	National	Secondary	773.1188	803.11875
Dawson	661-664	Voice	General	Use	773.1375	803.1375
Missoula	661-664	Voice	General	Use	773.1375	803.1375
Musselshell	661-664	Voice	General	Use	773.1375	803.1375
Park	661-664	Voice	General	Use	773.1375	803.1375
Teton	661-664	Voice	General	Use	773.1375	803.1375
Reserved	665-668	Voice	General	Use	773.1625	803.1625
Reserved	669-672	Voice	General	Use	773.1875	803.1875
Cascade	673-676	Voice	General	Use	773.2125	803.2125
Daniels	673-676	Voice	General	Use	773.2125	803.2125
Yellowstone	673-676	Voice	General	Use	773.2125	803.2125
Broadwater	677-680	Voice	General	Use	773.2375	803.2375
Dawson	677-680	Voice	General	Use	773.2375	803.2375
Liberty	677-680	Voice	General	Use	773.2375	803.2375
Mineral	677-680	Voice	General	Use	773.2375	803.2375
Stillwater	677-680	Voice	General	Use	773.2375	803.2375
	681-682	Voice	National	Call-In	773.2563	803.25625
	683-684	Voice	National	Reserved	773.2688	803.26875
	685-688	Voice	State	License	773.2875	803.2875
	685-688	Voice	State	License	773.2875	803.2875
	685-688	Voice	State	License	773.2875	803.2875
	689-692	Voice	State	License	773.3125	803.3125
	689-692	Voice	State	License	773.3125	803.3125
	693-696	Voice	State	License	773.3375	803.3375
	693-696	Voice	State	License	773.3375	803.3375
	693-696	Voice	State	License	773.3375	803.3375
	693-696	Voice	State	License	773.3375	803.3375

	69-72	Voice	State	License	769.4375	799.4375	
	69-72	Voice	State	License	769.4375	799.4375	
	697-698	Voice	National	Interop	773.3563	803.35625	
	699-700	Voice	National	Reserved	773.3688	803.36875	
Reserved	701-704	Voice	General	Use	773.3875	803.3875	
Big Horn	705-708	Voice	General	Use	773.4125	803.4125	
Lewis and Clark	705-708	Voice	General	Use	773.4125	803.4125	
Richland	705-708	Voice	General	Use	773.4125	803.4125	
Carbon	709-712	Voice	General	Use	773.4375	803.4375	
Dawson	713-716	Voice	General	Use	773.4625	803.4625	
Fergus	713-716	Voice	General	Use	773.4625	803.4625	
Silver Bow	713-716	Voice	General	Use	773.4625	803.4625	
	713-716	Voice	General	Use	773.4625	803.4625	
Liberty	717-720	Voice	General	Use	773.4875	803.4875	
Treasure	717-720	Voice	General	Use	773.4875	803.4875	
	721-722	Voice	National	Interop	773.5063	803.50625	
	723-724	Voice	National	Reserved	773.5188	803.51875	
	725-728	Voice	State	License	773.5375	803.5375	
	725-728	Voice	State	License	773.5375	803.5375	
	725-728	Voice	State	License	773.5375	803.5375	
	729-732	Voice	State	License	773.5625	803.5625	
	733-736	Voice	State	License	773.5875	803.5875	
	733-736	Voice	State	License	773.5875	803.5875	
	733-736	Voice	State	License	773.5875	803.5875	
	733-736	Voice	State	License	773.5875	803.5875	
	73-76	Voice	State	License	769.4625	799.4625	
	73-76	Voice	State	License	769.4625	799.4625	
	73-76	Voice	State	License	769.4625	799.4625	
	73-76	Voice	State	License	769.4625	799.4625	
	737-738	Voice	National	Interop	773.6063	803.60625	
	739-740	Trunked	National	Secondary	773.6188	803.61875	
Dawson	741-744	Voice	General	Use	773.6375	803.6375	
Missoula	741-744	Voice	General	Use	773.6375	803.6375	
Cascade	745-748	Voice	General	Use	773.6625	803.6625	

Musselshell	745-748	Voice	General	Use	773.6625	803.6625	
Richland	745-748	Voice	General	Use	773.6625	803.6625	
Reserved	749-752	Voice	General	Use	773.6875	803.6875	
Wheatland	753-756	Voice	General	Use	773.7125	803.7125	
Roosevelt	753-756	Voice	General	Use	773.7125	803.7125	
Reserved	757-760	Voice	General	Use	773.7375	803.7375	
	761-762	Voice	National	Interop	773.7563	803.75625	
	763-764	Voice	National	Reserved	773.7688	803.76875	
	765-768	Voice	State	License	773.7875	803.7875	
	765-768	Voice	State	License	773.7875	803.7875	
	765-768	Voice	State	License	773.7875	803.7875	
	765-768	Voice	State	License	773.7875	803.7875	
	769-772	Voice	State	License	773.8125	803.8125	
	769-772	Voice	State	License	773.8125	803.8125	
	773-776	Voice	State	License	773.8375	803.8375	
	773-776	Voice	State	License	773.8375	803.8375	
	773-776	Voice	State	License	773.8375	803.8375	
	773-776	Voice	State	License	773.8375	803.8375	
	777-778	Voice	National	Interop	773.8563	803.85625	
	77-78	Voice	National	Reserved	769.4813	799.48125	
	779-780	Voice	National	Reserved	773.8688	803.86875	
	7-8	Voice	National	LP	769.0438	799.04375	
Reserved	781-784	Voice	General	Use	773.8875	803.8875	
Lewis and Clark	785-788	Voice	General	Use	773.9125	803.9125	
Yellowstone	785-788	Voice	General	Use	773.9125	803.9125	
Carbon	789-792	Voice	General	Use	773.9375	803.9375	
Hill	789-792	Voice	General	Use	773.9375	803.9375	
Reserved	793-796	Voice	General	Use	773.9625	803.9625	
Blaine	797-800	Voice	General	Use	773.9875	803.9875	
Missoula	797-800	Voice	General	Use	773.9875	803.9875	
Richland	797-800	Voice	General	Use	773.9875	803.9875	

	79-80	Voice	National	Interop	769.4938	799.49375
	801-802	Voice	National	Interop	774.0063	804.00625
	803-804	Voice	National	Reserved	774.0188	804.01875
	805-808	Voice	State	License	774.0375	804.0375
	805-808	Voice	State	License	774.0375	804.0375
	805-808	Voice	State	License	774.0375	804.0375
	805-808	Voice	State	License	774.0375	804.0375
	809-812	Voice	State	License	774.0625	804.0625
	809-812	Voice	State	License	774.0625	804.0625
	813-816	Voice	State	License	774.0875	804.0875
	813-816	Voice	State	License	774.0875	804.0875
	813-816	Voice	State	License	774.0875	804.0875
	817-818	Voice	National	Interop	774.1063	804.10625
Reserved	81-84	Voice	General	Use	769.5125	799.5125
	819-820	Trunked	National	Secondary	774.1188	804.11875
Carbon	821-824	Voice	General	Use	774.1375	804.1375
Gallatin	821-824	Voice	General	Use	774.1375	804.1375
Liberty	821-824	Voice	General	Use	774.1375	804.1375
Blaine	825-828	Voice	General	Use	774.1625	804.1625
Big Horn	829-832	Voice	General	Use	774.1875	804.1875
Deer Lodge	829-832	Voice	General	Use	774.1875	804.1875
Toole	829-832	Voice	General	Use	774.1875	804.1875
Reserved	833-836	Voice	General	Use	774.2125	804.2125
Liberty	837-840	Voice	General	Use	774.2375	804.2375
Madison	837-840	Voice	General	Use	774.2375	804.2375
	841-842	Voice	National	Interop	774.2563	804.25625
	843-844	Voice	National	Reserved	774.2688	804.26875
	845-848	Voice	State	License	774.2875	804.2875
	845-848	Voice	State	License	774.2875	804.2875
	845-848	Voice	State	License	774.2875	804.2875
	845-848	Voice	State	License	774.2875	804.2875
	849-852	Voice	State	License	774.3125	804.3125
	849-852	Voice	State	License	774.3125	804.3125
	853-856	Voice	State	License	774.3375	804.3375
	853-856	Voice	State	License	774.3375	804.3375

