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December 16, 1992

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

WRITER'S DIRECT DIAL:

202-457-7329

BY HAND

Ms. Donna R. Searcy
Secretary
Federal Communications Commission
1919 M Street, N.W., Room 222
Washington, D.C. 20554

Re: Ex Parte Presentation in PR Docket No. 92-235

Dear Ms. Searcy:

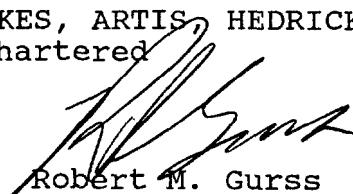
This is to inform the Commission that on December 15, 1992, representatives of Associated Public-Safety Communications Officers, Inc. ("APCO") met with (1) the Chief of the Private Radio Bureau and members of his staff, and (2) the Chief Engineer of the Commission and members of his staff, to discuss the Commission's Notice of Proposed Rulemaking in PR Docket No. 92-235. Attached is a copy of materials presented during these meetings and which formed the basis of our discussions. Attending the meetings on behalf of APCO were John Powell, Ronnie Rand, Art McDole, Ross Morris and the undersigned.

Pursuant to Section 1.1206 of the Commission's rules, two copies of this letter, with attachments, are being submitted for filing with the Commission.

Please contact the undersigned if you have any questions.

Respectfully submitted,

WILKES, ARTIS, HEDRICK & LANE
Chartered

By: 
Robert M. Gurss

Attorneys for APCO

Enclosures

cc: Mr. Ralph Haller (without enclosures)
Dr. Thomas Stanley (without enclosures)

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December 15, 1992

by hand

Mr. Ralph Haller
Chief, Private Radio Bureau
Federal Communications Commission
2025 M Street, N.W. Room 5002
Washington, D.C. 20554

Dear Mr. Haller:

As you know, representatives of the Associated Public-Safety Communications Officers, Inc. ("APCO") will be meeting with you today to discuss the Commission's Notice of Proposed Rulemaking in PR Docket No. 92-235. Attached is a detailed outline of the issues that APCO intends to discuss, along with supporting data and illustrations. Overall, APCO is deeply concerned that the Commission's proposal will reduce the total 150-174 MHz spectrum allocated for public safety by one-third and, at the same time, impose rules that would substantially reduce the quality and usefulness of all remaining public safety frequencies. In stark contrast, the Commission recently allocated 200 MHz for new, unproven personal communications services and a second 6 MHz channel to television stations.

The following is a summary of major areas of concern to APCO:

Migration to Narrowband Operation APCO does not believe that the time frame proposed in the Notice is workable or affordable and disputes the Commission's assumption that most existing radio equipment can be modified for narrowband operation without seriously degrading services. The Commission's narrowband migration proposals are also in direct conflict with the decisions made by APCO Project 25 after two years of deliberations.

Frequency Coordination APCO questions the viability of the Commission's multiple coordinator proposal for the new Public Safety Radio Service. The current coordinators use different methods and criteria in their coordination process and do not share a common database.

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FEDERAL COMMUNICATIONS COMMISSION
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Dr. Mr. Ralph Haller
December 15, 1992
Page 2

Channel Assignments While APCO favors increased use of pools (if properly managed and coordinated), it opposes the complete elimination of the current block allocations for radio services with varying needs. APCO also opposes the interspersing of SMR channels within the proposed Public Safety Radio Service channels. This will cause problems for frequency coordination and diminish the opportunity to implement wide band spectrum efficient technology.

Height and Power Limits APCO has long urged that frequency coordination be based on service area and field strength contours. The proposed use of HAAT would seriously limit spectrum use, as further demonstrated in the attached materials.

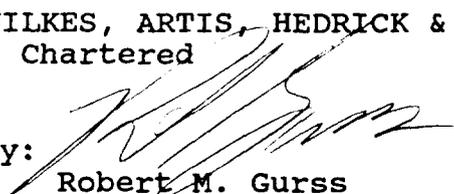
New Equipment Technical Requirements APCO Project 25, with the support of the manufacturing community, has already addressed many of the issues in the Notice in its efforts to establish digital radio equipment standards. From that experience, APCO questions many of the assumptions underlying the Commission's proposals.

