700 MHz
Regional Planning

Guidebook

Produced by
The National Public Safety Telecommunications Council (NPSTC)

For the
Federal Communications Commission

Based on recommendations of the Public Safety National Coordination Committee (NCC)

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(*) Note: These sections are updated to version 2.01 in this document. All others remain 2.0

OVERVIEW

On August 6, 1998, in the First Report and Order and Third Notice of Proposed Rule Making (R&O) in WT Docket No. 96-86, the Federal Communications Commission (FCC) adopted service rules for the 24 megahertz of spectrum in the 764-776/794-806 MHz frequency bands (collectively, the 700 MHz band). The FCC previously reallocated this spectrum from television broadcast services to public safety services (Advanced Television Systems or DTV). Broadcast spectrum will be made available for public safety use in concert with the deployment schedule for digital television. Also in the R&O, the Commission stated that it would charter a federal advisory committee for the purpose of addressing and advising the Commission on the operational and technical parameters for use of the 700 MHz public safety band. In January 1999, the Commission established the Public Safety National Coordination Committee (NCC) pursuant to the Federal Advisory Committee Act.

The NCC has an eleven member Steering Committee, three Subcommittees (Interoperability, Technology, and Implementation) and is intended to operate over a period of four years. Its major responsibilities are to: (1) formulate and submit for Commission review and approval an operational plan to achieve nationwide interoperability that includes a shared or priority system among users of interoperability spectrum for both day-to-day and emergency operations and, in this connection, recommendations regarding federal users' access to the interoperability spectrum; (2) recommend interoperability digital modulation, trunking, and receiver standards for Commission review and approval, where appropriate; (3) offer voluntary assistance in the development of coordinated regional plans; and (4) provide recommendations on other technical matters that are common to the public safety community generally.

Kathleen Wallman was selected by the FCC to chair the NCC's Steering Committee. Also, the Commission named Michael Wilhelm, an attorney with the Public Safety and Private Wireless Division of the FCC's Wireless Telecommunications Bureau, as the Designated Federal Officer (DFO) for the NCC. The NCC has an open membership policy. All interested parties are invited to become members and to participate in the Committee's process.

The National Telecommunications and Information Administration (NTIA), the U.S. Department of Justice (DOJ), the Federal Emergency Management Agency (FEMA) and the U.S. Department of Treasury are co-sponsors of the NCC.

From the outset, the FCC has strongly encouraged public participation, particularly from the public safety community. NCC meetings have been held at various locations throughout the United States to facilitate maximum participation. The 24 megahertz of spectrum in the 700 MHz band represents the second largest allocation of spectrum for public safety use that the FCC has ever made. It presents a once-in-a-lifetime opportunity for big picture thinking about how this spectrum resource can best serve the nation's public safety and emergency response needs.

Further, with the events of September 11, 2001, public safety is a primary concern of all people. Whether one is talking about police, fire, disaster relief, or the ability to efficiently respond to random crises, the public has high expectations. Like any other enterprise, however, our nation's public safety infrastructure can transition to doing more for the public with less through

technology. A state-of-the-art communications network that integrates and coordinates Federal, state and local public safety resources could be the key to "working smarter" on behalf of all the nation's citizens. In addition, there are wide disparities among the public safety networks used today by state and local governments. Allocations are scattered throughout several bands, and technology appears to contemplate the lowest common denominator. There is also a lack of integration between and among the various networks that Federal, state and local public safety and emergency response entities rely upon, including internal communications/information networks and the public switched telephone network. Also, policies for recommending frequencies have been handled through a parochial process that places a premium on satisfying the communications needs of certain local public safety officials. Intervening events, such as the ever-increasing pace of technological innovation, evolving concepts of efficiencies derived from reliance upon technology, and changing perspectives on what constitutes sound fiscal planning, compel decisions about the role of technology in public safety operations to be handled at the highest levels of local and state government.

