ORIGINAL

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of Amendment of Parts 2 and 90 of the Commission's Rule to Permit Increase Frequencies in the 0156-162 MHz Bands by Industrial and Land Transportation Private Land Mobile Radio Services	)	RM-7956

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

To: The Commission

OPPOSITION OF MOBILE MARINE RADIO, INC.
TO PETITION FOR RULEMAKING

Mobile Marine Radio, Inc. ("MMR"), by its attorneys, respectfully submit this its comments in opposition to the above referenced petition for rulemaking by the Council of Independent Communication Suppliers ("CICS"), which identifies itself as a distinct market council of the Special Industrial Radio Service Association ("SIRSA"). [1/]

I.

Introduction

1. Mobile Marine Radio, Inc. is the licensee of seven VHF marine stations licensed under Part 80 of the Commission's

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1/ By letter dated May 7, 1992, the Chief, Special Services Division, Private Radio Bureau, advised that comments would be accepted until May 29, 1992.

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List A B C D E

Rules. These facilities provide public correspondence and safety services over 500 miles of navigable waters along the Alabama, Mobile and Tombigbee Rivers, Mobile Bay and the Tennessee-Tombigbee waterway. This network provides a continuity of services utilizing frequencies allocated under Section 80.371 of the Commission's Rules. In addition MMR provides radio telephone, telegraph, telex and facsimile services utilizing the MF and HF bands.

2. MMR has been a Commission licensee in the maritime services since 1947 and has participated in various Commission proceedings relating to maritime communications issues. The CICS/SIRSA proposal is of interest to MMR. The VHF marine network is interdependent. If continuity of service is to be provided to the public, there must be uniform standards and protection to all VHF marine systems. If adopted the proposal has the potential for directly impacting MMR's VHF public correspondence stations and ultimately the users of the maritime public correspondence services provided by MMR.

II.

Comments

3. CICS/SIRSA in its rulemaking proposal is urging the Commission to amend Parts 2 and 90 of its Rules to expand authorized Industrial and Land Transportation Private Land Mobile Service operations within the 156-162 MHz band allocated for use by the maritime mobile service. CICS/SIRSA wants to establish in

the 156-162 MHz band new channels 12.5 kHz offset from existing frequencies allocated pursuant to Sections 80.371 and 80.373 of the Commission's Rules. Those frequencies are presently available for maritime public correspondence and port operations.

4. CICS/SIRSA proposes certain technical standards for the use of the offset frequencies designed to protect the primary maritime operations from interference. These standards include geographic separation and power limitations.

5. CICS/SIRSA claims that the marketplace reality, i.e., the fact that the demand by industrial/land transportation eligibles for spectrum in the 156-162 MHz band in many areas of the country exceeds the supply of spectrum allocated requires the Commission to take the action urged in the CICS/SIRSA petition for rulemaking. CICS/SIRSA argues that such action would be consistent with "long-standing goal of ensuring the electromagnetic spectrum is allocated in a maximally efficient, 'pro-growth' manner." Petition at p. 3. CICS/SIRSA cites the purposes clause of the Communications Act, 47 U.S.C. §151, to bolster its "pro-growth" theory. However, the mandate to the Commission in 47 U.S.C. §151 is "to make available, so far as possible, to all the people to the United States a rapid, efficient, nationwide, and worldwide wire and radio communication service with adequate facilities at reasonable charges for the purpose of the national defense, for the purpose of promoting safety of life and property through the use of wire and radio

communications...." There is no support in this mandate for growth for the sake of growth which in this case is assumed to mean more spectrum for the industrial/land transportation users.

6. The maritime mobile radio services are a vital link in the nationwide and worldwide service requirement contemplated in Act at 47 U.S.C. §151. The maritime mobile frequency band (156-162 MHz) supports marine communications in coastal areas and inland waterways throughout the nation and worldwide. These channels permit a variety of services including public correspondence, inter-ship and ship-to-coast, port operations, and safety. Thus, the key issue in evaluating the CICS/SIRSA petition is whether the proposal can be implemented "without reducing maritime users' interference protection or impinging the growth of maritime services."

7. The separations criteria which is supported to ensure interference protection for the existing marine licensees in the 156-162 MHz band is the critical technical issue in connection with the proposed use of this band by CICS/SIRSA. As demonstrated in the engineering analysis report attached hereto as Attachment A (and hereinafter referred to as the "Comp Comm Engineering Analysis Report"), the proposed 50 miles separation criteria is not adequate. In fact, the Comp Comm Engineering Analysis Report shows that a minimum separation of 177.9 miles is needed in order for a private land mobile operation on one of the

proposed split frequencies to ensure no harmful interference to a marine facility operating in the 156-162 MHz band. Furthermore, based on MMR's experience, the separation must be at least 200 miles to provide meaningful protection.