	853-856	Voice	State	License	774.3375	804.3375
	853-856	Voice	State	License	774.3375	804.3375
	857-858	Voice	National	Interop	774.3563	804.35625
Lewis and Clark	85-88	Voice	General	Use	769.5375	799.5375
Yellowstone	85-88	Voice	General	Use	769.5375	799.5375
	859-860	Voice	National	Reserved	774.3688	804.36875
Big Horn	861-864	Voice	General	Use	774.3875	804.3875
Missoula	861-864	Voice	General	Use	774.3875	804.3875
Toole	861-864	Voice	General	Use	774.3875	804.3875
Carbon	865-868	Voice	General	Use	774.4125	804.4125
Cascade	869-872	Voice	General	Use	774.4375	804.4375
Yellowstone	869-872	Voice	General	Use	774.4375	804.4375
Richland	869-872	Voice	General	Use	774.4375	804.4375
Missoula	873-876	Voice	General	Use	774.4625	804.4625
Silver Bow	873-876	Voice	General	Use	774.4625	804.4625
Reserved	877-880	Voice	General	Use	774.4875	804.4875
	881-882	Voice	National	Interop	774.5063	804.50625
	883-884	Voice	National	Reserved	774.5188	804.51875
	885-888	Voice	State	License	774.5375	804.5375
	885-888	Voice	State	License	774.5375	804.5375
	885-888	Voice	State	License	774.5375	804.5375
	889-892	Voice	State	License	774.5625	804.5625
	889-892	Voice	State	License	774.5625	804.5625
	893-896	Voice	State	License	774.5875	804.5875
	893-896	Voice	State	License	774.5875	804.5875
	893-896	Voice	State	License	774.5875	804.5875
	893-896	Voice	State	License	774.5875	804.5875
	897-898	Voice	National	Interop	774.6063	804.60625
Gallatin	89-92	Voice	General	Use	769.5625	799.5625
	899-900	Trunked	National	Secondary	774.6188	804.61875
Reserved	901-904	Voice	General	Use	774.6375	804.6375
Big Horn	905-908	Voice	General	Use	774.6625	804.6625
Sheridan	905-908	Voice	General	Use	774.6625	804.6625
Silver Bow	905-908	Voice	General	Use	774.6625	804.6625

Toole	905-908	Voice	General	Use	774.6625	804.6625	
Reserved	909-912	Voice	General	Use	774.6875	804.6875	
	9-10	Voice	National	LP	769.0563	799.05625	
Cascade	913-916	Voice	General	Use	774.7125	804.7125	
Richland	913-916	Voice	General	Use	774.7125	804.7125	
Madison	917-920	Voice	General	Use	774.7375	804.7375	
Wheatland	917-920	Voice	General	Use	774.7375	804.7375	
	921-922	DATA	National	Low Speed	774.7563	804.75625	
	923-924	Voice	National	Reserved	774.7688	804.76875	
	925-928	Voice	State	License	774.7875	804.7875	
	925-928	Voice	State	License	774.7875	804.7875	
	925-928	Voice	State	License	774.7875	804.7875	
	925-928	Voice	State	License	774.7875	804.7875	
	929-932	Voice	State	License	774.8125	804.8125	
	929-932	Voice	State	License	774.8125	804.8125	
	933-936	Voice	State	License	774.8375	804.8375	
	933-936	Voice	State	License	774.8375	804.8375	
	933-936	Voice	State	License	774.8375	804.8375	
	937-938	Voice	National	Interop	774.8563	804.85625	
Blaine	93-96	Voice	General	Use	769.5875	799.5875	
Lewis and Clark	93-96	Voice	General	Use	769.5875	799.5875	
Ravalli	93-96	Voice	General	Use	769.5875	799.5875	
	939-940	Voice	National	Reserved	774.8688	804.86875	
Reserved	941-944	Voice	General	Use	774.8875	804.8875	
Blaine	945-948	Voice	General	Use	774.9125	804.9125	
Deer Lodge	945-948	Voice	General	Use	774.9125	804.9125	
Gallatin	945-948	Voice	General	Use	774.9125	804.9125	
Sheridan	945-948	Voice	General	Use	774.9125	804.9125	
Wheatland	945-948	Voice	General	Use	774.9125	804.9125	
	949-950	Voice	National	LP	774.9313	804.93125	
	951-952	Voice	National	LP	774.9438	804.94375	
	953-954	Voice	National	LP	774.9563	804.95625	
	955-956	Voice	National	LP	774.9688	804.96875	
	957-958	Voice	National	LP	774.9813	804.98125	
	959-960	Voice	National	LP	774.9938	804.99375	

Carter	97-100	Voice	General	Use	769.6125	799.6125	
Fergus	97-100	Voice	General	Use	769.6125	799.6125	
Lincoln	97-100	Voice	General	Use	769.6125	799.6125	
Sheridan	97-100	Voice	General	Use	769.6125	799.6125	
Toole	97-100	Voice	General	Use	769.6125	799.6125	

Request for Utilization of Unallocated Reserved Spectrum

Any public safety entity may request use of the unallocated reserved spectrum as defined in the approved 700 MHz Spectrum Allocation Table. This spectrum may be requested through the Region 25 approval process if it meets the following requirements:

1. There is a legitimate need for additional spectrum beyond the approved allotment;
2. Requests for the spectrum meet system loading guidelines as defined in the Region 25 Plan;
3. Systems should be designed for minimum signal strength in the system coverage area while minimizing signal power out of the coverage area. TIA/EIA TSB88A (or latest version) will be used to determine harmful interference assuming 40 dBμ, or greater, signal in all systems coverage areas. This may require patterned antennas and extra sites compared to a design that assumes noise limited coverage.
4. If an interference contour extends into an adjacent region, use of that frequency must be approved by the adjacent region receiving interference.

Appendix H

Pre-Coordination Procedures
Simplified 700 MHz Pre-assignment Rules

Introduction

This Appendix describes a process for coordinating the initial block assignments of 700 MHz channels before details of actual system deployments is available. In this initial phase, there is little actual knowledge of the specific equipment to be deployed and the exact antenna sites locations. As a result, a simple, high-level method is proposed to establish guidelines for frequency coordination. When actual systems are deployed, additional details will be known and the system designers will be required to select specific sites and supporting hardware to control interference.

Overview

Assignments will be based on a defined service area for each applicant. This will normally be an area defined by geographical or political boundaries such as city, county or by a data file consisting of line segments creating a polygon that encloses the defined area. The service contour is normally allowed to extend slightly beyond the geo/political boundaries such that systems can be designed for maximum signal levels within the boundaries, or coverage area. Systems must also be designed to minimize signal levels outside their geo/political boundaries to avoid interference into the coverage area of other co-channel users.

For co-channel assignments, the 40 dBμ service contour will be allowed to extend beyond the defined service area by 3 to 5 miles, depending on the type of environment: urban, suburban or rural. The co-channel 5 dBμ interfering contour will be allowed to touch but not overlap the 40 dBμ service contour of the system being evaluated. All contours are (50, 50).

For adjacent and alternate channels, the 60 dBμ interfering contour will be allowed to touch but not overlap the 40 dBμ service contour of the system being evaluated. All contours are (50, 50).

Discussion

Based upon the ERP/HAAT limitations referenced in 47CFR ¶ 90.541(a), the maximum field strength will be limited to 40 dB relative to 1μV/m (customarily denoted as 40 dBμ). It is assumed that this limitation will be applied similar to the way it is applied in the 821-824/866-869 MHz band. That is, a 40 dBμ field strength can be deployed up to a defined distance beyond the edge of the service area, based on the size of the service area or type of applicant, i.e. city, county or statewide system. This is important that public safety systems have adequate margins for reliability within their service area in the presence of interference, including the potential for interference from CMRS infrastructure in adjacent bands.

The value of 40 dBμ in the 700 MHz band corresponds to a signal of -92.7 dBm, received by a half-wavelength dipole (λ/2) antenna. The thermal noise floor for a 6.25 kHz bandwidth receiver

would be in the range of -126 dBm, so there is a margin of approximately 33 dB available for "noise limited" reliability. Figure 1 shows show the various interfering sources and how they accumulate to form a composite noise floor that can be used to determine the "reliability" or probability of achieving the desired performance in the presence of various interfering sources with differing characteristics.

If CMRS out-of-band emissions (OOBE) noise is allowed to be equal to the original thermal noise floor, there is a 3 dB reduction[1] in the available margin. This lowers the reliability and/or the channel performance of Public Safety systems. The left side of Figure 1 shows that the original 33 dB margin is reduced by 3 dB to only 30 dB available to determine "noise + CMRS OOBE limited" performance and reliability.

There are also different technologies with various channel bandwidths and different performance criteria. C/N in the range of 17 – 20 dB is required to achieve channel performance.