Finally, the spectrum that will be the focus of the NCC's activities will form the basis for a nationwide wireless technology platform. The flexibility, ubiquity, and cost-effectiveness of wireless services all point toward the benefits of using the 700 MHz allocation to build the technology platform. Jurisdictions throughout the country can then tie into this wireless technology platform and derive the state-of-the-art functionality's that their own communications and information networks lack. In other words, the technology platform will make existing networks perform at higher levels and keep pace with the dynamic state of technology. Existing networks will not be made "obsolete," although existence of the technology platform will very likely inform local and state government decision-making regarding continuing levels of investment in network upgrades. This technology platform can, through economies of scale and scope, take form over the next ten years in a cost-effective and efficient way. Since 700 MHz band equipment is in the very early development stage, the NCC will literally be positioned to dictate the capabilities and costs of what will be designed to serve users in the band.

One of the primary functions of the NCC's Implementation Subcommittee was to develop a national planning process to coordinate the assignment of the new spectrum in a similar fashion to the national plan process that was developed for the 821 MHz allocation for the National Public Safety Planning Advisory Committee (NPSPAC) in the 1980s. In order to effectively allocate this spectrum, specific guidelines had to be developed that would provide clear direction to the regions to assist in formulating their plans.

Of primary concern to the Implementation Subcommittee was the addition of competition in the frequency coordination process. In the 821 MHz allocation, there was only one frequency coordinator. Increasing the number of coordinators has added another level of complexity to the coordination process. The Subcommittee recommended that each region use a common or centralized database to allot channels for planning, and that all the certified coordinators use the common database as a coordination tool. This Subcommittee has consistently recommended that the Commission require the use of a common database. Specifically, the Subcommittee recommended that the database system developed under the auspices of the National Public Safety Telecommunications Council (NPSTC) and funded by the National Law Enforcement and Corrections Technology Center – Rocky Mountain Region (NLECTC) be used during the pre-

coordination and coordination process. This database project is nearing completion, with an initial packing of available frequencies being loaded for all regions across the United States.

In conjunction with NPSTC, the pre-planning and coordination process illustrated by Appendix G was developed. The process was designed to utilize the NLECTC database to record the initial allotments made by the regional committees and subsequently coordinate and record frequency assignments made by the frequency coordinators.

The subcommittee recommended that specific geographic areas (such as counties) allocate channels on a population basis. The pre-coordination database becomes extremely important along a region's borders. To successfully coordinate applications, the frequency coordinators must have access to the adjacent region's plans and allotments. Use of this database will help regions avoid conflict along the borders. Additionally, the frequency coordinators will also use the common database to review assignments during the coordination process.

The NPSPAC National Plan was reviewed and used as a basis for the 700 MHz plan developed by this Subcommittee. While the NPSPAC National Plan was a good starting point, there were areas that could be improved. These were identified and addressed during the first NCC meetings. The subcommittee determined that taking advantage of the common database could enhance the approval, coordination and information exchange process. The notification process of the 1980's also required updating to include the use of the Internet and e-mail.

Building on the work done by NPSPAC in the previous release of spectrum, the subcommittee developed consistent guidelines and standards specifically designed to allow the regions to organize quickly once the spectrum became available. Implementation Subcommittee members also expressed concern that the FCC processes to review and approve initial Regional Plans and any subsequent Plan modification were lengthy and cumbersome. To this end, the subcommittee made recommendations to streamline the regional plan process in all phases.

A recurring concern throughout the NCC meetings was the lack of funding to support the regional plan process. Regional Planning Committees are typically not funded and are comprised of volunteers from public safety agencies acting as representatives of their respective agencies. Funding for the required mailings, advertisements and meetings was difficult if not impossible to acquire and usually the result of one or two particular agencies' generosity. The Subcommittee, in conjunction with the National Institute of Justice's NLECTC group, was successful in securing funding for the development of the regional plans.

The subcommittee also recommended the formation of an oversight group, the National Plan Oversight Committee (NPOC). The recommendation suggests a membership that includes the FCC authorized frequency advisors and some number of regional chairs. The committee will monitor the progress of the Regional Planning Committees, report progress to the FCC, assist the regions in preparing regional plans where necessary and monitor the progress of the Digital TV transition. Additionally, the NPOC would be tasked with assisting regions in resolving inter-region disputes.

Although there were few disputes during the NPSPAC planning process, the subcommittee considered the development of a dispute resolution process an important part of the planning process. Included in this Guidebook is a recommended dispute resolution procedure. The dispute resolution process provides a vehicle for an agency within the region to challenge a region's decision.