8. As shown in the Comp Comm Engineering Analysis Report, the CICS/SIRSA interference study is based upon an erroneous, unexplained assumption that a 40 dBu contour represents a de facto standard for service contours in the private land mobile services. However, marine operations are governed by Subpart P of Part 80 of the Commission's Rules which defines the service area contour in the maritime services as the 17 dBu contour. The rulemaking petition failed to take into account this Part 80 requirement as they relate to co-channel separations and accordingly has dramatically understated the minimum separations required to ensure interference free operations to adjacent marine facilities.

9. CICS/SIRSA also proposes operations offset to the maritime channeling in a further effort to reduce the interference potential. Yet, the Comp Comm Engineering Analysis Report at p. 5 is skeptical, absent significant experimental evidence to the contrary, that the use of offset full-width channels will provide any significant additional protection. In fact, the Comp Comm Engineering Analysis Report indicates such use will result in interference to both overlapping channels and require the same separation from each channel, exactly as if the channels had the same center frequency.

10. The World Administrative Radio Conference for the Mobile Services (Geneva, 1987) recognized the heavy use in the worldwide environment of the maritime frequencies. The World Administrative Radio Conference charged CCIR with studying the potential enhancement of the maritime spectrum including reduced channel spacing and the use of inter-leaved channels separated by 12.5 kHz. In response, the CCIR United States Working Party 8B has recommended 12.5 kHz separation for the maritime service. Thus, the CICS/SIRSA proposal for inter-leaved frequencies among the primary maritime channels is already being considered by the affected maritime operators themselves. Accordingly, any short term advantage which might be realized from the CICS/SIRSA proposal for the industrial/land transportation services would be eliminated when the maritime service moves to the 12.5 kHz channeling.

11. If land mobile stations operating on the offset frequencies advocated by CICS/SIRSA are allowed any place upon meeting the geographic separation requirements, the maritime licensees must be given primary consideration. Otherwise, such use even assuming proper separation, would clearly impinge upon the potential growth of the maritime service. MMR and other similarly situated maritime licensees must have the ability to enhance and improve service offerings to meet the demands of the public. It must be able to add new transmitter sites and move existing transmitters without considering any claims by adjacent primary industrial and land transportation stations.

12. MMR recognizes that it is not in the public interest for spectrum to lie fallow or under-utilized. The maritime communications service providers need to be open to technical developments now that will permit greater spectrum efficiency as well as a wider range of services to the public. Nonetheless, the CICS/SIRSA proposal must fail because of its flawed engineering considerations.

13. For the reasons stated herein, Mobile Marine Radio, Inc. urges the Federal Communications Commission to deny in full the above captioned proposal. [2/]

Respectfully submitted,

MOBILE MARINE RADIO, INC.

By: David L. Hill
Audrey P. Rasmussen
Its Attorneys

O'Connor & Hannan
1919 Pennsylvania Avenue, N.W.
Suite 800
Washington, D.C. 20006
(202) 887-1400

Dated: May 29, 1992

3024h

[2/] WJG Maritel Corporation, Memphis, Tennessee and Gulf Coast Maritel Corporation, Gulf Port, Mississippi, licensees of various VHF public coast stations serving the Great Lakes, Mississippi River, Gulf of Mexico and the southeast Atlantic Coast, joins in this opposition for the reasons stated therein.

ATTACHMENT 1

ENGINEERING ANALYSIS REPORT

COMP COMM INC.

900 Haddon Avenue, Fourth Floor
Collingswood, NJ 08108-2167

ENGINEERING REPORT

At the request of Mobile Marine Radio, Inc., Comp Comm, Inc. ("Comp Comm") has reviewed in depth the technical issues presented in the Petition For Rulemaking filed by The Council of Independent Communication Suppliers ("CICS"). This Petition For Rulemaking requests amendments to the Commission's rules to permit the Industrial and Land Transportation ("I/LT") Private Land Mobile Radio Services to utilize frequencies in the 156-162 MHz band currently allocated to the maritime services.

