

**Before the
Federal Communications Commission
Washington, D.C. 20554**

Application of Maritime
Telecommunications Network, Inc.
for Renewal of Experimental
Authorization Call Sign KI2XEE

FCC File No. 0100-EX-RR-1999

To: Chief, Office of Engineering and Technology

OPPOSITION TO PETITION TO DENY

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SUMMARY

Maritime Telecommunications Network, Inc. ("MTN"), hereby opposes the Petition to Deny filed by the Association of American Railroads ("AAR") and Consortium Digital Microwave System ("CDMS") (collectively, the "Petitioners") against MTN's application for renewal of its experimental authorization under Call Sign KI2XEE. MTN is preparing for the 2000 World Radio Conference through its ongoing experimental operations utilizing earth stations operated above vessels ("ESVs") under Call Sign KI2XEE.

AAR and CDMS allege, without any specific factual allegations, supporting evidence, or affidavits, that their point-to-point microwave coastal stations have experienced some unspecified level of interference due to unknown causes at unspecified locations over the course of the last two years. MTN has always fully cooperated, and resolved, specific allegations of harmful interference, and MTN is committed to assisting AAR and CDMS in that regard.

MTN has also begun discussing with AAR and CDMS the possibility of joint experiments to determine whether ESVs can operate in the same band as terrestrial microwave stations. In order to conduct such joint experiments, renewal, as well as a limited expansion, of MTN's experimental authorization would be essential.

The Commission should not dignify a petition to deny that does not provide specific allegations of fact or supporting data, documentation, or affidavits from individuals with personal knowledge. Instead, the Commission should promote advancement of efficient, innovative use of spectrum, such as ESV service. For these reasons, the Commission should dismiss the AAR and CDMS Petition to Deny, and grant MTN's application for renewal of its experimental authorization.

I. BACKGROUND

The FCC has granted MTN authority under Call Sign KI2XEE to operate earth stations operated above vessels ("ESVs") in the C Band. ESVs operate as fixed stations while ships are docked in port, and conduct mobile operations while ships are moving through established channels between the high seas and port. MTN's experimental authorization was initially granted to its predecessor-in-interest, Crescomm Transmission Services, Inc. ("Crescomm"), in 1992.¹ Crescomm and its successors in interest, first Holmdel Telecommunications Group, Inc., and then MTN, have requested and received periodic revisions to, and renewal of, the authorization issued under Call Sign KI2XEE. MTN's current authorization permits its operation of 45 ESVs.

In anticipation of the 2000 World Radio Conference, MTN has been gathering data in support of the United States agenda item proposing the permitted operations of ESVs in the Fixed Satellite Service ("FSS") C Band. MTN, in conjunction with its renewal application filed January 22, 1999, for Call Sign KI2XEE, again requested expansion of its experimental authority, for operation of 150 ESVs. In the alternative, MTN requested renewal of its experimental authority under the existing limit of 45 ESVs.²

¹ See FCC File No. 3093-EX-ML-92, Call Sign KI2XEE, granted effective Nov. 13, 1992; *see also Mobile Satellite-Based Communications Services by Crescomm Transmission Services, Inc., and Qualcomm Incorporated*, Joint Order of the Chief, International Bureau and the Chief, Office of Engineering and Technology, DA 96-650, 11 FCC Rcd 10944 (1996) (hereinafter *Crescomm Order*).

² In January 1997, MTN requested expansion of its experimental authorization from 45 ESVs to permit operation of 250 ESVs. MTN's request was predicated on cementing its case for non-interference of its service to licensed stations in the C Band. The Commission denied MTN's request, reissuing MTN's authorization for 45 ESVs. In December 1997, MTN filed a Petition for Partial Reconsideration of the Commission's decision, again requesting expansion of its experimental authorization to permit operation of 250 ESVs. The Commission has not yet

AAR and CDMS have filed a Petition to Deny³ MTN's renewal application for Call Sign KI2XEE, and an Opposition to MTN's Petition for Partial Reconsideration of the Commission's denial of MTN's request for expansion of its experimental authority to permit operation of more than 45 ESVs.⁴ In support of their Petition to Deny, AAR and CDMS make the following erroneous, and hence, unsubstantiated claims: (1) that MTN has *not* completely made its case for ESVs' non-interference to terrestrial microwave stations; (2) that MTN has not cooperated with the terrestrial microwave community to ensure interference protection for licensed terrestrial microwave use of the 6 GHz band; and (3) that the 100 km distance established in the *Crescomm Order* by the Commission for coordination between ESVs and fixed earth stations on land provides insufficient interference protection to terrestrial microwave users.

