

REGION 33

(OHIO)

700 MHz FRQUENCY PLAN

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1. INTRODUCTION

1.1 Background

In the early 1990's public safety officials testified before the United States Congress (Congress) regarding the lack of spectrum for public safety agencies throughout the country. Spectrum to meet current requirements and future technologies, for the advancement of public safety programs needed for efficient use of resources, was insufficient. As a result, Congress created the Public Safety Wireless Advisory Committee (PSWAC), made up of a cross-section of public safety officials, who were charged with studying the problem and making recommendations for remedies to Congress. The PSWAC report recommended that 97.5 MHz of new spectrum be allocated to public safety to meet the needs for the next 15 years. PSWAC further recommended that inter-operability within and among public safety and public service providers be a basic, essential requirement.

In 1996 Congress directed the Federal Communications Commission (FCC) to allocate 24 MHz of spectrum to public safety. Subsequently, the FCC established a federal advisory committee, called the National Coordinating Committee (NCC), to address inter-operability, technology, and implementation issues to be considered for the 700 MHz spectrum. The FCC required that a Regional Plan be prepared by regions outlining the use of public safety radio frequencies in the 700 MHz band and submitted for approval by the FCC. The plan must be approved before any agency within a region would receive channels from the new allocation.

Region 33 held it's first public meeting on February 28, 2001 at the State of Ohio Emergency Management Operations Center, 2855 West Dublin-Granville Road, Columbus, Ohio 43236. Region 33 800 MHz chairman, Donald Flahan, designated Raymond R. Smith as convener of the meeting. The purpose of the first meeting was to describe the 700 MHz planning process and to elect officers. Elected as the first chair was:

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1.2 Purpose

The purpose of the Region 33 plan is to document a process to insure that the maximum public benefit is derived from the 700 MHz spectrum by eligible agencies radio communication systems. The eligible agencies are defined in Chapter 41 of the Code of Federal Regulations (CFR) as follows:

Public safety – the public’s right, exercised through federal, state and local government as prescribed by law, to protect and preserve life, property and natural resources and to serve the public welfare.

Public safety services – those services rendered by or through federal, state or local government in support of public safety duties.

Public safety services provider – government and/or non-government entities; such as, private organizations, which, when properly authorized by the appropriate governmental authority, has a primary mission to provide public safety duties.

Public services – those services provided by non-public safety entities that furnish, maintain, and protect the nations basic infrastructures that are required to promote the public’s safety and welfare.

This plan gives priority to those public safety and public service agencies that are primarily responsible for the protection of life and property, and where assigned frequencies will be utilized in the most efficient manner possible through trunked and future advanced technologies.

This plan has been developed in a manner so that all 700 MHz voice and narrow band spectrum available for all public safety and public service applicants in the region will be impartially allocated according to criteria set forth in this document, when the spectrum is made available for use through United States government negotiations with Canada and when television stations transition to other spectrum.

1.3 National Standard

The Region 33 plan is in conformity with the NCC planning guidelines. If there is a conflict between this plan, the NCC documents or the FCC rules, the FCC rules will prevail. It is expected that Regional Plans for other regions may differ from this plan based on local needs. By officially sanctioning this plan the FCC agrees to its conformity to the NCC and FCC planning requirements. Nothing in the plan is to interfere with the proper functions and duties of organizations certified by the FCC for frequency coordination in the Private Land Mobile Services, but rather it provides procedures that are the consensus of the group of individuals that

developed the Region 33 plan. If there is a perceived conflict, then the judgment of the FCC will prevail.

1.4 RPC Membership

The members of the Region 33 planning committee can be found in Appendix (A). This listing includes each member's agency affiliation, mailing address, phone number and e-mail address. The officers of the RPC are noted as: Chair, Vice Chair and Secretary/Treasurer. The Region 33 committee membership represents a cross-section of public safety and public service users in the region.

1.5 Region Description

Region 33 encompasses the entire state of Ohio land mass and waterways and is bordered by the following regions: Region 21 (Michigan), Region 14 (Indiana), Region 17 (Kentucky), Region 44 (West Virginia) and Region 36 (Western Pennsylvania). For the purposes of frequency planning Region 55 (Western New York) must also be considered because the northeast corner of Region 33 is less than 70 miles from the southwestern corner of Region 55 (Chautauqua County). Region 33 also shares an international border with Canada; which, under current agreement with the United States, creates significant restrictions within Region 33 for the use of the 700 MHz spectrum.

Region 33 has eighty-eight (88) counties and numerous cities and metropolitan areas. The 2000 census for the region was 11,353,140 which represented a 4.9% increase over the 1990 census. Native American population represents 0.2% of the region population. Region 33 (Ohio) ranks as the 7th most populous state in the United States and its 41,004 square miles makes it 35th in overall size. Region 33 counties, cities, villages and townships; including maps showing population patterns and future growth trends are found in Appendix (B).