Comp Comm, through its technical principal, Dr. George L. Schrenk, is qualified to discuss this Petition For Rulemaking. Comp Comm is an engineering and information service company specializing in the Mobile Radio Industry. Comp Comm is regularly engaged in providing engineering consultation and communication system design services covering all technical aspects of the Mobile Radio Services. Comp Comm has done extensive work in both the prediction and measurement of radio signals in mobile communication systems.

George L. Schrenk, Ph.D., is the President of Comp Comm. He holds B.S., M.S., and Ph.D. degrees in Physics from Indiana University and an Honorary M.A. degree from the University of Pennsylvania. He is also an Adjunct Professor on the Engineering Faculty of the University of Pennsylvania. His qualifications are both a matter of public record and are also reported in American Men and Women of Science and other biographic publications. He has testified as an expert witness in engineering matters relating to the mobile radio industry before numerous state Public Utility Commissions and before the Federal Communications Commission. From 1983 to 1989, he served very actively on the IEEE Vehicular Technology Society Committee on Radio Propagation and has submitted extensive propagation research, data, and associated analyses to the Committee.

This report and its attachments present Comp Comm's assessment of the technical issues presented in this Petition For Rulemaking.

Phone (609) 854-1000 FAX (609) 854-8400

I. INTRODUCTION

The central technical issue underlying the potential use by I/LT of the frequencies in the 156-162 MHz band currently allocated to the marine services is the determination of the separations necessary to prevent I/LT users from causing harmful electrical interference to the marine services.

The Petition for Rule Making contains a very brief and cursory interference statement about co-channel interference. This statement is based on no overlap of the 40 dBu contours, as determined by the Commission's R6602 curves. This statement makes no mention of the fact that the marine services are governed by very specific interference criteria; in particular, Subpart P of Part 80 gives very specific "Standards for Computing Public Coast Station VHF Coverage." Significant parts of these rules are as follows:

> Section 80.753 defines the service area contour as being +17 dBu, calculated in accordance with the procedures of Section 80.771 and the propagation curves of Section 80.767.
>
> Section 80.773 states that "where a frequency is shared, the ratio of desired to undesired signal strengths must be at least 12 dB within the service area of a station."

The Petition for Rule Making fails to take into account these requirements as they relate to co-channel separations. The considerations that follow will determine the minimum co-channel separations necessary to comply with these provisions.

II. DETERMINATION OF SERVICE CONTOUR DISTANCE

The Petition for Rule Making suggests that a 40 dBu contour, as determined by the Commission's R6602 curves, be utilized as the Service Contour Distance. They state that for a system with a 50 watt transmitter, 9 dBd antenna gain, and 400 watts ERP, the 40 dBu contour is 24.2 mi. They state that they used the Commission's F(50,50) R6602 curves to determine this distance.

We have checked their representation using the F(50,50) curves from Figure 19 of the Commission's R6602 report without any terrain roughness correction being applied. We find that a 500' HAAT system with a 50 watt ERP has a 40 dBu signal at 24.1 miles. A 500' HAAT system with a 400 watt ERP has a 40 dBu signal at 35.2 miles.

The Petition for Rule Making does not justify why a 40 dBu signal level and Broadcast propagation curves (Report R6602) should be used to define the service area. Part 22 Public Land Mobile Services utilize a 37 dBu contour and Carey Propagation Curves to define a service area. Land Mobile, Broadcast, and Marine, however, are very different. First, different propagation curves are used in each service. Second, the height of the receive antenna is different in each service. In the marine and broadcast services, the receive height is defined as 30' whereas in the mobile services it is defined as 6'.

Subpart P of Part 80, Section 80.753, defines the service area contour for the marine VHF services as being +17 dBu, calculated in accordance with the procedures of Section 80.771 and the propagation curves of Section 80.767. Utilizing these values, we find that the +17 dBu service contour distance for a 500' HAAT, 400 watt ERP is 70.7 miles.

By way of comparison, the +17 dBu service contour distance for a 500' HAAT, 400 watt ERP system under Figure 19 of Report R6602 is 65.6 miles.

III. INTERFERENCE PROTECTION

The Petition for Rule Making makes no mention of the minimum C/I ratio that should be employed to protect facilities. Their proposed separation distance appears to be based on a C/I of approx 0 dB. This is contrary to reality; FM Mobile radios require a significant C/I ratio in order to capture the desired signal and reject the undesired signal. Under laboratory conditions, the ratio is typically 6 dB. Under actual field conditions, the ratio must be increased significantly to take into account the variability of signals that arises from both location variability and fast fading. In Part 22 Public Land Mobile Radio, this ratio for VHF is increased from 6 dB to a minimum of 21.6 dB in order to account for signal variabilities.