In response to questions from the Commission in the public meeting when the Notice was adopted, you stressed the need to accommodate the special needs and concerns of public safety communications. APCO hopes that today's meeting will assist the Commission in identifying those aspects of its proposal that pose serious problems for public safety. APCO will of course work with you to help find solutions to these problems.

We look forward to this opportunity to discuss our concerns regarding this important Commission proceeding.

Respectfully submitted,

WILKES, ARTIS, HEDRICK & LANE,
Chartered

By: 
Robert M. Gurs

Attorneys for APCO

Enclosures

APCO ISSUES STATEMENT - FCC DOCKET 92-235

I. SUMMARY

Public Safety Priority

Public safety communications priority ranks second only to national defense, as established both by statute and by court decision. APCO is concerned that the FCC's proposals in this proceeding are inconsistent with this statutory priority.

Specifically, refarming proposed for the 150-174 MHz band reduces public safety block allocation bandwidth by .71 MHz, or by 23% of our current allocation. While the proposal would give public safety 464 "channels," the proposed 5 kHz bandwidth will not, in the foreseeable future, be capable of providing the quality of communications, and the features required, as discussed later.

In Docket 84-232, the FCC projected public safety spectrum requirements to the year 2000. In responding to the recent NTIA spectrum inquiry, APCO determined, using FCC formulas, that public safety spectrum use was 70% above that projected by Docket 84-232 for September, 1992. [See Appendix A]

Section 88.429 proposes reduced transmitter output power that will cripple or destroy many existing systems, requiring the outlay of millions of dollars in public funds to add additional transmitters and sites to provide the same coverage and also requiring additional spectrum to link many of these new sites together. In many cases, the individual agencies will opt for additional frequencies to provide required coverage to avoid the expense of installing simulcast systems, thus requiring two or more times the initial number of channels.

Section 88.231 appears to prohibit mobile relay operation in 150-174 MHz band for the Public Safety Service. Thousands of public safety systems (city, county, regional and state) now use mobile relays in this band. **New allocations developed from splitting of current public safety channels in the 150-174 MHz band should be paired and assigned for exclusive public safety use.**

The assignment of 5 kHz channels in the 150-174 MHz band appears to require equipment which will make state/local government incompatible with recently adopted 6.25 kHz federal government standards in the same band using the same equipment at reasonable cost. Local/state/federal interoperability, a major concern at all levels of government, will be lost.

Docket 92-235 envisions both state/local government and commercial users in the United States using the small "cellular" type of systems used in Europe. The major shortfalls of the "cellular" approach are what has caused active British participation in APCO Project 25 and a detailed inspection by their Home Office of larger coverage systems in the United States. Small, low powered systems have specific applications, but do not fill the wide area (state, regional, county) requirements of many of today's public safety and commercial systems.

II. MIGRATION

- A. Time frames are unrealistic and, in some cases, undefined
1. What are time frames for moving existing channel assignments to new channel assignments?
 2. What are deadlines for these moves?
- B. Section 88.413, Table C-1, Note 2, requires that new systems licensed after the effective date of the new rules must meet new narrowband requirements, even though equipment may not be available for these 5.0/6.25 kHz channels.
- C. Section 88.245 is ambiguous. It discusses retention of frequencies after a system must meet the time requirements of 88.433 only in terms of "channel pairs."
1. No requirements on migration for simplex systems.
 2. No rules on which portion of the old assignment is to be occupied by the existing licensee and which is available for new use.
- D. While increases in spectrum efficiency are important, land mobile communications require a very high quality of service. This quality requirement is generally higher for public safety services and must not be compromised for the sake of spectrum efficiency.

Top engineers with leading United States public safety communications equipment manufacturers have provided the following information regarding proposed changes to existing equipment to support narrow band operation:

1. Reduced transmitter bandwidth will require a transmitter power increase of 20% to maintain equivalent range.

Reduction in transmitter bandwidth will have an adverse effect on receiver signal to noise by the ratio of 3/5 or 4.4 dB. Without corresponding improvement in receivers, performance will be degraded by a like amount. Adjacent channel protection interference ratio (ACIPR) is a function of both the transmitter and receiver, and must be calculated accordingly.