Region 33 is very diverse having a large industrial area in the northeast, a significant agriculture base and 29 counties in the southeastern portion of the region that falls within the Appalachian Economic Area. The region has six (6) metropolitan areas, (Akron/Canton, Cincinnati, Cleveland, Columbus, Dayton and Toledo) that are urban and have heavy concentrations of commercial business and population. The terrain varies from rugged Appalachian foothills in the southeast, rolling hills through the central portion of the region and flat farmlands in the west.

There are various individual mutual aid compacts and agreements implemented throughout the region, primarily between fire service agencies. There are no known existing organized interoperability agreements in the region that employ uniform standard operating procedures that cross different public safety services. Various public safety services have shared channel usage that is used under emergency conditions. These are generally service specific; ie, law enforcement,

fire and emergency services. Few conditions currently exist within Region 33 where cross service communication routinely occurs during emergency situations.

Region 33, being one state, has the typical governmental subdivisions; state, county, township and municipalities. Each subdivision, to the level of its legislated responsibility, has public safety responsibility for police, fire prevention and control, natural resource preservation and control, prisoner detention, emergency medical services and highway maintenance. Federal agencies of all stripes have a presence in the region. Only one major military facility, Wright-Patterson Air Force Base, and six (6) Coast Guard stations are located in the region. There are no cross jurisdiction arrangements or agreements that reach outside of Region 33. There are no recognizable tribal governments in this region.

This regional plan will consider, for planning purposes, the communication needs of all currently eligible entities under the FCC Public Safety (PW) pool. Additionally, this plan will consider the communication needs of those public safety service associated operations as the Region 33 planning committee may deem necessary and desirable to meet local needs.

1.6 Notification Process

The initial notification of meetings was accomplished through public notices posted on the FCC and Association of Public-Safety Communications Officials International, Inc (APCO) websites. Further, advertisements were placed in newspapers with wide distribution in Region 33 and the Ohio APCO bulletin. Ongoing notices were placed on the FCC and Ohio APCO websites. Additionally, personal contact with several individuals who had interest in the 700 MHz planning occurred throughout the process to encourage participation.

A list server was set up to announce meetings and share information among members of the planning committee. Representatives of bordering states RPC's were given access to the list server to ensure distribution of the Region 33 documents and process. Comments were solicited from all eligible parties through the list server and at the RPC meetings.

Comments received from eligible parties were forwarded to the appropriate subcommittee chairs for review and deliberation by their subcommittees. Comments that had merit were passed on to the RPC for consideration and implementation in the plan, where appropriate.

When the Region 33 plan is completed it will be published in accordance with FCC guidelines to receive final comments. The document will be posted on the Region 33 list server for comment for the general public. The plan will also be distributed to all border regions for their review and comment.

Appendix (C) includes copies of notices, comments and submissions. It also includes the dates, names of publications, and websites where meetings were announced.

2. REGIONAL PLAN ADMINISTRATION

2.1 Regional Planning Committee

The RPC will remain a functional entity after the approval of this plan to implement its features and requirements. The RPC By-Laws may be found in [Appendix \(D\)](#) of this plan. Meetings will be scheduled in accordance with the [By-Laws](#) or as directed by the RPC chair. Minutes can be found in Appendix E.

2.2 Implementation Subcommittee

The Implementation subcommittee is responsible for monitoring adherence to the Region 33 plan. The membership of this committee shall consist of the Interoperability subcommittee chairperson and three other members of the RPC selected by the RPC chairperson. Membership of the committee will be determined at the annual meeting. The committee will remain in place permanently to resolve inter-regional issues and recommend regional plan changes to the FCC.

The Implementation Subcommittee duties are as follows:

- Annually review and update the Region 33 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 RPC on applicants that fail to implement systems;
- and make recommendations to resolve inter-regional issues.

2.3 Technical Subcommittee

The primary responsibility of the Region 33 Technical subcommittee will be to review applications from agencies within the region for conformance to plan requirements. The Technical subcommittee will have access to the CAPRAD system, and will review and recommend approval of applications, as they are received in the system. Applications approved by the RPC will be forwarded to the selected coordinator, then to the FCC for licensure. The membership of this committee will consist of the Technical subcommittee chairperson, the Interoperability subcommittee chairperson and three other members of the RPC

selected by the RPC chair. Membership of the Technical subcommittee will be determined at the annual meeting.

The Technical subcommittee duties are as follows:

- Review applications for compliance to the Region 33 Plan;
- Deal with appeals/applicant clarifications and applicant presentations;
- recommend approval or denial to the RPC Chair;
- maintain coordination with neighboring RPC's and FCC certified frequency coordinators and advisors;
- update the Computer Assisted Pre-coordination Resource and Database (CAPRAD).

2.4 Interoperability Subcommittee

Ohio has elected to create a State Interoperability Executive Committee (SIEC) to oversee interoperability channels. The Ohio SIEC intends to include a member of the Region 33 RPC on its committee. The Region 33 interoperability subcommittee will serve as liaison with the Ohio SIEC and assist in the statewide interoperability planning process. The RPC believes the state has used good judgment by including RPC representation on the SIEC.

The Interoperability subcommittee duties are as follows:

- Work with the Ohio SIEC in the development of a statewide interoperability plan;
- load interoperability channel assignments in CAPRAD;
- and review application interoperability plans for conformance to the state plan.