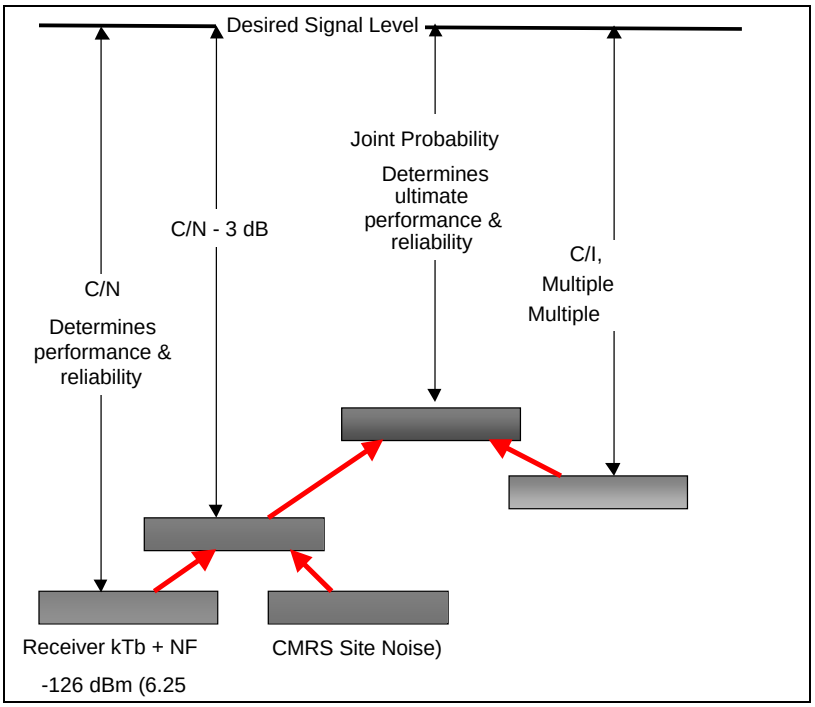


Figure 1 - Interfering Sources Create a "Noise" Level Influencing Reliability

In addition, unknown adjacent and alternate channel assignments need to be taken into account. The co-channel and adjacent/alternate sources are shown in the right hand side of Figure 1. At the edge of the service area, there would normally be only a single co-channel source, but there could potentially be several adjacent or alternate channel sources involved. It is recommended that co-channel assignments limit interference to <1% at the edge of the service area (worst case mile). A C/I ratio of 26.4 dB plus the required capture value (~10 dB) is required to achieve this goal.[2].

[1] TIA TR8 made this 3 dB allowance for CMRS OOBE noise during the meetings in Mesa, AZ, January 2001.
[2] See Appendix A for an explanation of how the 1% interference value is defined and derived.

The ultimate performance and reliability has to take into consideration both the noise sources (thermal & CMRS OOBE) and all the interference sources. The center of Figure 1 shows that the joint probability that the both performance criteria and interference criteria are met must be determined.

Table 1 shows estimated performance considering the 3 dB rise in the noise floor at the 40 dBμ signal level. Performance varies due to the different Cf/N requirements and noise floors of the different modulations and channel bandwidths.

Note that since little is known about the affects of terrain, an initial lognormal standard deviation of 8 dB is used.

Comparison of Joint Reliability for various				
Channel Bandwidth	6.25 kHz	12.5 kHz	12.5 kHz	25.0 kHz
Receiver ENBW (kHz)	6	6	9	18
Noise Figure(10 dB)	10	10	10	10
Receiver Noise Floor (dBm)	-126.22	-126.22	-124.46	-121.45
Rise in Noise Floor (dB)	3.00	3.00	3.00	3.00
New Receiver Noise Floor (dB)	-123.22	-123.22	-121.46	-118.45
40 dBu = -92.7 dBm	-92.7	-92.7	-92.7	-92.7
Receiver Capture (dB)	10.0	10.0	10.0	10.0
Noise Margin (dB)	30.52	30.52	28.76	25.75
C/N Required for DAQ = 3	17.0	17.0	18.0	20.0
C/N Margin (dB)	**13.52**	**13.52**	**10.76**	**5.75**
Standard deviation (8 dB)	8.0	8.0	8.0	8.0
Z	1.690	1.690	1.345	0.718
Noise Reliability (%)	**95.45%**	**95.45%**	**91.06%**	**76.37%**
C/I for <1% prob of capture	36.4	36.4	36.4	36.4
I (dBu)	3.7	3.7	3.7	3.7
I (dBm)	-129.0	-129.0	-129.0	-129.0
Joint Probability (C & I)	**94.7%**	**94.7%**	**90.4%**	**76.1%**
40 dBu = -92.7 dBm @ 770 MHz				

Table 1 Joint Probability For Project 25, 700 MHz Equipment Configurations.

These values are appropriate for a mobile on the street, but are considerably short to provide reliable communications to portables inside buildings.

Portable In-Building Coverage

Most Public Safety communications systems, today, are designed for portable in-building[3] coverage and the requirement for >95 % reliable coverage. To analyze the impact of requiring portable in building coverage and designing to a 40 dBμ service contour, several scenarios are presented. The different scenarios involve a given separation from the desired sites. Whether simulcast or multi-cast is used in wide-area systems, the antenna sites must be placed near the service area boundary and directional antennas, directed into the service area, must be used. The

[3] Building penetration losses typically required for urban = 20 dB, suburban = 15 dB, rural = 10 dB.

impact of simulcast is included to show that the 40 dBμ service contour must be able to fall outside the edge of the service area in order to meet coverage requirements at the edge of the service area. From the analysis, recommendations are made on how far the 40 dBμ service contour should extend beyond the service area.

Table 2 estimates urban coverage where simulcast is required to achieve the desired portable in building coverage. Several assumptions are required to use this estimate.

- Distance from the location to each site. Equal distance is assumed.
- CMRS noise is reduced when entering buildings. This is not a guarantee as the type of deployments is unknown. It is possible that CMRS units may have transmitters inside buildings. This could be potentially a large contributor unless the CMRS OOBE is suppressed to TIA's most recent recommendation and the "site isolation" is maintained at 65 dB minimum.
- The 40 dBμ service contour is allowed to extend beyond the edge of the service area boundary.
- Other configurations may be deployed utilizing additional sites, lower tower heights, lower ERP and shorter site separations.

Estimated Performance at 2.5 miles from each site				
Channel Bandwidth	6.25 kHz	12.5 kHz	12.5 kHz	25.0 kHz
Receiver Noise Floor (dBm)	-126.20	-126.20	-124.50	-118.50
Signal at 2.5 miles (dBm)	-72.7	-72.7	-72.7	-72.7
Margin (dB)	53.50	53.50	51.80	45.80
C/N Required for DAQ = 3	17.0	17.0	18.0	20.0
Building Loss (dB)	20	20	20	20
Antenna Loss (dBd)	8	8	8	8
Reliability Margin	8.50	8.50	5.80	-2.20
Z	1.0625	1.0625	0.725	-0.275
Single Site Noise Reliability (%)	85.60%	85.60%	76.58%	39.17%
Simulcast with 2 sites	97.93%	97.93%	94.51%	62.99%
Simulcast with 3 sites	99.70%	99.70%	98.71%	77.49%
Simulcast with 4 sites	99.96%	99.96%	99.70%	86.30%

Table 2, Estimated Performance From Site(s) 2.5 Miles From Typical Urban Buildings.

Table 2 shows for the example case of 2.5 miles a single site cannot provide >95% reliability. Either more sites must be used to reduce the distance or other system design techniques must be used to improve the reliability. For example, the table shows that simulcast can be used to achieve public safety levels of reliability at this distance. Table 2 also shows that the difference in performance margin requirements for wider bandwidth channels requires more sites and closer site-to-site separation.

Figures 2 and 3 show how the configurations would potentially be deployed for a typical site with 240 Watts ERP. This is based on:

- 75 Watt transmitter, 18.75 dBW
- 200 foot tower
- 10 dBd 180 degree sector antenna +10.0 dBd
- 5 dB of cable/filter loss. - 5.0 dB

23.75 dBW ≈ 240 Watts (ERPd)

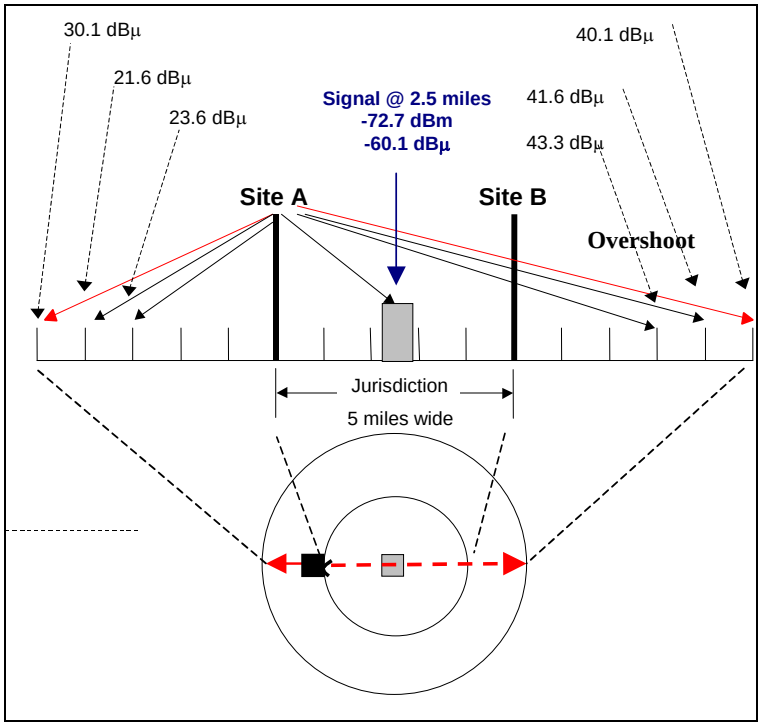


Figure 2 - Field Strength From Left-Most Site.