2. Received audio volume will also be reduced 40% to 60%, requiring audio gain (amplification) to be increased. Increased amplification also increases noise which may effect intelligibility. Many public safety agencies scan a number of frequencies, often from other local agencies. This is an issue of officer safety for many police agencies, especially those with overlapping jurisdiction. If all agencies being scanned do not reduce deviation simultaneously, output volume will vary greatly between channels making this feature unusable.

Available audio recovery power available in portable and mobile units used in high noise environments (police crowd control, fire apparatus, etc) may not be sufficient to allow radios transmitting with reduced deviation to be heard by the user.

Most current receivers do not use the concentrated or "lumped" circuit designs that allowed earlier receiver IF bandwidths to be easily reduced when channel widths were reduced in the past. Additionally, these integrated designs have been optimized for several characteristics, including selectivity, sensitivity, desensitization, and IM rejection. Changing one part of a design impacts all other characteristics. It is therefore impractical, if not impossible, to reduce the bandwidth of today's receivers.

Reduced deviation will remove approximately 50% of tone squelch decoder margin above threshold of detection. This will lead to system failure.

3. It may be possible to reduce deviation on some older transmitters by a field adjustment. Equipment manufactured since the early 1980's utilizes different technology; some will not have sufficient adjustment capability for deviation reduction to required levels. This limitation is equipment-specific and must be determined by each manufacturer.
4. Many of today's transmitters are type accepted by the FCC for a single (or defined range of) power output(s). Attempts to reduce output power below these levels to comply with Section 88.429 will most likely result in spurious emissions.
5. There is no assurance that late model equipment using synthesized frequency control can shift to the offset frequencies required in the new table of allocations. Much, if not most, of the newer equipment will not be capable of shifting.
6. Digital encryption will not work with reduced deviation.

7. Reduced deviation at the initial stage of implementation will render public safety paging receivers unreliable, if not inoperative, as they are designed to operate at the full 5 kHz.

Commercial paging frequencies are grandfathered at 5 kHz, necessitating development of a special product for public safety paging for the vital purpose of alerting emergency police, medical, and especially fire personnel.

8. New offset frequency requirements and more stringent frequency tolerances will render obsolete most current test equipment.

- E. There is no apparent graceful migration path or means for old equipment to communicate with new 5.0/6.25 kHz equipment, thus necessitating complete change out of systems.

1. There is no interoperability during changeover period (which could be several years) as different agencies change on different schedules. Project 25 spent extensive resources to research migration schemes and provide both backward/forward interoperability which is negated by this proposal.

2. The interoperability impact will, in most cases, render mutual aid plans unusable throughout the changeover period. In states that are large both geographically and by population (California, Florida, Texas, etc.) statewide mutual aid communications will be impacted throughout the transition period as metro areas change early, followed by rural areas many years later.

- F. Section 88.231, as written, precludes mobile relay operation as it presently exists in the 150-174 MHz band for the Public Safety Services.

1. Thousands of public safety systems (city, county, regional and state) now use mobile relays. How can they continue to operate? When must they reduce bandwidth? Vacate current channels? Where can they go?

2. Designating many new channels as "mobile only" or "low power" has the same effect; 150-174 MHz systems as we know them today will vanish or must undergo dramatic change.

3. **NEW ALLOCATIONS developed from splitting of current public safety channels in the 150-174 MHz band should be paired and assigned for exclusive public safety use.**

III. FREQUENCY COORDINATION

- A. The proposal does not include criteria for mileage separation, except on exclusive use channels.
- B. Methods/criteria for coordination vary greatly among current coordinators, even within the consolidated services specified in the new proposed rules.
- C. Coordinators do not share a common database.
 - 1. Without a single common database, critical coordination information is not available real-time:
 - ° Applications in process by another coordinator for the same frequencies;
 - ° Date & time application received by coordinator;
 - ° Detailed technical parameters on transmitter, such as antenna characteristics, CTCSS, etc.
- D. Vertical vs. horizontal channel loading will not work for public safety.
 - 1. Life threatening situations need a clear channel.
 - 2. For operational and political reasons, stacking of dissimilar public safety services onto a common conventional channel where signals overlap is ill advised.
 - 3. The only time different public safety services have been able to successfully share systems is when priorities can be automatically established by the equipment being used. This application is currently limited to public safety trunking systems.
- E. 3rd party providers must not be allowed to hold licenses in the public safety services; only government should be eligible for public safety blocks.
 - 1. Public safety users need to control their own systems, they can not be dependent on a 3rd party who could fail to provide required services, leaving an agency without public safety communications until its contract could be litigated.