3. ALLOCATION OF GENERAL USE SPECTRUM

3.1 General Provisions

This portion of the plan provides a basis for proper spectrum utilization. Its purpose is to evaluate the implementation of 700 MHz radio communication systems within the region. Region 33 places greater emphasis on agencies that provide services that result in preserving personal life and property protection and such agencies will receive the highest priority.

Systems operating in the Region 33 must comply with the FCC rules and regulations. A system of six (6) or more voice channels will be required to use trunking technology unless a more spectrum efficient technology can be demonstrated. Systems having five (5) or less voice channels may be conventional; however, such systems that do not meet the FCC loading

standards will be required to share the frequency on a non-exclusive basis. A mobile units system shall be digital and incorporate P25, Phase 1, on interoperability channels of a type accepted by the FCC.

The Region 33 plan adopts the NCC's **recommended Pre-Assignment Rules and Recommendations outlined in Appendix (F) as the appropriate** method used by the National Law Enforcement Telecommunications Council's, to develop CAPRAD as the base allotment methodology. A description of CAPRAD can be found in paragraph 5.4 of this plan.

Upon approval of this plan, Region 33 will announce that 700 MHz public safety channels are available in the Region and that channels have been assigned into pool allotments to counties within the Region. All available methods will be used to inform public safety entities of the availability of 700 MHz channels. All requests for channels will be handled on a first come, first serve basis.

Region 33 encourages small agencies to join multi-agency systems as such systems promote spectrum efficiency allowing small and large agency capacity needs to be met.

Agencies that desire spectrum must submit a complete application package containing various documents. A list of the documents is stated in Section 4.1 titled **Region 33 Application Requirements**. **All applicants will use CAPRAD for the preparation and submission of applications.**

3.2 Channel Allotments

General Use Channels

All agencies requesting spectrum during the initial filing window will be allotted channels if plan requirements are met. CAPRAD allotments are made in 25 KHz groups to allow for various digital technologies. Requests for voice channels will be allocated on the basis of one 12.5 KHz channel per one voice channel requested. It is the goal of the FCC to move toward one voice channel per 6.25 KHz of spectrum. Applicants should acknowledge their migration path to 6.25 KHz when applying to the RPC for channels in Region 33. For narrowband mobile data requests, one mobile data channel will consist of two (2) 6.25 KHz channels/one (1) 12.5 KHz channel. As 6.25 KHz migration continues, "orphan" 6.25 KHz channels can be allocated to agencies to maintain consistent grouping of 25 KHz blocks.

Special note: Although the CAPRAD system distributes frequencies geographically by county nationwide, this does not imply that counties have ownership of the frequencies. Channels are available to all eligible Region 33 public safety entities on a first come first serve basis.

CAPRAD maximizes the spectrum utilization. See Appendix (G) for the CAPRAD table of channel allocations for Region 33. The committee has determined that sufficient spectrum has been allocated for interoperability in the national plan to meet the current and future needs of this region.

Low Power “Campus Eligible” General Use Channels

In the implementation of the 700 MHz spectrum throughout Region 33 there may be opportunities for increased channel reuse when developing systems for “campus” type operations. Examples may be: hospitals, stadiums, malls, universities, transit systems, ports or other places of public gatherings. In many cases, these 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 also, in many cases, require in-building or confined space/tunnel radio coverage or communications along a linear pathway, such as 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. If power levels and Area of Protection (AOP) are taken into account increased spectral efficiency can be achieved. In order to facilitate this method of system implementation channels may be identified in certain areas of Region 33 that may be used in a smaller area. These channels will NOT be eligible for use throughout a county. The following criteria must be followed when requesting channels from the RPC for operations of this type:

- The 50dBu service contour of the proposed system must not exceed an area more than two (2) miles from the proposed service area. When this two (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 antenna, distributed antenna systems, radiating “leaky coax” are all tools that should be employed in the development of these types of systems. Region 33 will ensure the development of these types of systems will not interfere with co-channel or adjacent channel users within Region 33 or adjacent Regions. The Chair, or a majority of the members of this Region has the authority to request and require engineering studies from the applicant to verify that no harmful interference will be introduced to any co-channel or adjacent channel existing user prior to application approval. For 20 KHz co-channel assignments, the 50dBu service contour of the proposed stations will be allowed to extend beyond the defined service area of a distance not to exceed two (2) miles. An adjacent/alternate 25 KHz channel shall be allowed to have 60dBu (50,50) contour touch, but not overlap the 40dBu service (50,50) contour of an adjacent/alternate system being protected. Evaluations should be made in both directions to ensure compliance. Systems utilizing “campus” channels are subject to approval of the RPC. The RPC is the final authority on parameters associated with “campus” type operations.

- If Region 33 receives an application for low power fixed use and the proposed service contour encroaches onto an adjacent Region prior to the channel allotted to the Region being implemented in a specific system, the application must be modified so the service contour does not encroach into the adjacent Region. Otherwise, the applicant must supply Region 33 with written concurrence from the adjacent Region permitting the original design.