The Petition for Rule Making does not justify why a C/I of 0 dB should be used to define "protection". Subpart P of Part 80, Section 80.773, states that "where a frequency is shared, the ratio of desired to undesired signal strengths must be at least 12 dB within the service area of a station." Utilizing a Section 80.753 defined 17 dBu service contour value, the maximum interference

signal level at the protected service contour is +17 dBu - 12 dB = +5 dBu. For a 500' HAAT, 400 watt ERP system, the propagation curves of Section 80.767 give a 5 dBu signal at 107.2 miles.[1]

III. MINIMUM SEPARATION DISTANCE

Utilizing the distances derived above, a 500' HAAT, 400 watt ERP undesired transmitter must be 107.2 mi away from the service area it is required to protect. If the facility to be protected is also a 500' HAAT, 400 watt ERP facility, the service contour distance is 70.7 miles. These means that two 500' HAAT, 400 watt ERP facilities must be separated by a distance of 70.7 + 107.2 = 177.9 miles. This is illustrated in Exhibit 1.

The protection determined above and illustrated in Exhibit 1 specifically applies to base-to-mobile communications on a paired channel. Using path reciprocity, the same separations apply for mobile-to-base communications on a paired channel. Here the undesired mobile signal must be 12 dB below the desired mobile signal. The worst case scenario occurs when the desired mobile is at its service boundary and the undesired mobile is at the service boundary of the undesired facility at the point closest to the desired facility. This is illustrated in Exhibit 2.

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[1]By way of comparison, the +5 dBu service contour distance for a 500' HAAT, 400 watt ERP system under Figure 19 of Report R6602 is 97.6 miles. It is also useful to compare the signal level predictions obtained by several other propagation models. At a distance of 105 miles, a 500' HAAT, 400 watt ERP system, and a receiver height of 30', Okumura Quasi-Open predicts 23 dBu and Okumura Suburban predicts 10.8 dBu. Under a smooth-earth propagation model, for the same assumptions, the signal level prediction is 31.7 dBu.

Another useful comparison is the signal level prediction of the Part 22 Carey curves. Here, however, the receiver height is specified as 6'. These curves predict at a distance of 100 miles (the maximum distance on the curve) a 2 dBu signal level.

IV. BANDWIDTH

The Petition for Rule Making contains almost no discussion of the impact of bandwidth on interference. They, however, do propose to offset their center frequencies so that their center frequencies are exactly midway between the center frequencies employed in the marine services.

It is my professional judgment that, absent significant experimental evidence to the contrary, their proposal to use offset full-width channels will not provide any significant additional protection. In fact, their proposal will cause interference to both overlapping channels and require the same separation from each channel--exactly as if the channels had the same center frequency. Before any additional protection can be afforded to their use of full-width offset channels, extensive experiments are needed. Such experiments would need to utilize actual marine units as they are typically found in service. The marine environment is very hostile; accordingly, it is not unusual to see the selectivity of marine radios degrade significantly as the units' age. Such typical degradation needs to be taken into account in the development of any additional protection figure accorded to their use of full-width offset channels.

They also mention the possibly of using 12.5 KHz narrowband units. Obviously, such units would be expected to provide additional protection. Again, however, the amount of additional protection would need to be determined by tests using actual typical marine units.

Clearly, the best hope of utilizing narrowband offset-channels would be through the use of 5 KHz narrowband technology. Although the amount of additional protection would still need to be determined by tests using actual typical marine units, the use of 5 KHz narrowband technology would appear to offer the best hope for interference-free operation at distances closer than those developed above.

V. CONCLUSION

In order for I/LT to share the marine frequencies without causing harmful electrical interference, FCC Marine Rules require that a 12 dB protection be afforded to a 17 dBu service contour. For two 400 watt ERP, 500' HAAT cochannel facilities, it is shown that a minimum separation of 177.9 miles is needed in order for an I/LT facility not to cause harmful electrical interference to a marine facility. This 177.9 mile separation is significantly greater than the 50 mile separation proposed in CICS's Petition for Rulemaking. The impact of I/LT's possible adoption of various narrowband technologies on this minimum separation distance is also discussed. Any reduction in the above minimum cochannel spacing that can be achieved through I/LT's adoption of various narrowband technologies requires extensive experimental evidence using actual marine units as they are typically found in service in order to determine the actual amount of additional protection that would be achieved.

George L. Schrenk, Ph.D.
President
Comp Comm, Inc.