The first two claims in the Petition to Deny are completely unsupported by specific, factual allegations or by affidavits of individuals with personal knowledge, because the claims are untrue. In fact, in the rare instance where MTN has some facts relating to Petitioners' operations in its

responded to MTN's Petition for Partial Reconsideration. As stated, MTN then requested expansion of its experimental license by requesting authority to operate 150 ESVs in its application for renewal of Call Sign KI2XEE.

³ Arguably, given the apparent absence of a specific FCC Rule governing opposition to applications for renewal of experimental authorization, petitions to deny do not lie against such applications. In the event that the Commission chooses to entertain the AAR and CDMS Petition to Deny, the Petition should be governed by the general standards for petitions to deny set forth in Section 309 of the Communications Act, 47 U.S.C.A. § 309(d).

⁴ AAR and CDMS have also filed petitions to deny with the Commission's International Bureau against MTN's applications for fixed earth station authority for ESV operations while ships are docked at 32 specific sites in 17 specific ports. These operations have been coordinated as fixed earth station operations as required by the Commission's Rules, and the applications are under review by the International Bureau's staff. MTN filed its Consolidated Opposition to Petitions to Deny on March 18, 1999.

possession, MTN's information flatly contradicts the position of Petitioners.⁵ With regard to the third claim, concerning the 100 km interference restriction set forth in the *Crescomm Order*, AAR and CDMS attempt to reverse a Commission decision issued three years ago pursuant to notice and comment. As the Petitioners well know, the establishment of a coordination standard between ESV and terrestrial microwave operations is the subject of careful, considered negotiations and discussions within the industry. MTN's renewal of its experimental authorization is not the appropriate forum for review of an issue that is the subject of various U.S. and foreign working groups preparing for the 2000 World Radio Conference. The AAR and CDMS Petition to Deny is a weak attempt to make an end run around this open industry dialogue.

Because Petitioners have failed to establish their claims through specific, factual allegations and affidavits from individuals with personal knowledge regarding such facts, their Petition to Deny should be dismissed.

II. DISCUSSION

A. Petitioners' Unsupported Claims of Interference Warrant Dismissal of Their Petition to Deny

As AAR and CDMS acknowledge, MTN has received no unresolved reports of harmful interference from terrestrial station operators due to its ESV operations. While Petitioners purport to have received some unspecified levels of interference during the last two years at "several" coastal

⁵ See Attachment C, Letter from Stacey Cato, Frequency Protection Coordinator for Micronet Communications, Inc., on behalf of CDMS, *et al.*, to Tom Detrick, EK Wireless, Frequency Coordinator for MTN, dated March 31, 1997 (hereinafter, "CDMS Coordination Letter").

and port locations due to some unknown cause, such vague claims of interference are completely undocumented in the Petition to Deny. AAR and CDMS assure the Commission and MTN that an equipment vendor believes that the equipment is not at fault, but no affidavit, or even simple correspondence from an equipment vendor, has been produced.

The Commission, as well as MTN, are expected to take the word of Petitioners' counsel that some type of interference may have been experienced. Significantly, the Petitioners never actually assert that the supposed interference was caused by ESVs, or that the interference was experienced at unacceptable levels. Because AAR and CDMS have not provided any specificity regarding such claims of interference, including providing the level, time, frequencies, and location that alleged interference was experienced, MTN is unable to counter the claims, although it stands ready to assist Petitioners in investigating any documented problems involving unacceptable interference.

Moreover, it should be noted that the claims of potential interference by CDMS are particularly empty. CDMS conducts microwave operations in the area of the Gulf of Mexico. MTN's only ESV operations in that vicinity involve the port of New Orleans. When MTN's New Orleans ESV operations were coordinated with microwave users in accordance with the *Crescomm Order*, the potential interference limited ESV operations to frequencies simply not in use by microwave stations in the area. Because there is no frequency sharing between New Orleans ESV operations and terrestrial fixed service operations in the area, there is *no* potential interference to microwave systems in that region. Indeed, the frequency protection agent for CDMS, Micronet, Inc., responded favorably to MTN's prior coordination notification for fixed and mobile ESV operations

in New Orleans.⁶ To the best of MTN's knowledge, CDMS's operations are limited to the port of New Orleans and the Gulf of Mexico. Thus, where MTN is in possession of the facts concerning Petitioners' allegations, the facts completely contradict the position of Petitioners.