2. Labor disputes impacting the 3rd party leave public safety with little control, whereas government employees are usually prohibited from striking.
 3. Licensees have always been able to contract with a 3rd party to provide communications; with current method, public safety retains control of licenses and, thus, always has frequencies available.
- F. Dual rules apply for low power channels. Section 88.909 specifies 2 watt transmitter output provided the antenna does not exceed 20 feet above ground. This could, and does, result in 20 or more watts of ERP with an HAAT of several thousand feet. Section 88.429 limits power to 5 watts ERP if located in excess of 590 feet above HAAT. The potential for interference from quote "low powered stations" can be as much as 10 dB greater than from a conventional station when located at high HAAT.
- G. Although it might be contended that public safety gains additional channels by making them eligible in the General Category pool, examination of licenses will show that historically, in instances such as the 150 800 MHz General Access and the TV-shared 470-512 MHz pooled frequencies, public safety accounts for less than 1% of all licenses. Public safety can not successfully compete for channels on an even basis with non-public safety entities due to widely differing channel requirements and funding cycles.

IV. CHANNEL ASSIGNMENT PROPOSAL

- A. The proposal provides no discrete public safety service blocks (PF, PL, PP, etc). This has been the subject of APCO's comments in response to the spectrum refarming Notice of Inquiry.
1. All public safety services do not have equal priority. For example, Local Government Radio Service users are not currently afforded, nor do they require, the same quasi-exclusive use protection given to Police/Fire Radio Service licensees.
- B. Interspersing of SMR channels into public safety blocks is not a workable solution.
1. One of public safety's largest current problems is adjacent channel coordination, even with other public safety service coordinators.
 2. Public safety users tend to operate in defined geographic areas, while commercial users operate in wide and often undefined areas (any place their equipment will work). SMR mobiles on adjacent channels drifting into range of a public safety system could render public safety receivers inoperable.
 3. Public safety often co-locates their sites with other commercial users; adjacent channels cannot be co-sited, especially with reduced bandwidth and adjacent channel interference protection ratios inherent in these designs. Within the public safety services such conditions can be controlled; this is impossible with commercial licensees.
 4. EIA has made comparisons between a 25 kHz FM channel and a 5 kHz Side Band system for constant interference (each with equal adjacent channel interference). The study showed that the geographic separation for the Side Band interfering signal could come from up to 2.7 times greater distance than that of the reference 25 kHz FM system. This is demonstrated in Attachment B.
 5. THERE IS NO POSSIBILITY of developing wider bandwidth systems (e.g., high speed data for photos and fingerprints, and TDMA), by combining adjacent channels in the 150-174 MHz band because the proposed non-public safety assignments will preclude combining more than two channels (10 kHz).

- C. The lack of statewide exclusive channels will virtually eliminate the possibility of any wide-area government systems. It will not be possible for states, especially large states like those previously listed, to secure a statewide assignment due to competition for spectrum from other users in the major metropolitan areas.
- D. Assigning two channels to an entity that has met the time requirements for narrowband changeover proposed in Section 88.245 will not necessarily provide a usable system unless the entity can make wideband use of both frequencies. Adjacent channel interference could make either or both assignments unusable as individual channels.