Recognizing that there will be various technologies available for use in the 700 MHz band, the Implementation Subcommittee was careful not to be technology specific in any of its documents. The Regional Plans can be developed using this Guide and other informational documents without regard to technology. However, it is important to note that as regions form and channels are assigned, it will be essential to record the type of system planned to allow the coordinators to assign the appropriate channels with the correct spacing. The NLECTC Database will permit system information as attachments and will allow the coordinators to review technology specific information to assist in the coordination process.

The Implementation Subcommittee believes that the documents contained herein will provide the regions with a strong foundation upon which they can develop a comprehensive plan. The Guidelines are such that they can be taken and used with minimum modifications should a region elect to do so. If the region requires a more extensive plan, the Guidelines will provide an excellent foundation.

RECOMMENDATIONS

In its report to the Steering Committee, the Implementation Subcommittee made certain recommendations regarding the regional planning process. Some of the more important recommendations are included as background for this Guidebook.

RECOMMENDATION #1: Use of the NLECTC Database

The Implementation Subcommittee recommended that the FCC require the use of the NLECTC database by RPCs for pre-planning, and review of adjacent Region's plans. To date, the FCC has not implemented this recommendation. However, the frequency coordinators have all agreed to support the use of the NLECTC database as a common pre-coordination tool. Given that there will be many different types of technologies available in the 700 MHz band, it is extremely important that there be a sharing of technical information specific to each system deployed. Such information is vital to the frequency coordination process, particularly as the spectrum becomes increasingly populated. The database will permit the attachment of additional information required by the frequency coordinators (see 90.175(a) and portions of 90.176) such as receiver specific and technology specific parameters.

In addition to the NLECTC database, the Subcommittee recommended that all frequency coordinators use a frequency coordination program that utilizes terrain-based propagation modeling encompassing the methodologies of the current version of TIA/EIA TSB-88.

The Implementation Subcommittee feels that the NLECTC database use should be required of all 700 MHz Regional Planning Committees, and by all FCC-certified Public Safety coordinators.

Major difficulties in maximizing spectrum efficiency will be encountered unless the RPCs and FACs use the database for pre-planning and pre-coordination. Currently, all FCC-certified public safety frequency coordinators support use of the NLECTC database. If the FCC certifies additional public safety coordinators, the Implementation Subcommittee recommends that use of the NLECTC database be imposed as a condition for FCC certification of new coordination applicants. The participating public safety members of the NCC strongly support this recommendation. Many NCC members have commented that unless the Commission requires use of the NLECTC database, one non-compliant region could create problems for all the adjacent regions. For instance, if Iowa were to decide that it would not use the NLECTC database, Iowa's decision would impact seven adjacent regions. All seven adjacent regions would be greatly impacted in obtaining approval for Plan modifications.

The Implementation Subcommittee (as well as the other NCC Subcommittees) strongly supports mandatory use of the NLECTC database. The subcommittee believes that once the NLECTC database is functional, in use by the FACs and existing RPCs, with funding earmarked for its continued maintenance and operation, the FCC will have the information it needs to mandate its use.

RECOMMENDATION #2: Expedite FCC approval of initial 700 MHz Regional Plans and subsequent modifications.

The Implementation Subcommittee recommended that the FCC adopt procedures to expedite the Regional Plan approval process. One of the major identified problems associated with the 821 Regional Planning Process was the lengthy amount of time required for the Commission to review a region's plan. When the 821 Plans or modifications were submitted, it regularly took upwards of a year to complete the FCC review process. The Implementation Subcommittee believed that the FCC could streamline the RPC approval process.

RECOMMENDATION #3: 700 MHz National Planning Oversight Committee

Disputes over frequency assignments can arise within regions as well as between two adjacent regions. Disputes within regions can involve disagreements over how an applicant was ranked using the matrix criteria. Disputes between regions can arise from lack of available spectrum to satisfy applicants in both regions.

To provide a vehicle to mediate and resolve disputes at the local Regional level, the Implementation Subcommittee has developed a dispute resolution process. The Implementation Subcommittee believes that the dispute resolution process defined in Appendix D will provide a mechanism to resolve the majority of disputes arising both between applicants within a region and between adjoining regions.