If the Commission were to permit the denial of applications on the basis of unsubstantiated allegations, any competing party, at its whim, could obtain the dismissal of an application before the Commission, simply by filing a self-serving, unsupported petition to deny. For this reason, under long-established Commission precedent, petitions to deny must allege specific facts, and such facts must be supported by an affidavit submitted by an individual with personal knowledge regarding such facts. In the instance where MTN has facts in its possession, the facts negate Petitioner's assertion. On the principle that petitions to deny must allege facts with specificity, the Petition to Deny of AAR and CDMS fails, and consequently must be dismissed.

B. MTN's Experimental Authorization is Vital to Cement its Strong Case for Non-interference of Earth Station Aboard Vessel Operations

Ironically, AAR's and CDMS's filing of a petition to deny against MTN's request for renewal of its experimental authority proves the point that MTN has made all along: expansion of its experimental authorization is necessary to establish conclusively that its ESV operations do not cause harmful interference to terrestrial fixed service stations. Petitioners demonstrate the importance of continuing MTN's experimental authorization by: (1) attempting to shift the burden of proving vague, undocumented claims of interference to MTN; and (2) entering into discussions

⁶ See Attachment C, CDMS Coordination Letter (stating, "Our analysis indicates that no objectionable interference should result from your proposal. Thank you for your cooperation in acceptably coordinating the above-referenced system with our client.")

with MTN to conduct joint experiments on the effects of ESV operations on 6 GHz microwave operations.

1. Petitioners Inappropriately Attempt to Shift the Burden of Proving Unsubstantiated Claims of Interference to MTN

MTN has conducted an extensive interference coordination program which supports its conclusion that ESV operations, both mobile and fixed, can be coordinated to protect existing licensed terrestrial microwave stations in the 6 GHz band.⁷ Because MTN's ESVs operate at a lower transmitter power than typical earth stations, not only do MTN's ESV operations have ten times *less* real interference impact than do typical earth stations, they have *less* real interference impact than typical microwave stations. As a consequence, numerous point-to-point microwave station operators have successfully coordinated new stations in the areas already coordinated by MTN.

MTN is fully committed to resolving all documented cases of unacceptable interference that might have been caused by ESV operations. However, AAR and CDMS have thus far refused to provide any specific support for their claims of unacceptable interference. Instead, Petitioners demand extensive documentation from MTN, documentation that does not exist, far in excess of the information that they might require to correlate instances of actual unacceptable interference with ESV operations. Petitioners maintain that because MTN's operations under its experimental

⁷ See C-Band Shipboard Earth Stations: Interference Analysis Method, Frequency Coordination, and Microwave Interference Protection, by Dan Collins, Krishna Sampath, Tom Detrick, and Kam Falkenthal, Edwards and Kelcey Wireless, L.L.C. (1997) (included as Attachment A). This paper was provided to FCC staff in 1997, including the Office of Engineering and Technology, as well as to the National Spectrum Managers Association ("NSMA").

authorization are secondary in nature, it is incumbent on MTN to prove that over every minute of the last two years, it did not cause any possible interference to AAR and CDMS.

Petitioners perhaps come too quickly to the conclusion that if a transitory microwave system degradation occurs, it must be the result of interference from an ESV operation. Among the factors missing from Petitioners' list of possible causes for the alleged interference is the most common one: propagation anomalies that result in short-term interference from *any* same band operation—including other microwave stations and earth stations. The 6 GHz band is currently used by an estimated 10,000 microwave stations and 3,500 earth stations. Moreover, the alleged interference would probably not have been caused by a "nearby" station, as Petitioners suggest; the greater likelihood, because of the nature of propagation-related interference, is that the alleged interference source is 100 to 200 miles away from Petitioners' stations. Short-term interference of this type is experienced by microwave stations everywhere, including areas such as Kansas.

MTN concedes that once a documented instance of unacceptable interference is produced, the burden of proving that ESV operations did not cause the interference shifts to MTN. However, the Commission's interference policies do not contemplate that experimental license holders prove that interference has never been caused to any licensed operator, no matter the time frame, channels used, or continental land mass involved. If the Commission were to require experimental licensees to complete such an impossible, quixotic task, new radio services or technologies could not possibly be developed.