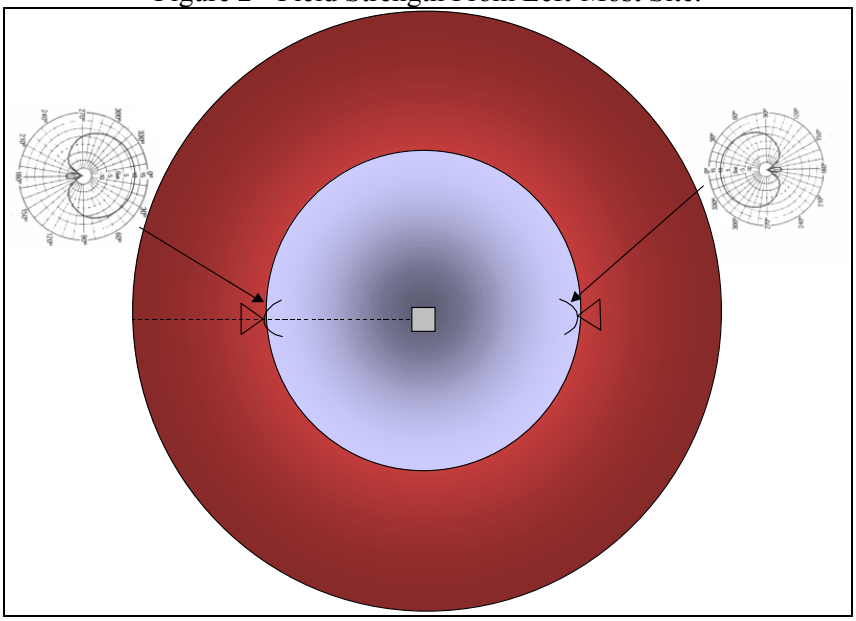


Figure 3 - Antenna Configuration Required To Limit Field Strength Off "Backside"

Figure 2 is for an urbanized area with a jurisdiction defined as a 5 mile circle. To provide the necessary coverage to portables in buildings at the center of the jurisdiction requires that the sites be placed along the edge of the service area and utilize directional antennas oriented toward the center of the service area (Figure 3). In this case, at 5 miles beyond the edge of the service area, the sites would produce a composite field strength of approximately 40 dBμ. Since one site is over 10 dB dominant, the contribution from the other site is not considered. The control of the field strength behind the site relies on a 20 dB antenna with a Front to Back Ratio (F/B) specification as shown in Figure 3. This performance may be optomistic due to back scatter off local obstructions in urbanized areas. However, use of antennas on the sides of buildings can assist in achieving better F/B ratios and the initial planning is not precise enough to prohibit using the full 20 dB.

The use of a single site at the center of the service area is not normally practical. To provide the necessary signal strength at the edge of the service area would produce a field strength 5 miles beyond in excess of 44 dBμ. However, if the high loss buildings were concentrated at the service area's center, then potentially a single site could be deployed, assuming that the building loss sufficiently decreases near the edge of the service area allowing a reduction in ERP to achieve the desired reliability.

Downtilting of antennas, instead of directional antennas, to control the 40 dBμ is not practical, in this scenario. For a 200 foot tall tower, the center of radiation from a 3 dB down-tilt antenna hits the ground at ~ 0.75 miles[4]. The difference in angular discrimination from a 200 foot tall tower at service area boundary at 5 miles and service contour at 10 miles is approximately 0.6 degrees, so ERP is basically the same as ERP toward the horizon. It would not be possible to achieve necessary signal strength at service area boundary and have 40 dBμ service contour be less than 5 miles away.

Tables 3 and 4 represent the same configuration, but for less dense buildings. In these cases, the distance to extend the 40 dBμ service contour can be determined from Table 5.

Estimated Performance at 3.5 miles from each site				
Channel Bandwidth	6.25 kHz	12.5 kHz	12.5 kHz	25.0 kHz
Receiver Noise Floor (dBm)	-126.20	-126.20	-124.50	-118.50
Signal at 3.5 miles (dBm)	-77.7	-77.7	-77.7	-77.7
Margin (dB)	48.50	48.50	46.80	40.80
C/N Required for DAQ = 3	17.0	17.0	18.0	20.0
Building Loss (dB)	15	15	15	15
Antenna Loss (dBd)	8	8	8	8
Reliability Margin	8.50	8.50	5.80	-2.20
Z	1.0625	1.0625	0.725	-0.275
Single Site Noise Reliability (%)	**85.60%**	**85.60%**	**76.58%**	**39.17%**
Simulcast with 2 sites	97.93%	97.93%	94.51%	62.99%
Simulcast with 3 sites	99.70%	99.70%	98.71%	77.49%
Simulcast with 4 sites	99.96%	99.96%	99.70%	86.30%

Table 3 - Lower Loss Buildings, 3.5 Mile From Site(s)

[4] Use of high gain antennas with down-tilt on low-level sites is one of the causes of far-near interference experienced in the 800 MHz band.

Estimated Performance at 5.0 miles from each site				
Channel Bandwidth	6.25 kHz	12.5 kHz	12.5 kHz	25.0 kHz
Receiver Noise Floor (dBm)	-126.20	-126.20	-124.50	-118.50
Signal at 5.0 miles (dBm)	-82.7	-82.7	-82.7	-82.7
Margin (dB)	43.50	43.50	41.80	35.80
C/N Required for DAQ = 3	17.0	17.0	18.0	20.0
Building Loss (dB)	10	10	10	10
Antenna Loss (dBd)	8	8	8	8
Reliability Margin	8.50	8.50	5.80	-2.20
Z	1.0625	1.0625	0.725	-0.275
Single Site Noise Reliability (%)	**85.60%**	**85.60%**	**76.58%**	**39.17%**
Simulcast with 2 sites	97.93%	97.93%	94.51%	62.99%
Simulcast with 3 sites	99.70%	99.70%	98.71%	77.49%
Simulcast with 4 sites	99.96%	99.96%	99.70%	86.30%

Table 4 - Low Loss Buildings, 5.0 Miles From Site(s)

Note that the receive signals were adjusted to offset the lowered building penetration loss. This produces the same numerical reliability results, but allows increasing the site to building separation and this in turn lowers the magnitude of the "overshoot" across the service area.

Table 5 shows the field strength for a direct path and for a path reduced by a 20 dB F/B antenna. This allows the analysis to be simplified for the specific example being discussed.

	Site A Direct Path	Site B Back Side of 20 dB F/B Antenna
Overshoot Distance (mi)	Field Strength (dBμ)	Field Strength (dBμ)
1	73.3	53.3
2	63.3	43.3
2.5	60.1	40.1
3	57.5	37.5
4	53.3	33.5
5	50.1	30.1
…	…	
10	40.1	
11	38.4	
12	37.5	
13	36.0	
14	34.5	
15	33.0	

Table 5 - Field Strength Vs. Distance From Site

For the scenarios above, the composite level at the Service Contour is the sum of the signals from the two sites. The sum can not exceed 40 dBμ. Table 5 allows you to calculate the distance to Service Contour given the distance from one of the sites.

Scenario 1: Refer to Figure 3a. Site B is just inside the Service Area boundary and Service Contour must be <5 Miles outside Service Area boundary. Signal level at Service Contour from Site B is 30.1 dBμ. Signal level for Site A can be up to 40 dBμ, since when summing two signals with >10 dB delta, the lower signal level has little effect (less than 0.4 dB in this case). Therefore, Site A can be 10 miles from the Service Contour, or 5 miles inside the Service Area boundary. The coverage perfomance for this scenario is shown in Table 2, above, for 20 dB building loss typical of urban areas.