For those cases where the local dispute resolution process cannot solve the problem, another venue is needed. The Implementation Subcommittee envisioned a 700 MHz National Planning Oversight Committee (NPOC) created to be an arbitrator for those conflicts that cannot be

resolved at the regional level. The NPOC would be comprised of five or more (odd-numbered) members drawn from the Chairs of the 700 MHz RPCs as well as representatives from the FCC-certified public safety frequency advisory committees.

The NPOC would mediate and resolve disputes between regions such as disputes over allotments and disputes over assignments. The NPOC will entertain appeals of the decisions of the Region's appeals subcommittee. In all matters the FCC remains the final authority.

The NPOC will also monitor the Regional Planning process, report progress to the FCC, assist the regions in preparing regional plans where necessary and monitor Digital TV transition.

RECOMMENDATION #4: Pre-planning Process Proposal

In the 821 Planning process, Regions that did not immediately form and develop their regional plan found there was little spectrum available near the regional borders because the adjacent region had already assigned that spectrum. The Implementation Subcommittee recommended that all Regions use the following pre-planning methodology to facilitate coordination with adjacent Regions. This procedure will provide a spectrum allocation for adjacent Regions that do not immediately form a Committee.

Counties or other geographic subdivisions within 70 miles of Regional border need to share spectrum with the adjacent Region(s). The appropriate ratio of channels should be allotted to counties in adjacent Regions based upon each county's population. To allocate 700 MHz channels near the Region borders, a 25 kHz building block will be used to distribute spectrum between the regions. Since multiple technologies (FDMA, TDMA, etc.), bandwidths (6.25, 12.5, 25 kHz), and modulations will be available, 25 kHz is the common allotment bandwidth. The use of 25 kHz allotment bandwidth allows for technology-neutral pre-planning. If a licensee chooses a technology that does not use their entire 25 kHz allotment, they shall return the unused bandwidth to the Region's 'general use' pool or work with the RPC and/or frequency coordinators to trade for another equivalent allotment. This methodology is the basis for the initial nationwide packing of the NLECTC pre-coordination database.

If a Region has not yet exhausted its 821 MHz allotment, the 700 MHz RPC should work with the 821 MHz RPC to first encourage utilization of the 821 MHz allocation.

RECOMMENDATION #5: The Handling of Unformed Regions

The 821 MHz NPSPAC Regions were given a deadline of five years after the 821 allocation to form and write their Regional Plan. While the Commission has imposed a deadline of 12/31/01 on States to file for their 2.4 MHz state license, there is no time limit for 700 MHz regions to form and develop a plan for use of the General Use channels.

The Implementation Subcommittee believes that a deadline is useful. If a Region has not formed or has not written its Regional Plan by 12/31/2004, the FCC-certified public safety frequency

coordinators, the 700 MHz Regional Chairpersons of the adjacent regions, or the 700 MHz National Planning Oversight Committee (or a combination thereof) shall take responsibility for developing that unformed Region's plan. If a 700 MHz Region has not formed, the adjacent 700 MHz Region is not required to obtain that Region's written approval of its 700 MHz Plan so long as it has used the pre-planning procedure outlined in Recommendation #4. The pre-planning process will pre-allot spectrum along the regional borders to protect the interests of unformed adjacent regions until they can develop a regional plan.

RECOMMENDATION #6: Periodic Re-Evaluation of Allotments

To accommodate population changes, changing technologies, and to maximize spectrum efficiency, a periodic re-evaluation of allotments and assignments is recommended. If the frequencies have not been coordinated after five years, the allotment should be reviewed.

This process will ensure that agencies within a Region do not 'warehouse' spectrum indefinitely thereby blocking other agencies that have an immediate spectrum need and the funding to implement a system without delay. This would also provide a mechanism to periodically review all unconstructed frequency assignments.

RECOMMENDATION #7: Support of Interoperability Subcommittee Recommendations

The Interoperability Subcommittee developed detailed recommendations for use of the Interoperability (I/O) Channels. The Implementation Subcommittee fully supports the recommendations of the Interoperability Subcommittee and strongly urged the 700 MHz RPCs to follow these guidelines. See Appendix A for I/O channel assignments and technical parameters.