Orphaned Channels

The narrowband pool allotments will have a channel bandwidth of 25 KHz. These allotments are characterized as “technology neutral” i.e., able to accommodate multiple technologies utilizing multiple bandwidths. If agencies choose a system technology that requires less than 25 KHz channel bandwidth there is the potential for residual “orphaned channels” of 6.25 KHz or 12.5 KHz bandwidth immediately adjacent to the assigned channel. An orphaned 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.

When in the best interest of public safety communications and efficient spectrum utilization within the Region 33, the RPC shall have the authority to move these orphaned channels, and/or co-channel or adjacent channel allotments affected by the movement of orphaned channels, to other areas throughout the Region, as deemed necessary to retain spectrum efficiency and/or minimize co-channel or adjacent channel interference. If it is required to move a full 25 KHz channel, or a portion of a channel allotment, to a location outside of the county area to which it was originally approved, the Region 33 Technology subcommittee will review the application. The subcommittee will advise the RPC whether the full/partial channel allotment meets frequency coordination guidelines and should, or not be, moved to accommodate the application at hand. The movement of the full/partial channel allotments can be approved by a majority vote of the RPC members at a regular or special meeting of the RPC.

If the movement of a full/partial channel allotment is deemed in the best interest of public safety, and the relocation of the channel is less than 10 miles outside of its original county boundaries, there will be no plan amendment required. If the move is over 25 miles outside the original county boundaries the Region will gain concurrence from adjacent Regions and file a Region 33 Plan amendment to the FCC.

If, in the best interest of public safety, relocation of a full/partial; channel allotment from Region 33 to another Region, in the interest of inter-regional sharing, the RPC will amend the Region 33 plan, gain adjacent Region concurrence, and submit the amendment to the FCC.

Low Power Channels

The FCC in the 700 MHz band plan set aside channels 1 - 8 paired with 961 – 968 and 949 – 958 paired with 1909 – 1918 for low power use for on-scene

incident response purposes using mobiles and portables subject to Commission-approved regional planning committee regional plans. Transmitter power must not exceed two (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 two (2) watts ERP.

These channels may operate using analog operation. To facilitate analog modulation this plan will allow aggregation of two 6.25 KHz channels for 12.5 kHz bandwidth. On scene temporary base and mobile relay stations are allowed (to the extent FCC rules allow) with an antenna height limit of 6.1 meter (20 feet) above the ground. However, users are encouraged to operate in simplex mode with the least practicable amount of power to reliably maintain communications whenever possible. This plan does not limit use to analog only operations and channels are intended for use in a wide variety of applications that may require digital modulation types as well. The use of EIA/TIA-102, Project 25, Common-Air-Interface is required when using a digital mode of operation.

In its dialog leading up to CFR §90.531 allocating the twenty-four low power 6.25 kHz frequency pairs (of which eighteen fall under RPC jurisdiction)¹, the FCC suggested that there is a potential for multiple low power applications, and absent a compelling showing, a sharing approach be employed rather than making exclusive assignments for each specific application because low power operations can co-exist (in relatively close proximity) on the same frequencies with minimal potential for interference due to the two (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, there is some logic in replicating that template throughout the region for firefighter equipment. 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, we recommend the following regarding assignments associated with the eighteen narrowband channels for which the RPC has responsibility:

- Channels 1-4 and 949-952 are set aside as General Use base channels for use by public safety agencies operating within Region 33, and the complementary mobile channels 961-964 and 1909-1912 are set-aside as General Use mobile channels also for use by public safety agencies

¹ See paragraphs 35 through 39 in FCC's Third Memorandum Opinion and Order for WT Docket No. 96-86 adopted September 18, 2000.

including GPS differential correction telemetry for channels 961-964 and 1909-1912 likewise operating within Region 33.

- Channels 5-8 are designated as Fire Protection/Emergency Medical and Emergency Management base channels for licensing and exclusive use by the Fire/Emergency Medical disciplines, as well as political subdivisions and public safety agencies engaged in official emergency management activities during a disaster, and the complementary mobile channels 965-968 are set aside as Fire Protection/Emergency Medical and Emergency Management mobile channels also for licensing and exclusive use by the Fire/Emergency Medical disciplines, as well as political subdivisions and public safety agencies engaged in official emergency management activities during a disaster.
- Channels 953-956 are set aside as Law Enforcement base channels for licensing and exclusive use by the Law Enforcement disciplines, and the complementary mobile channels 1913-1916 are set-aside as Law Enforcement mobile channels also for licensing and exclusive use by the Law Enforcement disciplines, as well as political subdivisions and public safety agencies engaged in official crisis management activities during a disaster.
- Multi-jurisdiction Joint Public Safety Operations - Channels 957-958 are set aside as Multi-jurisdiction Joint Public Safety Operations channels for licensing and use by political subdivisions and public safety agencies operating under a unified command at a common incident for the express mission of safety of life, property or environment, and the complementary mobile channels 1917-1918 are set aside as Multi-jurisdiction Joint Public Safety Operations Channels.