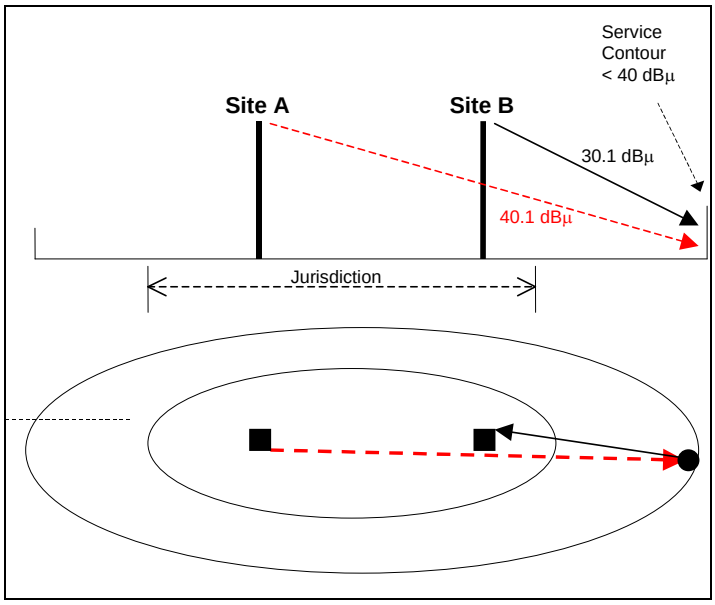


Figure 3a. Scenario 1 on of Use of Table 5

Scenario 2: Refer to bold data in Table 5. Site B is just inside the Service Area boundary and Service Contour must be <4 Miles outside Service Area boundary. Signal level at Service Contour from Site B is 33.5 dBμ. Signal level for Site A can be up to 38.4 dBμ. (See Appendix B for simple method to sum the powers of signals expressed in decibels.) The composite power level is 39.7 dBμ. Therefore, Site A can be slightly less than 11 miles from the Service Contour, or ~7 miles inside the Service Area boundary. The coverage perfomance for this example is shown in Table 3, above, for 15 dB building loss typical of suburban areas.

Scenario 3: Site B is just inside the Service Area boundary and Service Contour must be <3 Miles outside Service Area boundary. Signal level at Service Contour from Site B is 37.5 dBμ. Signal level for Site A can be up to 36.4 dBμ. (See Appendix B simple method to sum signals expressed in decibels.) The composite power level is 40.0 dBμ. Therefore, Site A can be ~13 miles from the Service Contour, or ~10 miles inside the Service Area boundary. The coverage perfomance for this example is shown in Table 4, above, for 10 dB building loss typical of rural areas.

Service Contour Extension Recommendation

The resulting recommendation for extending the 40 dBμ service contour beyond the service area boundary is:

Type of Area	Extension (mi.)
Urban (20 dB Buildings)	5
Suburban (15 dB Buildings)	4
Rural (10 dB Buildings)	3

Table 6 - Recommended Extension Distance Of 40 dBμ Field Strength

Using this recommendation the 40 dBμ service contour can then be constructed based on the defined service area without having to perform an actual prediction.

Interfering Contour

Table 1 above shows that 36.4 dB of margin is required to provide 10 dB of co-channel capture and <1% probability of interference. Since the 40 dBμ service contour is beyond the edge of the service area, some relaxation in the level of interference is reasonable. Therefore, a 35 dB co-channel C/I ratio is recommended and is consistent with what is currently being licensed in the 821-824/866-869 MHz Public Safety band.

Co-Channel Interfering Contour Recommendation

- Allow the constructed 40 dBμ (50,50) service contour to extend beyond the edge of the defined service area by the distance indicated in Table 6.
- Allow the 5 dBμ (50,50) interfering contour to intercept but not overlap the 40 dBμ service contour.

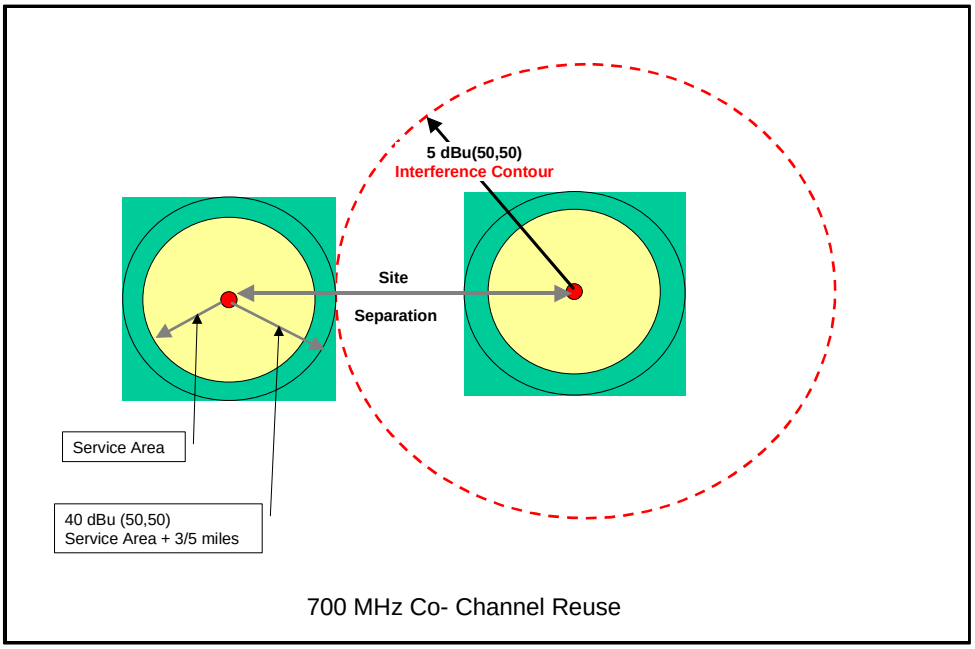


Figure 4 - Co-Channel Reuse Criterion

Adjacent and Alternate Channel Considerations

Adjacent and alternate channels are treated as being noise sources that alter the composite noise floor of a victim receiver. Using the 47 CFR § 90.543 values of ACCP can facilitate the coordination of adjacent and alternate channels. The C/I requirements for <1% interference can be reduced by the value of ACCPR. For example to achieve an X dB C/I for the adjacent channel that is -40 dBc a C/I of [X-40] dB is required. Where the alternate channel ACP value is -60 dBc, then the C/I = [X-60] dB is the goal for assignment(s). There is a compounding of interference energy, as there are numerous sources, i.e. co channel, adjacent channels and alternate channels plus the noise from CMRS OOBE.

There is insufficient information in 47 CFR § 90.543 to include the actual receiver performance. Receivers typically have "skirts" that allow energy outside the bandwidth of interest to be received. In addition, the FCC defines ACCP differently than does the TIA. The term used by the FCC is the same as the TIA definition of ACP. The subtle difference is that ACCP defines the energy intercepted by a defined receiver filter (e.g., 6 kHz ENBW). ACP defines the energy in a measured bandwidth that is typically wider than the receiver (e.g., 6.25 kHz channel bandwidth). As a result, the FCC values are optimistic at very close spacing and somewhat pessimistic at wider spacings, as the typical receiver filter is less than the channel bandwidth.

In addition, as channel bandwidth is increased, the total amount of noise intercepted rises compared to the level initially defined in a 6.25 kHz channel bandwidth. However, the effect is diminished at very close spacings as the slope of the noise curve falls off rapidly. At greater spacings, the slope of the noise curve is essentially flat and the receiver's filter limits the noise to a rise in the thermal noise floor.

Digital receivers tend to be less tolerant to interference than analog. Therefore, a 3 dB reduction in the C/(I+N) can reduce a DAQ = 3 to a DAQ = 2, which is threshold to complete muting in digital receivers. Therefore to maintain a DAQ = 3, at least 17 dB of fading margin plus the 26.4 dB margin for keeping the interference below 1% probability is required, for a total margin of 43.4 dB. However, this margin would be at the edge of the service area and the 40 dBμ service contour is allowed to extend past the edge of the service area.

Frequency drift is controlled by the FCC requirement for 0.4-ppm stability when locked. This equates to approximately a 1 dB standard deviation, which is negligible when associated with the recommended initial lognormal standard deviation of 8 dB and can be ignored.

Project 25 requires that a transceiver receiver have an ACIPR of 60 dB. This implies that an ACCPR ≥ 65 dB will exist for a "companion receiver". A companion receiver is one that is designed for the specific modulation. At this time the highest likelihood is that receivers will be deploying the following receiver bandwidths at the following channel bandwidths.

Estimated Receiver Parameters	
Channel Bandwidth	Receiver Bandwidth
6.25 kHz	5.5 kHz
12.5 kHz	5.5 or 9 kHz
25 kHz	18.0 kHz

Table 7 - Estimated Receiver Parameters

Based on 47 CFR ¶ 90.543 and the P25 requirement for an ACCPR ≥ 65 dB into a 6.0 kHz channel bandwidth and leaving room for a migration from Phase 1 to Phase 2, allows for making the simplifying assumption that 65 dB ACCPR is available for both adjacent 25 kHz spectrum blocks.

The assumption is that initial spectrum coordination sorts are based on 25 kHz bandwidth channels. This provides the maximum flexibility by using 65 dB ACCPR for all but one possible combination of 6.25 kHz channels within the 25 kHz allotment.