DIGITAL TELEVISION TRANSITION

Incumbent users of 700 MHz Band channels, and the adjacent channels, will potentially hold implementation of this spectrum in limbo for a significant period of time in the major population areas of the United States. While the FCC's DTV Allocation Docket required incumbent stations in TV channels 60 to 69 to vacate their spectrum by December 31, 2006, a loophole was provided that postponed this date if 85% market penetration by DTV was not reached within the specific station's service area. The Implementation Subcommittee reviewed the effects of 700 MHz TV/DTV spacing rules and transition plans upon implementation of Public Safety systems.

Incumbent broadcast TV/DTV station assignments from throughout the country were studied and from that data, maps were developed showing those areas of the United States where 700 MHz spectrum is immediately available for assignment. The maps also demonstrate those areas of the country that are blocked by incumbent TV/DTV broadcast stations.

To maximize public safety use of 700 MHz in those portions of the nation that have significant TV/DTV broadcast incumbent blockage, methodologies were developed for short-spacing public

safety to TV/DTV. The proposed methodologies include engineering analysis and terrain-based coverage analysis.

Because of the impact of proposed Canadian DTV allotments and existing Canadian TV assignments, the WG reviewed the impact of the International Border Blockage issues with appropriate FCC personnel and affected public safety representatives.

The most recent report is included in this Guidebook as Appendix L. The most recent version of the report is available at the NPSTC website: http://www.npstc.org

GUIDEBOOK DEVELOPMENT

In developing the model plan contained in this Guidebook, the Subcommittee reviewed the Booz-Allen report on the 821 MHz NPSPAC plans prepared in support of the Public Safety Wireless Network (PSWN) program in March, 1998. This report analyzed and compared the effectiveness of the 55 NPSPAC Regional Plans. It identified problem areas such as lack of funding, the lack of oversight on a national basis, and the lack of a common database. Based on the positive as well as negative experience gained at 821 MHz, the Subcommittee proposed that many of the elements of the 821 RPCs be carried over to the 700 MHz RPCs. The Regional Planning Guideline and template that follow are designed to assist the 700 MHz RPCs in the development of their plans.

While the 700 MHz National Plan elements are virtually identical to the NPSPAC National Plan, the 700 MHz band itself has many technical aspects that are different from the 821 MHz band. Therefore, a document containing guidelines for the RPCs to follow as they developed their plans was needed. This "Guidelines" document contains information, suggestions and provides guidance and direction to the RPCs. For instance, the availability of 700 MHz within a specific region depends on whether or not there are blocking broadcast TV stations operating in the region. Region-specific information about broadcast TV incumbency in the band will be available on the NLECTC website as part of the NLECTC database.

The Guidebook also contains information on ways to facilitate the exchange of information between RPC members such as list servers and websites. In addition, the guidelines provide information on how to obtain funds for regional start-up. To maximize flexibility within the regions, the Guidebook emphasizes those items and sections which the WG feels should be addressed in every plan.

TECHNOLOGY POLICY

Coordination and Licensing

Based on extensive experience from the NPSPAC licensing process, the majority of the existing procedures for Pre-Coordination Frequency Allotment within the regions have proven to be successful, with an exception of the lack of a national database and approved procedures for adjacent state/region coordination. The attached flow charts (Appendix G) were devised and approved by all of the FCC- authorized public safety coordinators as part of the Pre-coordination

Database development process. The WG believes that this flow chart clearly and accurately depicts all the necessary steps for frequency coordination and licensing. If regions simply follow these flowcharts as their guidelines, adjacent regions will be required to communicate avoiding future conflicts. Moreover, by using the Pre-Coordination Database, members of a region or adjacent regions will be able to view the recommended plan as it is being submitted for adjacent region concurrence and/or FCC approval.

Interference Issues

Frequency allocation should be based on a defined area such as political jurisdiction (e.g., a county), or by a data file consisting of line segments creating a polygon that encompasses the defined geographic area of operation.

For co-channel assignments, the 40 dBµ coverage contour will be allowed to extend beyond the defined area of operation (AOP) by 3 to 5 miles, depending on the type of environment: urban, suburban or low density (See Table 1). The 5 dBµ interfering co-channel contour will be allowed to touch but not overlap the 40 dBµ coverage contour of the system being evaluated. All contours are (50,50). See Figure 1.