Simplex operations may occur on either the base or mobile channels. Users are cautioned to coordinate on scene use among all agencies involved, particularly when the use of a repeater mode is possible at or in close proximity to a common incident. Users should license multiple channels and be prepared to operate on alternate channels at any given operational area. Under no circumstances may a user claim a channel as exclusively theirs; all channels within this section are shared.

Wideband Data Channels

Region 33 has a number of metropolitan areas that have significant populations. The region is also impacted by international agreements with Canada that affects 49% of the region's population and 39% of its territory.

Because of the aforementioned conditions Region 33 has allotted wideband channels using a geographical area approach within the region to allow for the greatest amount of flexibility and efficient use of the wideband channels. In this plan four (4) wideband channels (43-45, 58-60, 70-72 and 88-90) have been

placed in reserve pool managed by the RPC. This was designed to augment areas of the region that may need additional capacity, aid in the mitigation of border issues and allow for the potential development of a statewide data system. These channels show up in CAPRAD noted as "RPC Reserved".

The remaining channels were formed into two (2) groupings of (18) 50 KHz channels aligned sequentially into six (6) 150 KHz blocks each. Group A has been allotted to four (4) metropolitan areas comprised of 17 counties. Group B, the six (6) remaining 150 KHz blocks, were allotted to the remaining 71 Counties surrounding the four (4) metropolitan areas. Spacing between the areas made this practice feasible. The major metropolitan areas of this region are the most likely candidates to implement wideband data channel systems. (No agencies have asked for wideband allocations.) A wideband loading calculator can be found at NSPTC website at www.npstc.du.edu to assist agencies in determining wideband requirements.

3.3 Spectrum Utilization Agreements

By using CAPRAD the need for regional agreements on the use of spectrum is virtually eliminated for narrowband channels. Region 33 has not entered into any special agreements over the use of spectrum in border regions. If special situations occur in the future the RPC will act on behalf of region entities in any border matter that may arise. In some instances Region 33 public safety agencies may allow other agencies access and/or use of their system. In such cases a Memo of Understanding such shown in Appendix (H) must be completed and recorded with the RPC.

3.4 Funding Requirements

Since Region 33 has elected to use the first come first serve method of approving applications for frequencies, abuses could occur. In order to prevent the potential for frequency "warehousing" applicants must submit clear documentation with their applications indicating that funding is available to implement the frequencies requested. This may be in the form of legislation, letter or other recognizable document signed by an official authorized to commit funding for the project.

3.5 Slow Growth Plans

Agencies submitting applications where funding is questionable and the progress for the system may be limited, slow growth plans must be submitted if the agency anticipates system implementation taking more than five (5) years. An agency must provide convincing affirmative evidence once a year after the plan is approved showing that they are actually in the process of implementing their proposed system. If the slow growth plan is not submitted, and acted upon by an

agency, its licensed frequencies will be forfeited back to the General Pool for reallocation to other potential users.

3.6 Use of Long-Range Communications

During incidents of major proportions where public safety requirements might include the need for long-range communications in and out of a disaster area, alternate radio communications plans are to be addressed by the lead agencies within this region. These agencies shall integrate the appropriate interface to the five (5) national channels at a minimum. Such long-range communications could be amateur radio operations, satellite communications and/or long-range emergency preparedness communications systems. They then could provide the means to communicate outside the area for themselves and the smaller agencies that might need assistance. Instances, such as; earthquakes, terrorist attacks, hurricanes, floods, widespread forest fires or nuclear reactor problems, could be cause for such long range communications.

3.7 Expansion of Existing 800 MHz Systems

Existing 800 MHz systems that are to be expanded to include the frequency bands of 700 MHz will have to meet requirements of both the 700 MHz and 800 MHz Region 33 plans. These systems will not be required to meet the reassignment requirements outlined in Section 3.10 of this plan. Available 800 MHz NPSPAC channels must be utilized, where applicable, before 700 MHz channels will be approved.

3.8 TV/DTV Stations during DTV Transition

Region 33 is impacted by a number of TV/DTV stations operating in channels 60-69 in the United States and Canada, thus, applicants must perform the necessary engineering analysis as outlined in Appendix (I) to insure that no interference will occur from the applicant's system operation to existing TV/DTV stations.

3.9 Design and Engineering Responsibilities

700 MHz trunked radio systems are considered the most advanced level of technology, at this time, on the FCC's guideline hierarchy and intent to implement digital types of technology. Spectrum efficiency is of primary importance in the development of systems. As high-level systems reach capacity, the smaller systems in the public safety service must consider uniting their communications efforts, using advanced technology, to formulate one large system. Where smaller conventional 700 MHz subsystems needs are requested, those frequencies utilized must not interfere with the trunked systems.