V. **EFFECTIVE RADIATED POWER BASED ON HEIGHT ABOVE TERRAIN (Section 88.429)**

- A. **THE EARTH IS NOT FLAT.** With the proliferation of quality personal computer based spectrum engineering programs, propagation prediction is both available and affordable. The FCC needs to establish a procedure to accept coverage prediction models to service Part 88 licensees. Applicants would be required to file coverage report(s) with each application showing that coverage did not exceed service area. Such services could be performed by the coordinator for a fee, by a consultant, or by the licensee if they chose to purchase the program. For users of shared systems (or add-ons to SMRs), it would only be necessary to demonstrate that a system with coverage limited to the user's service area was being proposed. It would be up to the service coordinators to make this decision. This method is now used by most NPSPAC Regional Plan Committees to maximize spectrum reuse. As part of the coordination process, good RF engineering practices (directional antennas, downtilt, reduced power, etc) are ensured.
- B. The proposed requirement will limit the use of antenna downtilt as an effective method of limiting coverage. The only practical method of developing downtilt is to start with a medium to high gain antenna. Because antenna gain increases ERP, the situation becomes self-limiting.
- C. The proposed requirement is a disincentive to use antennas with patterns tailored to coverage area. ERP calculations do not take into account the directional pattern of an antenna. In fact, highly directional antennas with limited coverage can have higher ERPs than non-gain omnidirectional antennas which have a much larger coverage area.
- D. The current ERP/HAAT proposal would devastate existing systems at all levels of government, but especially regional and statewide systems. The reduction in coverage is clearly shown in a series of coverage maps from around the U.S. included as Appendix C.
- E. Coordination must be based on service area and field strength contours, as used in NPSPAC Regional Plans. Service area coverage is required, therefore spectrum will be used whether from one or from ten transmitters.

- F. **Current proposal would actually require more spectrum to provide coverage.** Coverage is required, so users will have to add more transmitter sites to cover current area, plus use additional spectrum (microwave or fixed links) to interconnect these sites. In many cases, the individual agencies will opt for additional frequencies to provide required coverage to avoid the expense of installing simulcast systems, thus requiring two or more times the initial number of channels.

- G. Firm ERP rules can apply at most on a local or regional basis and vary dramatically between regions, especially when topography is considered.

VI. TECHNICAL ISSUES REGARDING NEW EQUIPMENT

A. While increases in spectrum efficiency are important, public safety communications requires a very high quality of service. As previously stated, the high standard of service required for public safety communications mandates an appropriate balance between spectrum efficiency and quality of service. For two years, APCO Project 25 has considered this balance and has arrived at the conclusion that the smallest practical channel bandwidth for public safety systems at the present time is 12.5 kHz, with an ultimate goal of 6.25 kHz. There is general concurrence between equipment suppliers and users that bandwidths below 6.25 kHz will not support critical features such as public safety trunking, voice recognition, and encryption that is essential to public safety operations. The proposed Project 25 standards have been demonstrated to provide these features throughout the user's service area with sufficient overhead for additional features as technology develops. No other system has demonstrated even similar capabilities.

1. In defining the parameters for Project 25, consideration was given as to when key components (such as linear amplifiers) would be available for mass production. A stepped conversion to 12.5 kHz and finally to 6.25 kHz bandwidth, using an interim compatible digital modulation scheme (QPSKC) for forward and backward compatibility, has been selected as the best alternative.
2. Even so, Project 25 is not sure when 6.25 kHz equipment will be available. APCO strongly recommends that final narrowband specifications be reviewed several years after the interim move to 12.5 kHz bandwidths is completed.
3. Cellular and Personal Communications Services are based on quality of service. There are no channel loading requirements for these services.

B. Proposed frequency stability (Section 88.425)

1. The proposed .1 ppm for base stations operating above 174 MHz is not economically feasible. Such highly stable oscillators will approach the cost of the entire base station.
2. Amplitude types of modulation can experience as much as 10-14 dB more degradation due to impulse noise than frequency modulation for a given frequency error.

C. Availability of highly linear amplifiers is an absolute requirement for the narrow bandwidths (5 or 6.25 kHz) being proposed. The question is: when will these be commercially available in a usable size at an affordable price within the required frequency bands?

1. Amplifier power consumption must be considered; linear amplifiers are not power efficient. While this is critical for portable equipment (due to battery service per charge), it is important for environmental and economical reasons in all equipment.

D. Use of Amplitude Modulation Technology

Many of today's sites, both commercial and public safety, are located in congested areas near or on private residence buildings. The use of high power non-constant carrier methods of modulation will result in audio frequency rectification in many of types of household and commercial entertainment equipment. Likewise, communications receivers for these same modulation schemes will be susceptible to interference from household and commercial appliances.