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

Table 1 - Recommended Extension Distance of 40 dBµ Field Strength

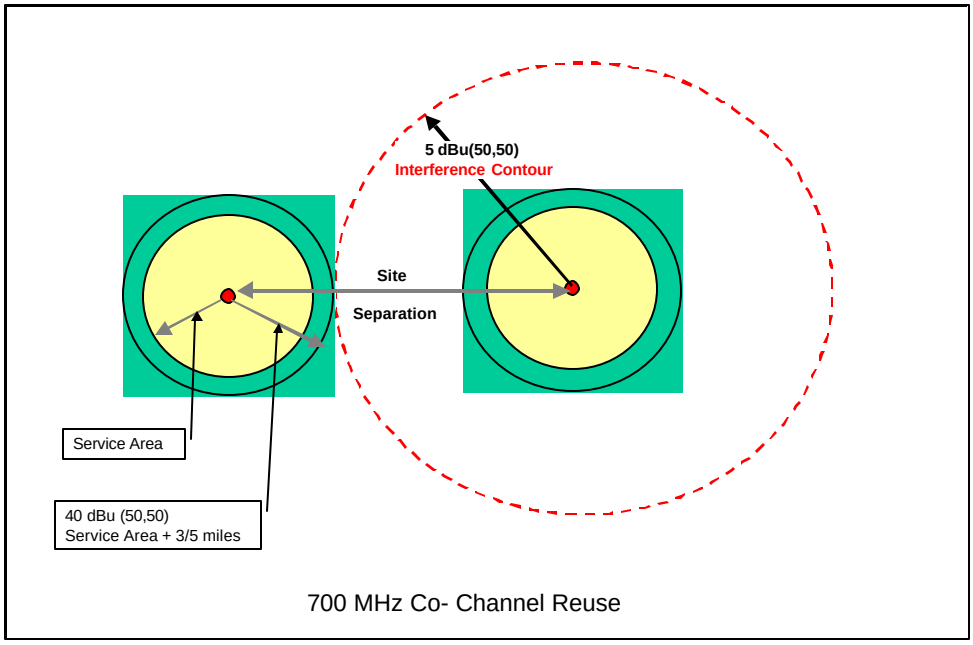

Figure 1 - Co-Channel Reuse Criterion

For most adjacent and alternate channels, or for preliminary analysis between 25 kHz spectrum blocks, the 60 dBµ interfering contour will be allowed to touch but not overlap the 40 dBµ contour of the system being evaluated. (See Figure 3) All contours are (50, 50). This assumes > 65 dB coupled power protection (ACCPR) between channels. Some close channel separations between different technologies (see Figure 2 and Table 2) require additional protection because coupled power protection is much lower (40 dB ACCPR). Therefore, we may have to utilize a more detailed analysis for those specific cases.