Disruptive interference with communications involved in these services will not be permitted. No co-channel interference within an authorized area of coverage will be tolerated and will undergo engineering analysis, on a case-by-case basis, by the PW FCC certified frequency coordinators. **Section 5 of this plan outlines frequency coordination technical requirements and responsibilities and Appendices F and I provide important engineering information.** Applicants for radio communications in the 700 MHz public safety services in Region 33 will be required to provide loading criteria information for the proposed system. The provisions of the Region 33 plan must be used as a guide for establishing any new system. Strict adherence for limiting area coverage to the boundaries of the applicant's jurisdiction must be observed. Overlap or extended coverage must be minimized even where systems utilizing 700 MHz trunked radio systems are proposing to inter mix systems for cooperative and/or mutual aid purposes.

Antenna heights are to be limited to provide only the necessary coverage of the applicant. When antenna locations are restricted to only the "high ground" transmitter outputs and special antenna patterns must be employed to produce the necessary coverage with the proper amount of ERP. All necessary precautions must be taken to gain maximum reuse of the 700 MHz spectrum.

The FCC certified PW frequency coordinators are responsible for the coordination of the 700 MHz spectrum and will be responsible for the engineering consideration of an application. Separation of co-channel transmitters will be determined using the most recent version of TIA/EIA TSB88-A, coverage needs of the applicant, natural separation barriers, antenna patterning, and limited ERP, where possible. System tests and/or propagation studies should also be provided to establish minimum distances for separation. (See Appendix F)

Six (6) metropolitan areas, described in Section 1.6 of this plan, consist of heavy industrial, commercial and high rise structures that may require enhanced coverage. Agencies in these areas may propose increased signal strength to 50db within their operational jurisdictions in order to attain in-building coverage. These areas must limit coverage to five (5) miles outside their operational jurisdiction.

3.10 Reassignment of Frequencies

It is anticipated that, in all but the most unusual cases, frequencies presently utilized by a licensee will be turned back for reassignment **when applying for new 700 MHz channels.** The FCC certified frequency coordinators are responsible for assignment of these channels. Normal application and coordination procedures will be followed with returned channels to the PW pool. It is not consistent with the goals and objectives of Region 33 to permit direct reassignment of radio frequencies between agencies. All VHF and UHF frequencies are to be returned to their respective radio service PW pool for assignment. Also, agencies shall not "farm down" frequencies to other radio services within their political structure

simply to take advantage of surplus equipment and frequencies. Agencies must submit a letter with their application for 700 MHz channels; addressed to the FCC, outlining the channels they will turn back for reassignment and a reasonable date that the channels will be returned to the PW pool. The RPC Technical subcommittee will carefully review applications to determine if the applicant intends to relinquish the appropriate number of channels. If the subcommittee determines that insufficient channels are not being returned by the applicant the matter will be brought before the RPC at either a special or regularly scheduled meeting for a review and vote of the membership. If the RPC agrees with the subcommittee's determination the application will be returned to the applicant for further review.

After the RPC and applicant have agreed to the specific channels to be returned for reassignment, the applicant's agency will modify the existing FCC license(s), through the certified FCC frequency coordinator, that processes the channels agreed upon. The coordinator will move the designated channels from the original callsign and create a new one, which will be attached to a newly created FCC FRN number. Part of the reassignment agreement will be for the agency to provide the RPC the authority, and password, to use the FRN number associated with the reassigned channels to cancel the new callsign on the agreed upon date when the new 700 MHz allotments are implemented. This will enable other agencies in the area to benefit from the applicant's reassigned legacy radio channels. It is anticipated that agencies need a migration period that will vary in length where agencies will be utilizing both existing channels and their new 700 MHz allotment.

Expansion of existing 800 MHz systems with the use of 700 MHz channels, LEERN, Inter-City, statewide fire and sheriff's mutual aid or SIEC designated inter-operability channels and "Microwave" radio frequencies or systems licensed within the "Microwave Public Safety Pool" (Radio Service Code "MW") will be exempt from reassignment.

3.11 Implementation of Channels

Should system implementation not begin within two (2) years, or if projected planned channel loading is not attained within four (4) years after granting of license, the channels will be returned for re-allotment to others. A one (1) year extension may be supported by the RPC if it can be shown that circumstances are beyond the control of the applicant. The applicant will be responsible for contacting the FCC to request an extension. Applicants must be acting to the fullest extent of their power to implement the project within their authority.

System implementation will be monitored by the RPC Implementation subcommittee who will be responsible for determining the progress being made on implementation. Monitoring of systems implementation by the subcommittee will take place on 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, and the Region 33 plan, and the consequences of their lack of progress. The Implementation subcommittee will inform the RPC and PW frequency coordinator of the situation. The Implementation subcommittee will continue to monitor the progress of any system determined in default and if progress is still not being made the subcommittee will inform the RPC and recommend informing 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.

3.12 Interoperability Channels

Interoperability between federal, state and local governments during daily, emergency and disaster operations will normally take place on the interoperability channels identified in the state and the national plan. Additionally, through the use of an S-160 and MOU or equivalent agreement(s), (See Appendix H), a licensee may permit federal agency use of non-federal communication system spectrum if deemed appropriate. Such use, on other than interoperability channels, is to be in full compliance with FCC requirements governing the use of spectrum.