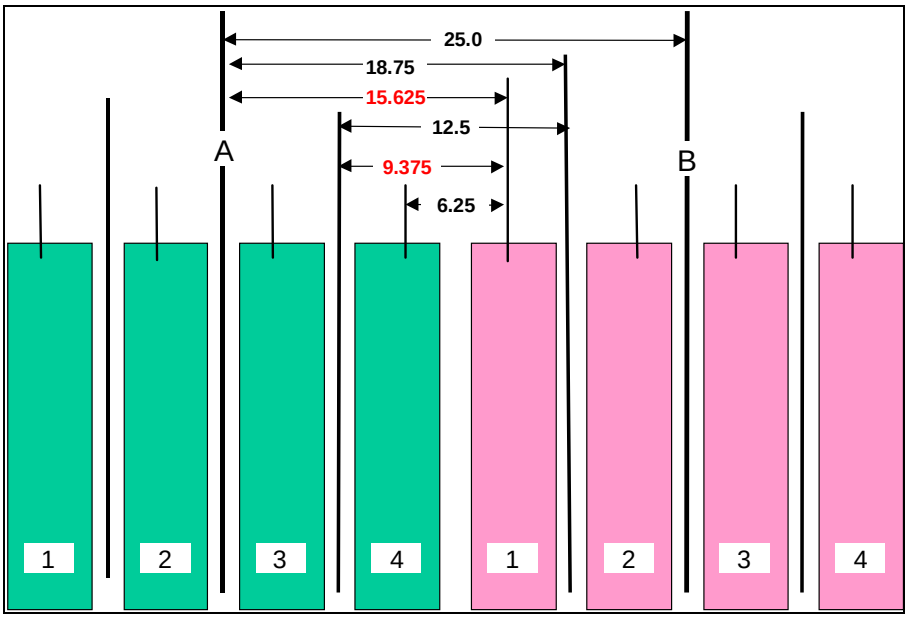


Figure 5, Potential Frequency Separations

Case	Spacing	ACCPR
25 kHz to 25 kHz	25 kHz	65 dB
25 kHz to 12.5 kHz	18.750 kHz	65 dB
25 kHz to 6.25 kHz	15.625 kHz	>40 dB
12.5 kHz to 12.5 kHz	12.5 kHz	65 dB
12.5 kHz to 6.25 kHz	9.375 kHz	>40 dB
6.25 kHz to 6.25 kHz	6.25 kHz	65 dB

Table 8 - ACCPR Values For Potential Frequency Separations

All cases meet or exceed the FCC requirement. The most troublesome cases occur where the wider bandwidths are working against a Project 25 Phase 2 narrowband 6.25 kHz channel. This pre-coordination based upon 25 kHz spectrum blocks still works if system designers and frequency coordinators keep this consideration in mind and move the edge 6.25 kHz channels inward away from the edge of the system. This approach allows a constant value of 65 dB ACCPR to be applied across all 25 kHz spectrum blocks regardless of what channel bandwidth is eventually deployed. There will also be additional coordination adjustments when exact system design details and antenna sites are known.

For spectrum blocks spaced farther away, it must be assumed that transmitter filtering, in addition to transmitter performance improvements due to greater frequency separation, will further reduce the ACCPR.

Therefore, it is recommended that a consistent value of 65 dB ACCPR be used for the initial coordination of adjacent 25 kHz channel blocks. Rounding to be conservative due to the

possibility of multiple sources allows the Adjacent Channel Interfering Contour to be approximately 20 dB above the 40 dBμ service contour, at 60 dBμ.

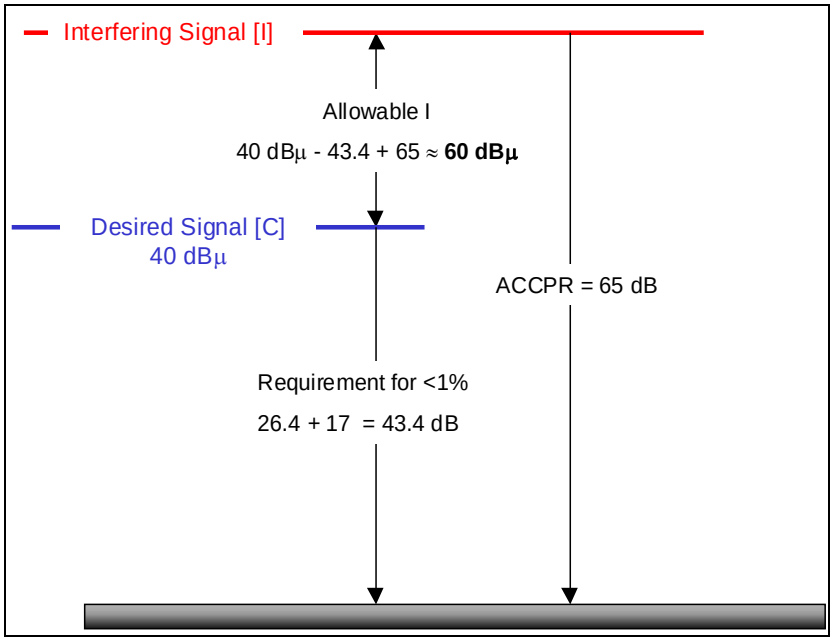


Figure 6 - Adjusted Adjacent 25 kHz Channel Interfering Contour Value

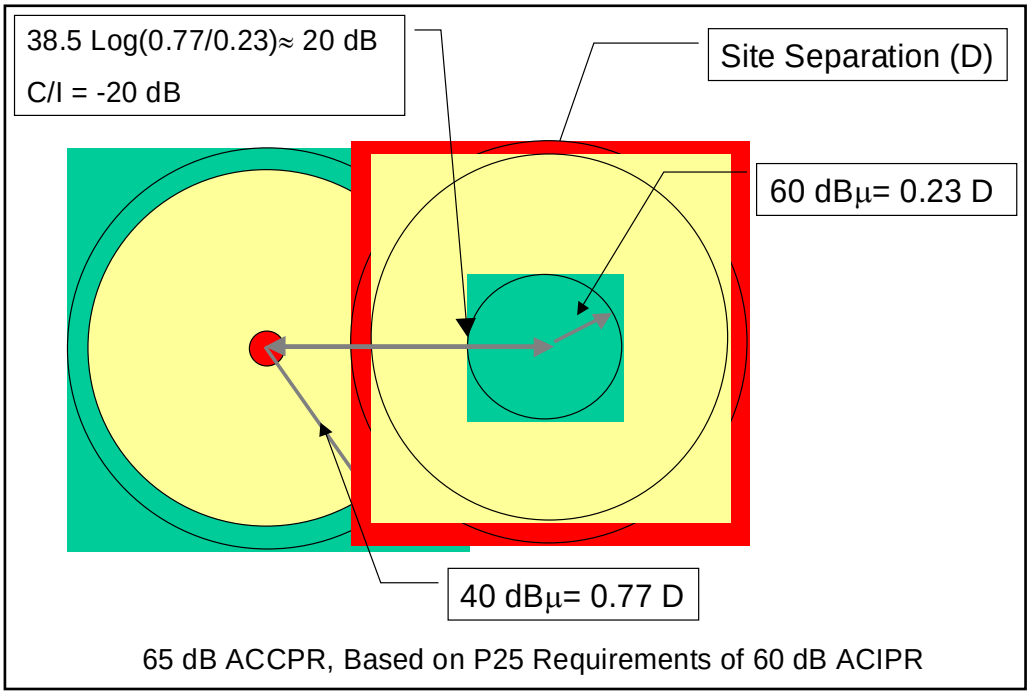


Figure 7 - Example Of Adjacent/Alternate Overlap Criterion

Adjacent Channel Interfering Contour Recommendation

An adjacent (25 kHz) channel shall be allowed to have its 60 dBμ (50,50) interfering contour touch but not overlap the 40 dBμ (50,50) service contour of a system being evaluated. Evaluations should be made in both directions.

Final Detailed Coordination

This simple method is only adequate for presorting large blocks of spectrum to potential entities. A more detailed analysis should be executed in the actual design phase to take all the issues into consideration.

Additional factors that should be considered include:

- Degree of Service Area Overlap
- Different size of Service Areas
- Different ERPs and HAATs
- Actual Terrain and Land Usage
- Differing User Reliability Requirements
- Migration from Project 25 Phase 1 to Phase 2
- Actual ACCP
- Balanced Systems
- Mobiles vs. Portables
- Use of voting
- Use of simulcast
- Radio specifications
- Simplex Operation
- Future unidentified requirements.

Special attention needs to be paid to the use of simplex operation. In this case, an interferer can be on an offset adjacent channel and in extremely close proximity to the victim receiver. This is especially critical in public safety where simplex operations are frequently used at a fire scene or during police operation. This type operation is also quite common in the lower frequency bands. In those cases, evaluation of base-to-base as well as mobile-to-mobile interference should be considered and evaluated.

Appendix H-A

Carrier-to-Interference Requirements

There are two different ways that Interference is considered.