2. In Order to Conduct Joint Experiments with Petitioners, MTN's Experimental Authorization Should be Renewed and Expanded

MTN is so committed to establishing that ESV C band operations are a viable, innovative, and efficient means of utilizing C band spectrum that it is currently discussing with Petitioners the possibility of conducting joint experiments. Such experiments could be conducted in specific ports under agreed conditions. To establish such joint experiments, however, MTN would be required to operate at least 10 more ESVs than it is currently authorized to operate. MTN therefore respectfully requests that the Commission expand its experimental licensing authority to permit operation of a total of 55 ESVs.⁸

Precisely because Petitioners claim that unspecified, undocumented instances of alleged harmful interference have occurred, MTN's experiments with ESVs must proceed. At the World Radio Conference next year, it will be incumbent upon the United States delegation (not just MTN) to demonstrate the validity of ESV operation in the C band, before the international community. Thus, it is in the public interest for the Commission to grant, and even expand, MTN's experimental authorization.

⁸ To produce additional data for the World Radio Conference, MTN would require permission to operate additional ESVs beyond the ten ESVs that it would utilize in controlled experiments with AAR and CDMS (along with a few of the currently authorized ESVs). Thus, MTN's request for a small number of additional ESVs to conduct joint experiments with AAR and CDMS is not a concession that additional ESVs are needed to conduct final coordination experiments.

C. MTN Has Fully Cooperated with the Terrestrial Fixed Service Community to Establish Interference and Coordination Standards between Shipboard Earth Stations and Terrestrial Fixed Microwave Stations

AAR and CDMS make the ridiculous, outrageous allegation that MTN is somehow not abiding by the Commission's conditions in the *Crescomm Order*. This statement, when examined closely, appears to be reduced to MTN's refusal to try to prove, without any guidance or assistance from Petitioners, that MTN has never, ever, caused any interference to any of AAR's and CDMS's coastal stations during an entire two-year period. The *Crescomm Order* included no such requirement.

Instead, MTN has complied fully with the letter and spirit of the *Crescomm Order*, to protect current licensed fixed service use of the 6 GHz band, and to establish, through industry consensus, an interference protection standard for ESV operations vis-a-vis terrestrial microwave stations. MTN has been working with the terrestrial fixed service community for *years* to accomplish these goals. In particular, MTN has worked with the National Spectrum Managers Association ("NSMA") to develop frequency coordination and protection standards; NSMA is about to issue an interim resolution on the issue. For Petitioners to suggest that MTN is not cooperative, and that it has not abided by the *Crescomm Order*, is so specious that it necessitates no refutation. Numerous members of the Commission's staff, as well as Petitioners themselves (including their counsel) can attest to MTN's tireless efforts to develop coordination standards to protect licensed terrestrial operations, both now, and in the future. Moreover, MTN stands ready and able to investigate any instances of unacceptable interference that are specified in terms of the date, time, frequencies, and location involved.

D. The *Crescomm* Order 100 km Frequency Coordination Distance is the Appropriate Interim Commission Standard for Shipboard Earth Station Operations

Petitioners complain that the 100 km coordination distance referred to in the *Crescomm Order* is inadequate to protect terrestrial fixed microwave operations. However, this position avoids several points: (1) the standards for coordinating microwave stations, and the standards for coordinating FSS stations, including the coordination distances involved, differ from one another; (2) the 100 km coordination distance is the standard "default minimum" distance for short-term interference coordination of FSS earth stations with same-band operations under the Commission's Rules and the International Telecommunications Union ("ITU") regulations; (3) the in-motion ESV operations were frequency coordinated using the standard short-term interference objective, -131-dBW/4 kHz, for which the standard coordination distance is the default minimum of 100 km; and (4) the establishment of an interference objective for ESV operations is the subject of on-going industry discussions that have not yet reached a conclusion.

First, by arguing that the ESV coordination distance contour should resemble a "keyhole" shape, and distances commonly used in coordination between microwave systems, Petitioners reveal their misapprehension of the distinction between the coordination distances used for point-to-point microwave stations versus those used for FSS earth stations.⁹ In particular, nowhere in the FCC's Rules, the ITU's regulations, or NSMA industry recommendations is there any reference to the 400 km and 200 km figures cited in the Engineering Statement attached to the Petition to Deny. As explained in Attachment B, per an NSMA industry recommendation (not referenced in the FCC's

⁹ For an explanation of the distinct coordination parameters governing these two types of stations, see Attachment B, Engineering Statement of Daniel J. Collins.

Rules), the "keyhole" distances associated with 6 GHz microwave coordination with *other microwave systems* are 250 miles (within 5 degrees of the antenna boresight) and 150 miles (at all other angles). In addition, as those familiar with the subject are well aware, the specific coordination distances used for earth station coordination are calculated using ITU procedures, and the resulting distances differ for *each* earth station, depending on its particular technical parameters; thus, there is no single distance figure, or set of distance figures, applicable to all earth stations.