The state of Ohio will administer the interoperability channels via a State Interoperability Executive Committee (SIEC) under NCC guidelines. If the state is unable to form the SIEC and develop interoperability operating procedures then this committee will do so. The following are some recommendations to the SIEC:

Tactical Channels

All mobile and portable units operating in this region should have all the interoperability channels, both repeat and direct modes, programmed into each unit. The radio must be programmed with the minimum number of channels called for in the NCC guidelines or as the SIEC specifies. The channel display will be in accordance with the NCC guidelines that have common alphanumeric nomenclature to avoid any misinterpretation of use.

Deployable Systems

This plan strongly supports use of deployable systems, both conventional and trunked. Deployable systems are prepackaged 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 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. Those agencies that are part of a multi-agency trunked system that commonly provide mutual aid to each other are

encouraged to have trunked deployable systems that operate on the tactical channels designated by the FCC for interoperability use. The SIEC should 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.

Monitoring of Calling Channels

It is desired that the state of Ohio take responsibility for monitoring the interoperability calling channels. This would include assignment of channels to mutual aid incidents as required. The SIEC will develop operational guidelines for this function.

Interoperability Wideband Data Channel Standards

The NCC has adopted the following standards for interoperability wideband data channels. Channels will be 50 KHz with a mid rate modulation represented by 16QAM or 4ASK. The physical layer standard adopted by the NCC is Scalable Advanced Modulation (SAM).

Interoperability Incident Command System Standards

The 700 MHz allocation and the NCC's requires that interoperability channel usage employ the ICS standards offers the SIEC an opportunity to incorporate interoperability standards within all public safety bands in the region.

4. PROCESSING AND EVALUATING APPLICATIONS

4.1 Region 33 Application Requirements

To request channels in Region 33 a full application package must be submitted by CAPRAD at <http://caprad.nlectc.du.edu/login/home>. The application must contain the following:

- Completed FCC ULS 601 Form(s);
- Statement of need for installing a new 700 MHz system to include an explanation of the budget commitment for the proposed system with agency budgets and funding sources (Paragraph 3.4);
- explanation of the systems future growth for all agencies involved in the system (Paragraph 3.5);
- explanation of how the system will interface with long distance radio communications, such as; amateur radio, satellite communications, and/or long range emergency preparedness communications systems (Paragraph 3.6);

- details of engineering surveys and/or maps showing radio coverage will not exceed the applicant's requirements or create interference to other systems, TV or Canadian broadcasters (Paragraphs 3.8 and 3.9);
- list all participating agencies PW radio frequencies. Describe how they are utilized and the date they are to be returned to the PW pool (Paragraph 3.10);
- explain how the system will communicate with other services in other bands and certify that the applicant's agency will comply with the interoperability requirements of the SIEC plan (Paragraph 3.11);
- any 821 MHz systems that are expanding to 700 MHz channels shall explain how they plan to meet the interoperability requirements of both plans (Paragraph 3.11);
- list mobile and portable units by agency inventory;
- indicate the PW frequency coordinator the applicant desires to have coordinate the license application (AASHTO, APCO, FCCA, or IMSA);
- applicants shall provide a review analysis of the approval matrix scoring components, found in Appendix (K) of this plan, and incorporate the point score their application has attained which will be reviewed by the Technical subcommittee if a competing application is received.

The Chair will distribute the application request to other agencies with allotments in the plan for review. **Adjacent regions will be informed if they are affected by the application.** Absent disputes from other agencies, applications will be reviewed by the Region 33 planning committee to assure compliance with the plan and approved. The RPC will note approval on the application and forward it to the designated coordinator for technical review. The CAPRAD database will reflect the approved application and place the channels for the proposed system in "pre-license" status. Upon approval by the frequency coordinator the application will be forwarded to the FCC for licensure. Any conflicts encountered during the process will be returned for resolution.

4.2 Applicant Evaluation

The applicant evaluation criteria established in the NCC process, and as further defined in this plan, will be followed for approval. All requests will be considered on a first come, first serve basis. In cases, where specific frequency allotments is required by numerous applicants at the same time, the applicant evaluation matrix point system contained in Appendix (J) will be utilized to determine the successful applicant. In all cases, area of coverage, technical requirements, and channel loading criteria will be applied. Exceptions may apply upon unique circumstances, after review and approval by the RPC. Deviations from FCC rules are not to be approved unless a fully justified waiver request has been presented to the RPC. The Region 33 Technical subcommittee will evaluate and process applications within thirty (30) days after notified of receipt by CAPRAD.

4.3 Intra-Region Dispute Resolution and Appeals Process

It is the intent of this RPC to resolve disputes in a timely and fair manner to all parties. Minor disputes may be brought before the RPC chair for resolution. If the chair can not resolve the dispute within two (2) weeks, or the dispute is complex, adversarial, or the chair is party to the dispute, then the grievant must follow the formal Appeals Process outlined in Appendix (K).

5. PROCEDURES FOR FREQUENCY COORDINATION

5.1 Process

Region 33 has accepted the CAPRAD assignment of narrowband channels, without modification. The RPC has allotted wideband data channels groups of channels to geographical areas in the region to attain maximum flexibility of assignment. Careful coordination will be required between the coordinator and RPC when wideband channels are assigned. When wideband channels are requested and approved by the RPC the Technical subcommittee will access CAPRAD and remove the channels from the database in surrounding areas to eliminate future interference.