E. Narrowband equipment needs to support trunking & encryption.

1. Public safety encryption and trunking both require transmission of a digital signal on each voice channel. A digital modem would have to be applied for any analog modulation scheme such as ACSSB or SSB-TTIB (SSB-Transparent Tone In-Band).
2. The data rate of encryption and, thus, the quality of encryption, and the features supported on a trunking system, will be limited by the narrow channel.

F. Time frame to implement new equipment.

1. Technology that will be available in the time limits imposed by Docket 92-235 will not meet the requirements of the public safety services.

VII. MUTUAL AID AND INTEROPERABILITY

- A. Insufficient and undefined mutual aid exclusive channels by service.
- B. Disaster cache radios (example: 8000+ at Boise Interagency Fire Cache) will be obsolete.
- C. State Mutual Aid communications plans will be eliminated for lack of channel assignments.
- D. No compatibility with federal government in the 150-174 band.
 - 1. VHF high band is the most popular for local/state and federal interoperability. The federal government has selected channel widths of 12.5 and 6.25 as their standard.
 - 2. The assignment of 5 kHz channels in the 150-174 MHz band appears to require equipment which will make state/local government incompatible with recently adopted NTIA 6.25 kHz federal government standards using the same equipment at reasonable cost. Local/state/federal interoperability, a major concern at all levels of government, will be lost.

APPENDIX A

**Appendix A
Projected Growth**

Based on Docket 84-232, Table 18

Radio Service	Proj 1990 Stations	Proj % Growth	% Growth to 10/92*	Proj Stns 10/92
Local Govt	81,200	6.5/yr	11.69	90,695
Police	92,600	6.2/yr	11.14	102,915
Fire	48,700	6.1/yr	10.95	54,035
Highway Maint	19,900	5.5/yr	9.85	21,860
Forestry Cons	13,900	6.7/yr	12.06	15,575
Total	250,700			285,080

*Projected "Annual Growth Rate" computed using annual compounding for 1.75 years (December 31, 1990, through September 23, 1992)

**Table 2
Actual vs. Projected Growth**

Radio Service	Actual Public Safety Band Licenses**					Diff vs Table 1
	VHF Lo	VHF Hi	UHF	UHF-TV	Total	
Local Govt	8,640	46,551	21,407	3,036	79,634	-11,061
Police	16,215	44,322	19,148	30,391	110,076	+ 7,161
Fire	13,270	34,704	5,401	3,698	57,073	+ 3,038
Highway Maint	13,108	20,864	1,709	7	35,688	+13,828
Forestry Cons	8,483	42,447	635	0	51,565	+35,590

800 MHz Stations Not Included Above

800 MHz Band	Conventional**	Trunked**	Total
806-821/851-866	7,817/4,335	84,920/9,083	106,155
821-824/866-869 National Plan	1,122/ 496	35,450/6,165	43,233
Total	8,939/4,831	120,370/15,248	149,388
Total, All Bands			483,424

** Number of transmitters from FCC license data base on 09/23/92; this count includes all stations of class Fnn (FB, FBn, FXn, etc).