EXHIBIT 1. Required Minimum Separation Distance
Base-to-Mobile Communications - Paired Channels

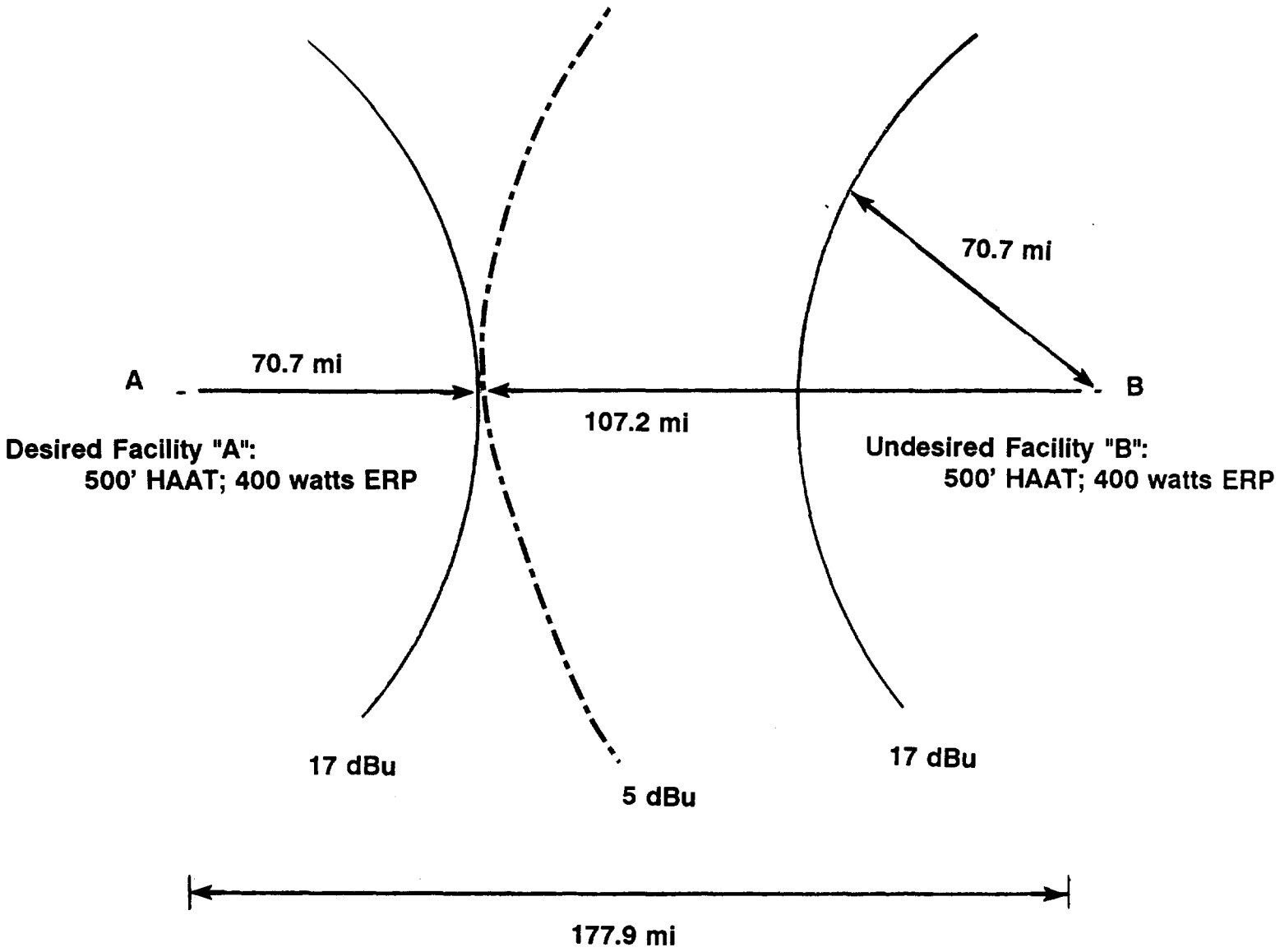
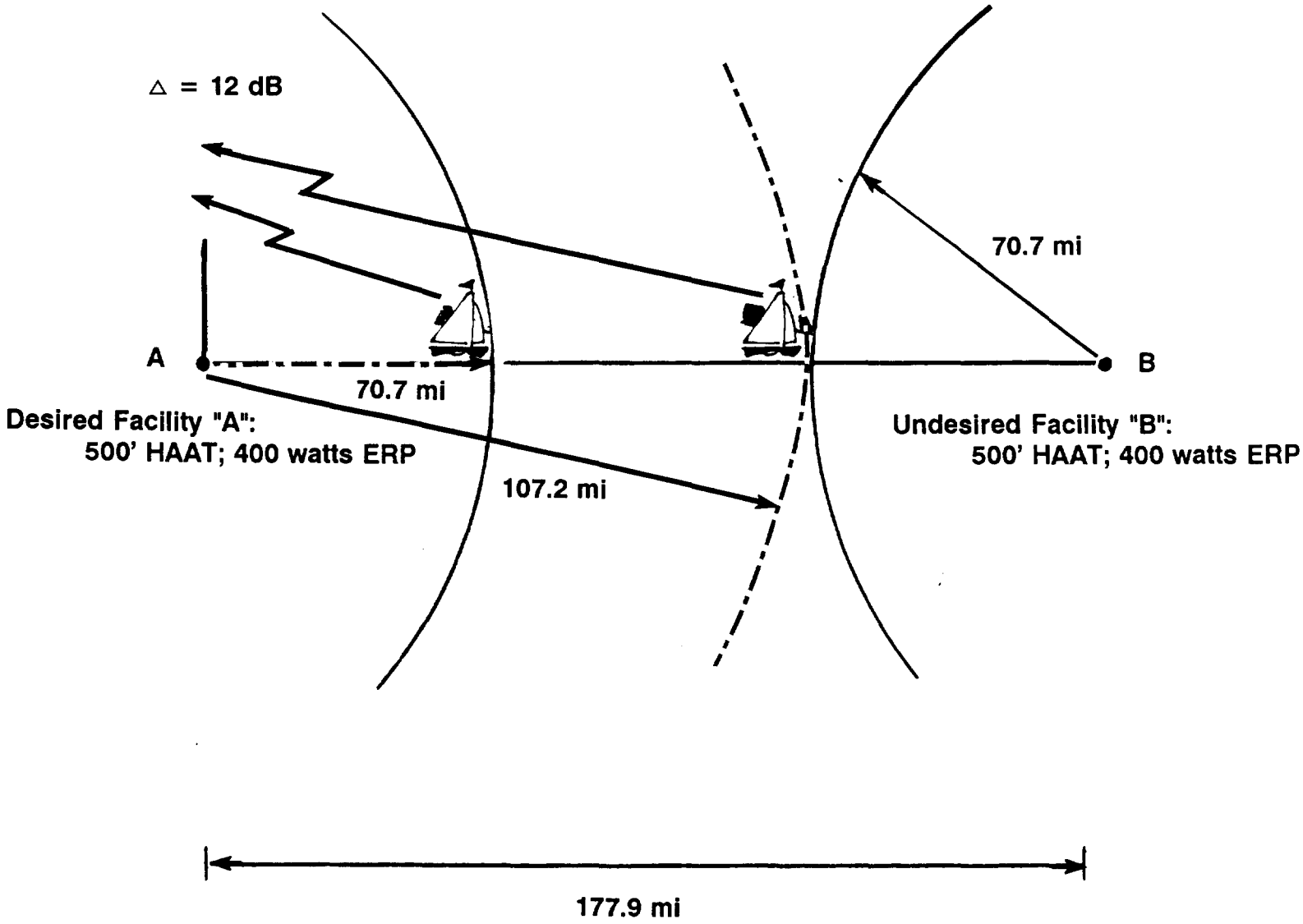


EXHIBIT 2. Required Minimum Separation Distance
Mobile-to-Base Communications - Paired Channels



CERTIFICATE OF SERVICE

I, Gladys L. Nichols, do hereby certify that on this 29th day of May, 1992, the foregoing **COMMENTS** were served to the following persons by First Class Mail:

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

Jeff Sheldon, Esq.
Utilities/Telecommunications Council
1140 Connecticut Avenue, N.W.
Suite 1140
Washington, D.C. 20036

Marnie K. Sarver, Esq.
Reed, Smith, Shaw & McClay
1200 18th Street, N.W.
Washington, D.C. 20036
Counsel for SIRSA

John D. Lane, Esq.
Wilkes, Artis, Hedrick & Lane
1666 K Street, N.W.
Washington, D.C. 20006
Counsel for APCO

George Petrutsas, Esq.
Fletcher, Heald & Hildreth
1225 Connecticut Avenue, N.W.
Suite 400
Washington, D.C. 20036
Counsel for Forest Industries Telecommunications

Gladys L. Nichols

* Hand Delivered

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