5.2 Coverage

It is the responsibility of the PW frequency coordinator to restrict or limit the coverage to the area of the applicant jurisdiction. It is expected that the most recent version of TIA/EIA TSB88-A will be used. This plan uses the same standard developed for the 800 MHz NPSPAC plan as follows: the desired coverage of a system is considered to be, as a maximum, three (3) miles outside of the boundary of the applicant's serviced jurisdiction. The maximum "designed mean signal strength" at this contour shall be at least +40dBu or greater (+40dB above one micro-volt per meter), using five (5) feet above ground with a ¼ wave whip antenna. In order to allow for practical system design, the three (3) mile pad may be altered on a case-by-case basis, and the maximum/minimum coverage radius in all cases shall not exceed five (5) miles.

5.3 Interference

Engineering analysis for co-channel and adjacent channel assignments will be made in accordance with most recent version of TIA/EIA TSB88-A and the best available information on the technology proposed for or occupying the co-channel and adjacent channel(s). This plan will not protect agencies from interference if their systems utilize low quality receivers.

5.4 700 MHz Public Safety Frequency Pre-Coordination Database

The purpose of the Computer Assisted Pre-Coordination Resource and Database (CAPRAD) is to create a nationwide centralized database to manage the distribution of 700 MHz public-safety spectrum. CAPRAD will serve as a central repository of 700 MHz frequency information including regional plans, application submittals, approvals, coordination and licensure. Applicants will be able to make application, receive regional approval, acquire coordination from their selected coordinating body and submit application to the FCC for licensure via CAPRAD. By using CAPRAD, pre-coordination is accomplished by the system as it designs the allotment based on a distribution of voice channel frequencies to every county in the continental United States. CAPRAD utilizes population density, census data, height above average terrain (HAAT) and public safety use curves generated by the Public Safety Wireless Advisory Committee to provide spectrally efficient channel assignments to specific counties. Border considerations are also designed in the algorithm of the system.

The CAPRAD system features website access with a graphical user interface, an informational front page and secure access for registered users. The system is comprised of several interactive, relational databases that provides a frequency availability “notebook”, search and report generating tools, interface to the FCC’s automated systems. This access includes the Universal Licensing System (ULS) with nightly data comparison and updates, and on-line help features for queries, entries and updates.

The system also serves as a repository for supplemental information such as; completed regional and state plans, a list of television channels with potential impact, the final FCC Report & Order frequency table, contact information for RPC chairpersons or others as required, and RPC frequency limitations by regions and adjacent regions and will serve as a coordination tool for all public safety frequency coordinators.

CAPRAD is administered by the National Law Enforcement and Corrections Technology Center – Rocky Mountain Region-(NLECT-RM), NPSTC Support Office. NLECT-RM is a program of the National Institute of Justice.

6. ADJACENT REGION COORDINATION

6.1 Adjacent Region Review

Region 33 has adopted the use of the CAPRAD system for frequency allotments and management. This region will post its 700 MHz plan on the CAPRAD system for review and comment from adjacent regions. The use of CAPRAD will virtually eliminate the need for detailed border coordination with neighboring

regions if they incorporate CAPRAD for assignment of voice channels. Wideband data channels require adjacent region review.

6.2 Inter-Region Coordination and Dispute Resolution

Region 33 has adopted the standard "Inter-Regional Coordination Agreement". In the event that a dispute arises between Region 33 and any adjacent Region or Regions, regarding spectrum allocations or implementation, that can not be resolved within sixty (60) day the parties to the dispute will request a hearing before the NPSTC-National Regional Planning Oversight Committee. Details and a signed agreement with adjacent Regions can be found in Appendix (L).

6.3 Unformed Regions

The NCC Implementation Subcommittee has recommended that all regions use the CAPRAD allotment of channels to facilitate coordination with adjacent regions. This will allow spectrum allotments for regions that do not immediately form a 700 MHz planning committee. Counties or other geographic subdivisions within 70 miles of a regional border must share spectrum with adjacent region(s). The sharing is built in to the NSPTC-CAPRAD channel packing program, as it views all counties, nationwide, as separate entities while ignoring state borders. With all criteria being equal, this ensures all counties are provided sufficient spectrum in relation to their surrounding counties. The appropriate ration of channels shall be allotted to counties in adjacent regions based upon each county's population. A 25 kHz building block of channels will be used to distribute spectrum between regions. Included is a description of affected border areas demographics.

When the Region 33 plan was submitted for approval two (2) adjacent regions (Region 44 West Virginia and Region 55 Western Pennsylvania) had yet to form. A waiver request has been filed in the cover letter accompanying this plan.

7. CERTIFICATION

7.1 Chairman Certification Signature

I hereby certify that all planning committee meetings, including subcommittee or executive committee meetings were open to the public. A summary of the Region 33 deliberations pursuant to the development of this plan can be found in Appendix (L).

Signed _____