- Co Channel
- Adjacent and Alternate Channels

Both involve using a C/I ratio. The C/I ratio requires a probability be assigned. For example, if 10% Interference is specified, the C/I implies 90% probability of successfully achieving the desired ratio. 1% interference means that there is a 99% probability of achieving the desired C/I.

$$\frac{C}{I}\% = \frac{1}{2} \bullet erfc\left(\frac{\frac{C}{I}\text{margin}}{2\sigma}\right) \quad (1)$$

This can also be written in a form using the standard deviate unit (Z). In this case the Z for the desired probability of achieving the C/I is entered. For example, for a 90% probability of achieving the necessary C/I, Z = 1.28.

$$\frac{C}{I}\% = Z \cdot \sqrt{2} \cdot \sigma \quad (2)$$

The most common requirements for several typical lognormal standard deviations (σ) are included in the following table based on Equation (2).

Location Standard Deviation (σ) dB	5.6	6.5	8	10
Probability %				
10%	10.14 dB	11.77 dB	14.48 dB	18.10 dB
5%	13.07 dB	15.17 dB	18.67 dB	23.33 dB
4%	13.86 dB	16.09 dB	19.81 dB	24.76 dB
3%	14.90 dB	17.29 dB	21.28 dB	26.20 dB
2%	16.27 dB	18.88 dB	23.24 dB	29.04 dB
1%	18.45 dB	21.42 dB	26.36 dB	32.95 dB

Table A1 - Probability of Not Achieving C/I For Various Location Lognormal Standard Deviations

These various relationships are shown in Figure A1, a continuous plot of equation(s) 1 and 2.

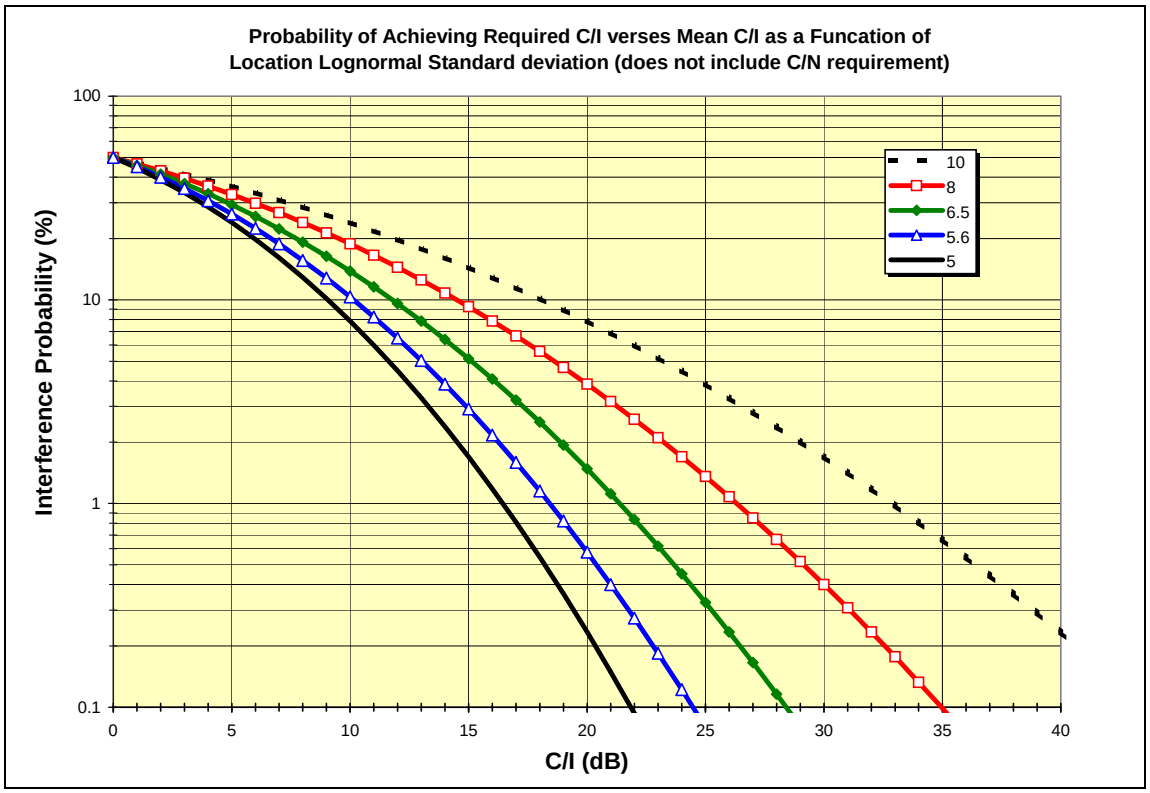


Figure A1, Probability Of Achieving Required C/I As A Function Of Location Standard Deviation

For co-channel the margin needs to include the "capture" requirement. When this is done, then a 1% probability of co channel interference can be rephrased to mean, there is a 99% probability that the "capture ratio" will be achieved. The capture ratio varies with the type of modulation. Older analog equipment has a capture ratio of approximately 7 dB. Project 25 FDMA is specified at 9 dB. Figure A1 shows the C/I requirement without including the capture requirement.

The 8 dB value for lognormal location standard deviation is reasonable when little information is available. Later when a detailed design is required, additional details and high-resolution terrain and land usage databases will allow a lower value to be used. The TIA recommended value is 5.6 dB. Using 8 dB initially and changing to 5.6 dB provides additional flexibility necessary to complete the final system design.

To determine the desired probability that the C/N and C/I will be achieved requires that a joint probability be determined. Figure A2 shows the effects of a family of various levels of C/N reliability and the joint probability (Y-axis) in the presence of various probabilities of Interference. Note that at 99% reliability with 1% interference (X-axis) that the reduction is nearly the difference. This is because the very high noise reliability is degraded by the interference, as there is little probability that the noise criterion will not be satisfied. At 90%, the 1% interference has a greater likelihood that it will occur simultaneously when the noise criterion not being met, resulting in less degradation of the 90%.

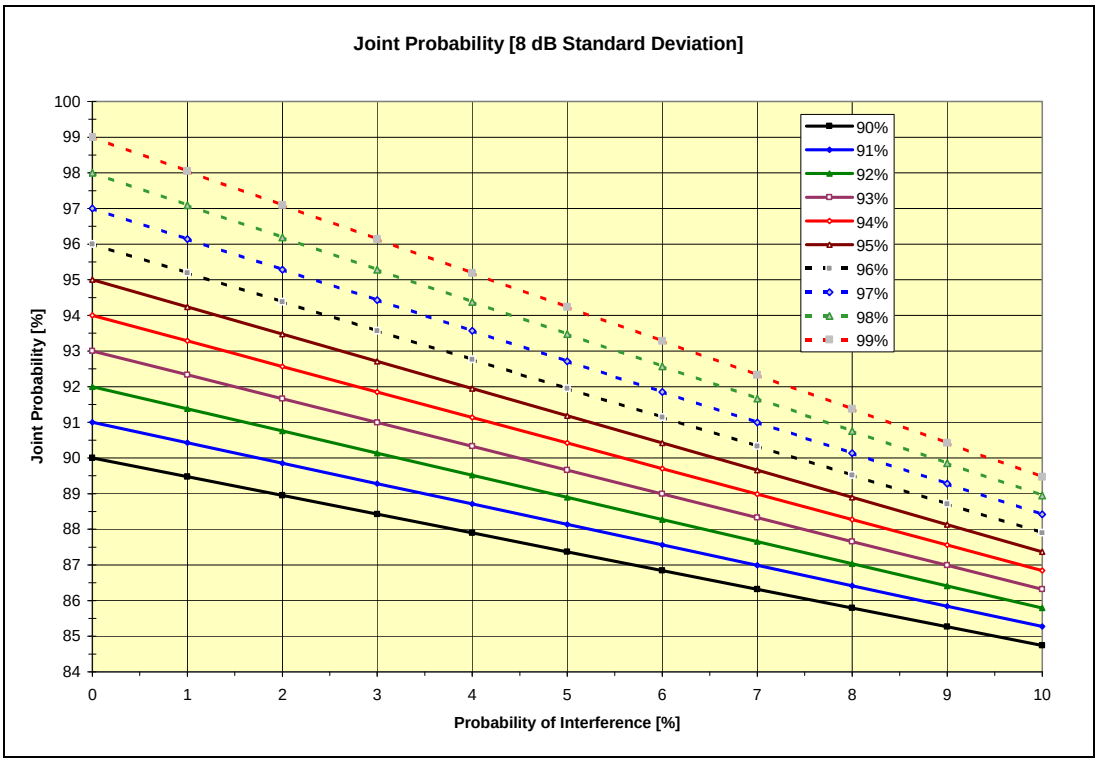
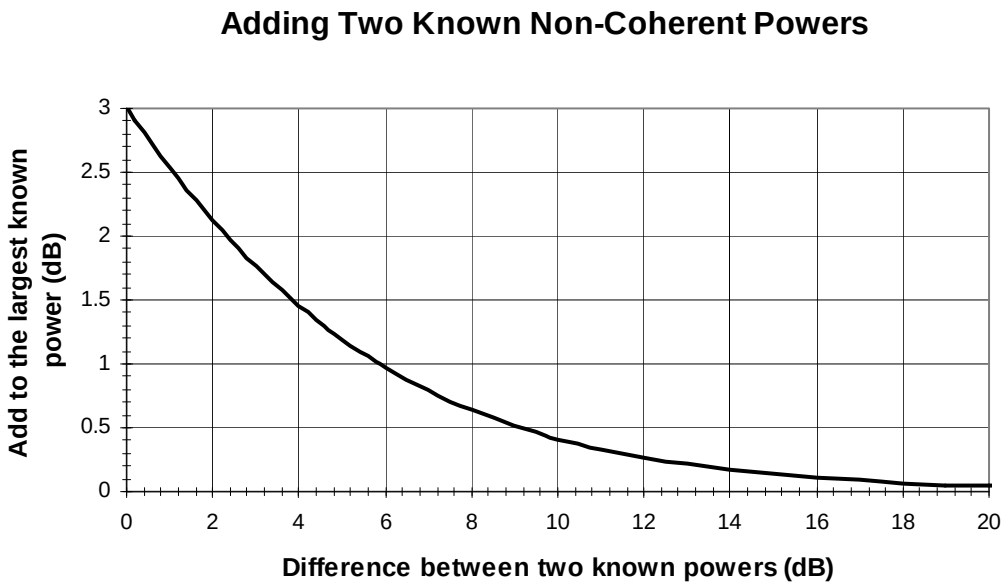