APPENDIX B

Comparison of Constant Range Interference from Adjacent Channel

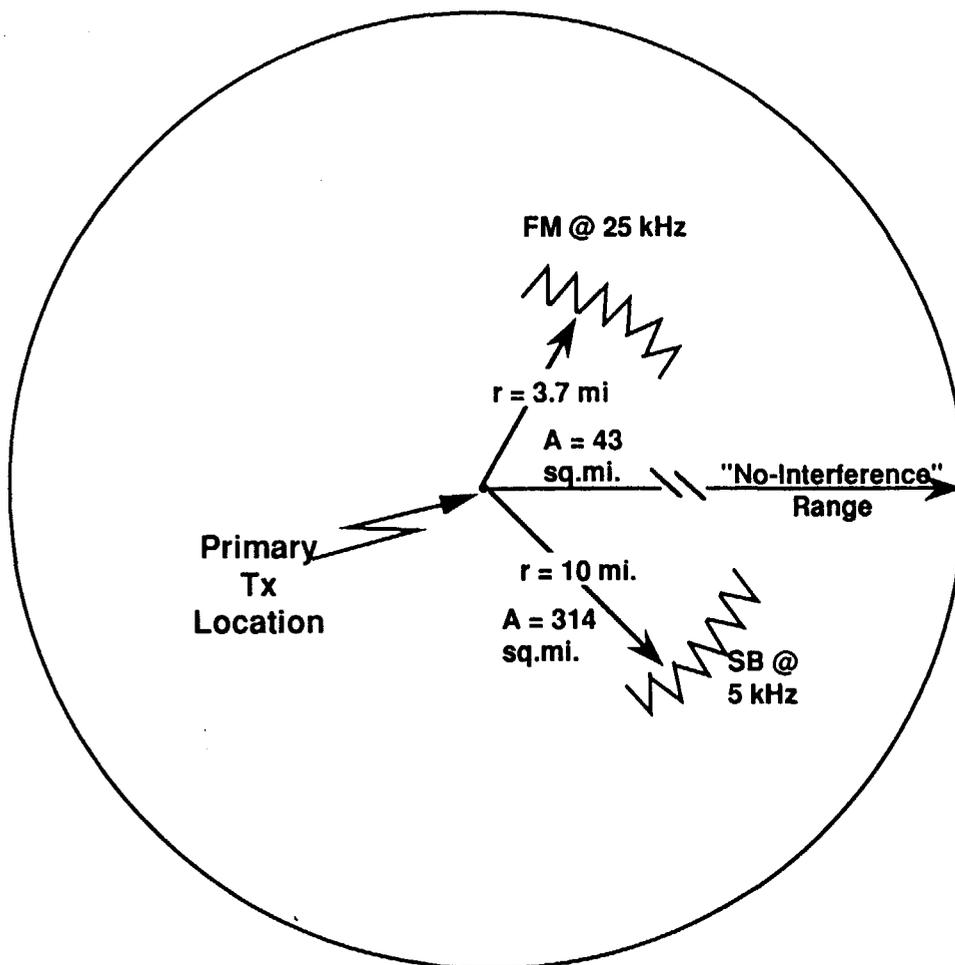
**FM System
@ 25 kHz
Spacing**

Vs.

**SB System
@ 5 kHz
Spacing**

Key

 = Threshold of interference (with equal Tx Powers for primary "Desired" and "Adjacent" channels, the "r" value where 12 dB SINAD is degraded to 6 dB.



r = Geographic separation (Mi) of interference (Adjacent Channel) Tx from Primary Tx

A = Geographic Area (Sq. Mi.) surrounding Primary Tx in which penetration by Adjacent Channel Tx makes Primary System unusable

Conclusion:

Protection of the Primary Tx location from Adjacent channel interference (@ equal Tx Powers) requires a protected area increased by 7.3:1 for the SB system at 5 KHz as compared to the FM system at 25 kHz

(Derived from EIA Land Mobile Section filing on Docket 15398.)

APPENDIX C

The following are examples of sites affected by the ERP/HAAT Restrictions. The blue area shows the present coverage from this site. The green area shows the coverage from the site if the proposed ERP Restrictions from Part 88 are implemented. Since these sites are used by wide area systems, the reduction in ERP will require additional sites to provide equivalent coverage. In many cases, the individual agencies will opt for additional frequencies to provide required coverage to avoid the large expense of installing simulcast systems, thus requiring two or more times the initial number of channels.