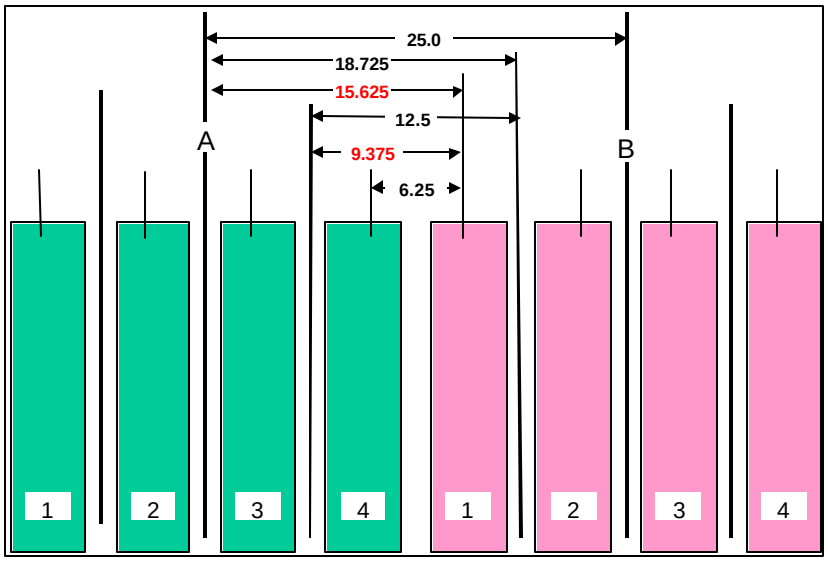

Figure 2 - Potential Frequency Separations

Center-to-Center Channel Spacing	ACCPR
25 kHz	65 dB
18.725 kHz	65 dB
15.625 kHz	**>40 dB**
12.5 kHz	65 dB
9.375 kHz	**>40 dB**
6.25 kHz	65 dB

Table 2 - ACCPR Values For Potential Frequency Separations

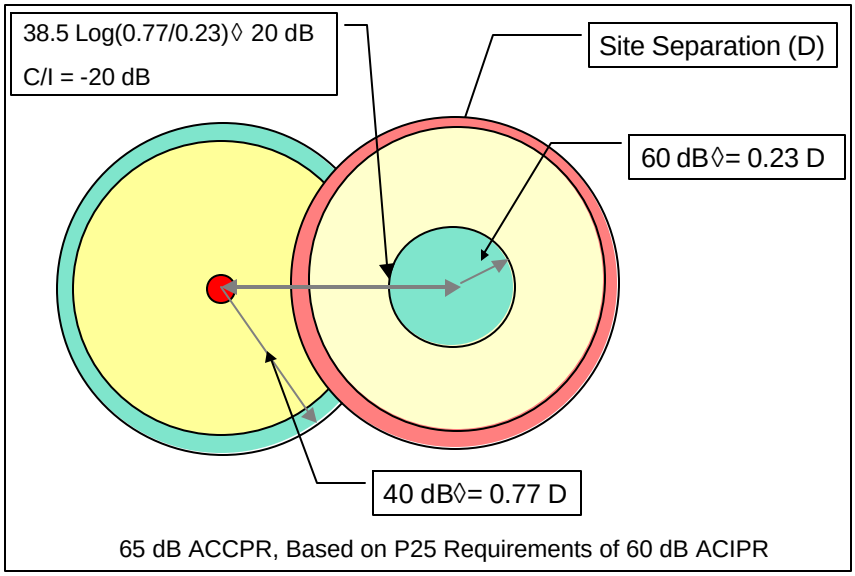

Figure 3 - Example Of Adjacent/Alternate Overlap Criterion

For complete details on Co-channel and Adjacent channel coverage and interference contours for different bandwidths, and for various technologies see Appendix K, which is the output of the TIA TR8.18 Committee, commonly referred to as the TSB88 document.

FUNDING

A report on existing funding mechanisms available through state, local and federal sources to be used for equipment purchases was prepared. This lengthy report is not included as part of this Guidebook, but is available on the NPSTC website listed below.

The National Institute of Justice (NIJ) has made funding available to the Regional Planning Committees (RPC) through the NIJ's Advanced Generation of Interoperability for Law Enforcement (AGILE) Program. The Regional Planning Committee Support Funding Program was formed to promote the efforts of the Regional Planning Committees in planning the use of the newly allocated 700 MHz public safety spectrum. Funds will be distributed through the National Public Safety Telecommunications Council (NPSTC) Support Office [www.npstc.org] as hosted by the University of Denver.

Requests for funding must be initiated by the designated regional convener or by the established 700 MHz RPC chairperson. In order to obtain funding, each region must identify a single public safety host organization that agrees to take fiduciary responsibility for the proper allocation of the awarded funds through a simplified accountability process based on a standardized form for financial summary reporting.

The maximum funding available to any Regional Planning Committee under the 2001 support funding program is $2,500.00. This funding could be requested on a one-time basis as either preliminary funding of anticipated expenses with the responsibility of annual financial summary reporting specifying each area of expenditure (until all such funds are depleted); or, as reimbursement funding for authorized, documented expenses incurred by the Regional Planning Committee during a period prior to the request, but not before January 1, 2000. Additional funding under the 2002 support program is available, with priority going to those RPCs that did not receive funding for 2001. Copies of expense receipts are required to be submitted with the financial summary reports. Forms for these submissions are included as Appendix H.