Figure A2 - Effect Of Joint Probability On The Composite Probability

For adjacent and alternate channels, the channel performance requirement must be added to the C/I ratio. When this is applied, then a 1% probability of adjacent/alternate channel interference can be rephrased to mean, there is a 99% probability that the "channel performance ratio" will be achieved.

Appendix H-B



In order to sum the power of two or more signals expressed in dBm or dBμ, they level should be converted to a voltage level or a power level, summed (root of the sum of the squares), and then converted back to dBm or dBμ.

The chart above provides simple method to sum two power levels expressed in dBm or dBμ. First find the difference between the two signals on the horizontal axis. Go up to the curve and across to the vertical axis to find the power delta. Add the power delta to the larger of the two original signal levels.

Example 1: Signal A is 36.4 dBμ. Signal B is 37.5 dBμ. Difference is 1.1 dB. Power delta is about 2.5 dB. Composite signal level is 37.5 dBμ + 2.5 dB = 40 dBμ.

Example 2: Signal is –96.3 dBm. Signal B is –95.2 dBm. Difference is 1.1 dB. Power delta is about 2.5 dB. Composite signal level is –95.2 dBm + 2.5 dB = -92.7 dBm.

Appendix I

Inter-Regional Dispute Resolution Agreements

Draft Agreement has been sent on 1/29/11 to adjacent 700 Regions. Below is Draft Agreement. Signed Agreements will be posted to Appendix I when received.

Inter-Regional Coordination Agreement and
Procedures for Resolution of Disputes
That May Arise Under FCC 700 MHz Approved Plans

I. INTRODUCTION

1. This is a mutually agreed upon Inter-Regional Coordination Procedures Agreement by and between the Region 25 700 MHz Planning Committee and the adjacent Region _____ 700 MHz Planning Committee.

The following is the specific procedure for inter-regional coordination which has been agreed upon by Region 25 and Region _____ and which will be used by the Regions to coordinate with adjacent Regional Planning Committees.

a. An application filing window is opened or the Region announces that it is prepared to begin accepting applications on a first-come/first serve basis.
b. Applications by eligible entities are accepted.
c. An Application filing window (if this procedure is being used) is closed after an appropriate time interval.
d. Inter-regional review and coordination takes place, including a technical review resulting in assignment of channels.
e. After intra-regional review, a copy of those frequency-specific applications requiring adjacent Regional approval, including a definition statement of proposed service area, shall then be forwarded to the adjacent Region(s) for review [5]. This information will be sent to the adjacent Regional chairperson(s) using the CAPRAD database or by e-mail.
f. The adjacent Region reviews the application. If the application is approved, a letter of concurrence shall be sent via the CAPRAD database or by e-mail to the initiating Regional chairperson within thirty (30) calendar days.

II. Dispute Resolution

1. If the adjacent Region(s) cannot approve the request, the adjacent Region shall document the reasons for partial or non-concurrence and respond within ten (10) calendar days via e-mail. If the applying Region cannot modify the application to satisfy the objections of the adjacent Region, a working group comprised of representatives of the two regions shall be convened within thirty (30) calendar days to attempt to resolve the dispute. The working group shall report its

[5] If an applicant's proposed service area or interference contour extends into an adjacent Public Safety Region(s), the application must be approved by the affected Region(s). Service area shall normally be defined as the area included within the geographical boundary of the applicant plus three (3) miles. Interference contour shall normally be defined as a 5 dBu co-channel contour or a 60 dBu adjacent channel.

findings within thirty (30) calendar days to the Regional Chairpersons e-mail (CAPRAD database). Findings may include but not be limited to:

(i) Unconditional concurrence;

(ii) Conditional concurrence contingent upon modification of the applicants technical parameters; or

(iii) Partial or total denial of proposed frequencies due to inability to meet co-channel/adjacent channel interference free protection to existing licenses within the adjacent Region;

(2) If the Inter-Regional Working Group cannot resolve the dispute, the matter shall be forwarded for evaluation to the National Plan Oversight Committee (NPOC). Each Region involved in the dispute shall include a detailed explanation of its position including engineering studies and any other technical information deemed relevant. The NPOC will, within thirty (30) calendar days, report its recommendation(s) to the Regional chairpersons via the CAPRAD database. The NPOC's decision may support either of the disputing Regions or it may develop a proposal that it deems mutually advantageous to each disputing Region.

g. Where adjacent Region concurrence has been secured and the channel assignments would result in no change to the Region's currently Commission approved channel assignment matrix, the initiating Region may advise the applicant(s) that their application may be forwarded to a frequency coordinator for processing and filing with the Commission.

h. Where adjacent Region concurrences have been secured and the channel assignments would result in a change to the Region's currently Commission approved channel assignment matrix, the initiating Region shall file with the Commission a Petition to amend their current Regional Plan's frequency matrix reflecting the new channel assignments with a copy of the Petition sent to the adjacent Regional chairperson(s).

i. Upon Commission issuance of an Order adopting the amended channel assignment matrix, the initiating Regional chairperson will send a courtesy copy of the Order to the adjacent Regional chairperson(s) and may then advise the applicant(s) that they may forward their applications to the frequency coordinator for processing and filing with the Commission.

IN AGREEMENT HERETO, REGION 25 AND REGION _____ DO SET THEIR SIGNATURES THE DAY AND YEAR FIRST WRITTEN ABOVE.

_____

BY: REGION 25 CHAIR PERSON

_____

BY: REGION __ CHAIR PERSON

Date: _____

Appendix J

Low-Power Pool Frequencies
Pursuant to 2nd Report & Order
(Released August 10, 2007/Effective October 23, 2007)

Channel #	Center Frequency (6.25 kHz)	Center Frequency (12.5 kHz)	Center Frequency (25 kHz)	Use	Channel #	Center Frequency (6.25 kHz)	Center Frequency (12.5 kHz)	Center Frequency (25 kHz)
1	769.003125			RPC Admin	961	799.003125		
2	769.009375	769.00625		RPC Admin	962	799.009375	799.00625	
3	769.015625		769.0125	RPC Admin	963	799.015625		799.0125
4	769.021875	769.01875		RPC Admin	964	799.021875	799.01875	
5	769.028125			RPC Admin	965	799.028125		
6	769.034375	769.03125		RPC Admin	966	799.034375	799.03125	
7	769.040625		769.0375	RPC Admin	967	799.040625		799.0375
8	769.046875	769.04375		RPC Admin	968	799.046875	799.04375	
9	769.053125			Itinerant	969	799.053125		
10	769.059375	769.05625		Itinerant	970	799.059375	799.05625	
11	769.065625		769.0625	Itinerant	971	799.065625		799.0625
12	769.071875	769.06875		Itinerant	972	799.071875	799.06875	
949	774.928125			RPC Admin	1909	804.928125		
950	774.934375	774.93125		RPC Admin	1910	804.934375	804.93125	
951	774.940625		774.9375	RPC Admin	1911	804.940625		804.9375
952	774.946875	774.94375		RPC Admin	1912	804.946875	804.94375	
953	774.953125			RPC Admin	1913	804.953125		
954	774.959375	774.95625		RPC Admin	1914	804.959375	804.95625	
955	774.965625		774.9625	RPC Admin	1915	804.965625		804.9625
956	774.971875	774.96875		RPC Admin	1916	804.971875	804.96875	
957	774.978125			RPC Admin	1917	804.978125		
958	774.984375	774.98125		RPC Admin	1918	804.984375	804.98125	
959	774.990625		774.9875	Itinerant	1919	804.990725		804.9875

960	774.996875	774.99375		Itinerant	1920	804.996875	804.99375	