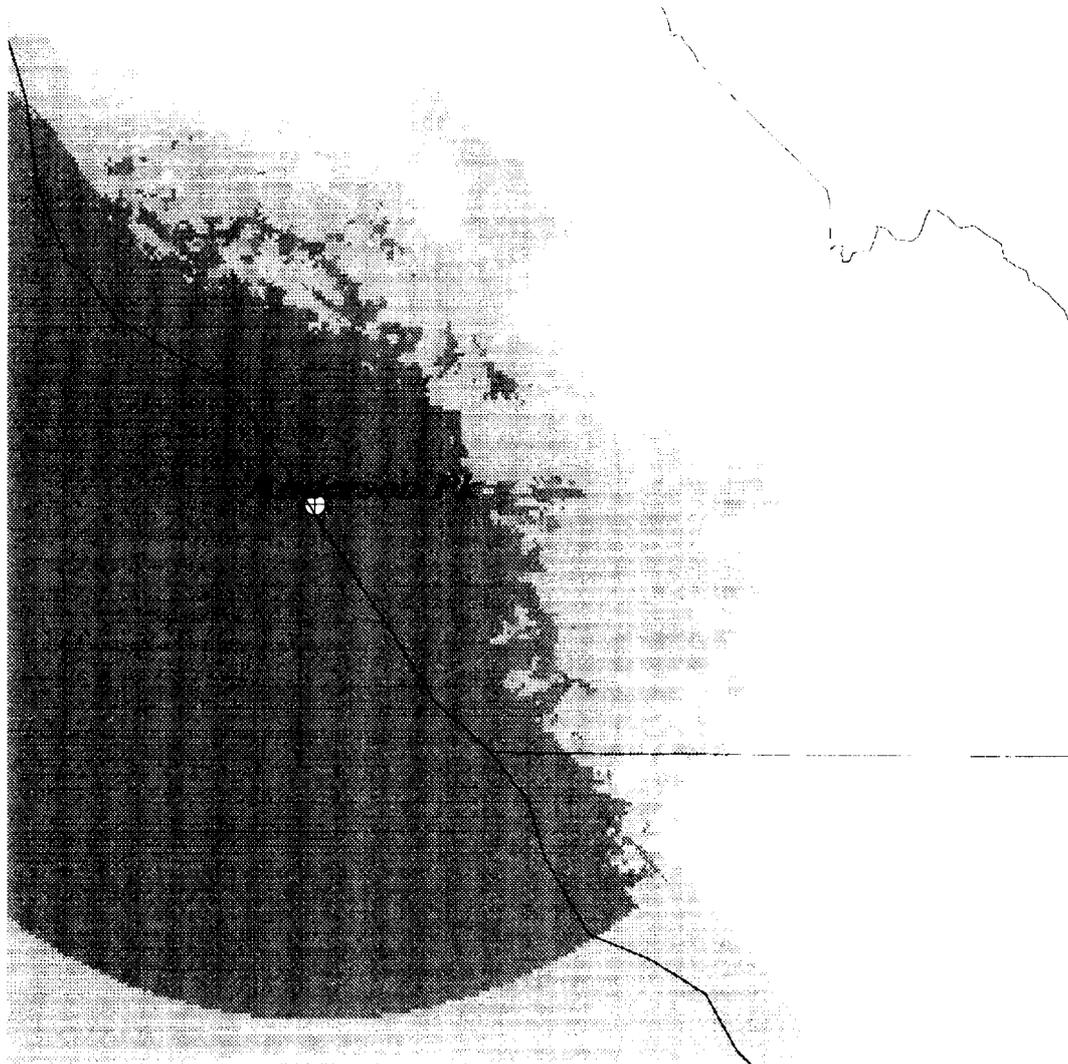
ANDERSON PEAK - MONTEREY COUNTY, CALIFORNIA

Area to the west is the Pacific Ocean, to the right is the Ventana Wilderness Area. Present coverage shown in blue. Would be reduced to the green. No alternate site available!

Freq : 155.0 Mhz
A/Ht : 50.0 Ft.
HAAT : 3473.7 Ft.

APCO Docket 92-235
Anderson Pk

Lat : 36 1 51.0
Long : 121 38 30.0
Elev : 4070.0 Ft.



dBu (NOT FOR FCC) : dB



15 32
MOTOROLA, INC.
0.0 5.0 10.0 15.0 20
SCALE : 12.00 MILES PER INCH
Job # : 422787854
Engineer : mcgng37
Date : 12/11/1992
Time : 15:05:38

98
Base To Mobile Study
Field Unit On Street
Base ERP : 229.1W(53.6dBm)
Base Ant Az: 0.0°
H BeamWidth: 360.0°
FU ERS : 1.58µv(-103.0dBm)
FU Ant Ht : 5.0 Ft.
FU Ant Type:

Calculated values are derived using average loss values for surroundings. Some low lying, heavily wooded or urban areas may result in lower values than those indicated

GOLD MOUNTAIN, KITSAP COUNTY, WASHINGTON

Gold Mountain is used by numerous public safety agencies to cover Kitsap County, Pierce County to the south and the city of Seattle (King County) to the east. As can be seen from the map, the coverage into Seattle and Pierce County is almost totally lost and Kitsap County is no longer fully covered.