The 100 km standard does have current applicability under the Commission's Rules; it is the default minimum coordination distance applied by the ITU under Appendix 28 of the ITU Radio Regulations, and by the Commission via reference to the ITU's regulations in Section 25.251 of the Commission's Rules, 47 C.F.R. § 25.251 (1998) to the protection a new FSS earth station must accord to same-band licensed operators. The 100 km coordination distance is also specifically linked to the standard objective in the ITU's regulations (-131 dBW/4 kHz) for the protection of microwave stations from short-term earth station interference.

When docked at a specific site in port, ESV operations are indistinguishable from typical fixed earth stations. ESV operations at fixed sites were coordinated using the standard ITU long- and short-term objectives (-154 and -131 dBW / 4 kHz, respectively) and the coordination distances applicable to those objectives.¹⁰ Thus, if Petitioners intend to claim that the 100 km standard is inadequate for ESV fixed operations when a ship is docked at a pier, they are in effect maintaining

¹⁰ This issue is the subject of the petitions to deny that AAR, CDMS, and others have filed against fixed satellite service earth station applications that MTN has filed with the FCC's International Bureau for its fixed ESV operations at specifically coordinated piers in 17 specific ports.

that the Commission's Rules under Part 25, and consequently, ITU's regulations under Appendix 28, are inadequate.

The in-motion ESV operations were frequency coordinated using the standard ITU short-term interference objective (-131 dBW / 4 kHz) and its associated standard coordination distance, 100 km, as specifically cited in the *Crescomm Order*. As AAR and CDMS know, MTN has worked diligently with NSMA to ensure that any coordination standard adequately protects point-to-point microwave stations while permitting mobile ESV operations in the 6 GHz band. The standard to which the parties will agree will take into account the fact that newer microwave systems utilize digital equipment, and that 6 GHz transmissions over water are governed by certain characteristics that require specific consideration in the establishment of a coordination standard. MTN's application for renewal of its experimental authorization is hardly the forum for addressing such complex industry issues that are the subject of numerous on-going meetings, papers, reports, discussions, and correspondence.¹¹

As stated previously, AAR and CDMS do not provide any engineering data or facts to support their claim that the 100 km standard is inappropriate. Petitioners cannot rely on bare allegations, without any underlying support, and without an affidavit of an individual with *personal*

¹¹ For the benefit of AAR and CDMS, MTN has included as Attachment A "C-Band Shipboard Earth Stations: Interference Analysis Method, Frequency Coordination, and Microwave Interference Protection, by Dan Collins, Krishna Sampath, Tom Detrick, and Kam Falkenthal, Edwards and Kelcey Wireless, L.L.C." which discusses appropriate frequency coordination standards for in-motion ESV operations. A copy of this paper was submitted to the FCC and to NSMA in 1997, and has been the basis for the on-going establishment of a coordination standard for ESV operations.

knowledge, to alter a Commission decision that was subject to notice and comment, or to revise Commission regulations established pursuant to a rulemaking proceeding.

III. CONCLUSION

AAR and CDMS, by opposing MTN's request for renewal of its experimental authorization, are apparently seeking to accomplish what they have been unable to achieve in an open, industry forum: to impede advanced, efficient shared use of the 6 GHz band. However, their Petition to Deny does not include any specific allegations of fact supported by an affidavit from an individual with personal knowledge regarding the facts. Where MTN is able to bring facts to light for the Commission's review, the facts contradict Petitioners' assertions. For these reasons alone, the Petition to Deny must be dismissed.

While MTN is prepared to work with Petitioners by conducting joint experiments and investigating documented reports of interference, MTN will not stand by while a decade of innovation and industry cooperation is disparaged or ignored. Because the public interest strongly supports continued progress and development of new communications services, the Commission should grant MTN's request for renewal of its experimental authorization and expansion of its authority to permit joint experiments as in the public interest, and dismiss the AAR and CDMS Petition to Deny.

RESPECTFULLY SUBMITTED,

MARITIME TELECOMMUNICATIONS
NETWORK, INC.

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ATTACHMENT A

**C-BAND SHIPBOARD EARTH STATIONS:
INTERFERENCE ANALYSIS METHOD, FREQUENCY COORDINATION,
AND MICROWAVE INTERFERENCE PROTECTION**

**by Dan Collins, Krishna Sampath,
Tom Detrick, And Kam Falkenthal,
Edwards And Kelcey Wireless, L.L.C. (1997)**

ATTACHMENT B

ENGINEERING STATEMENT OF DANIEL J. COLLINS

ENGINEERING STATEMENT

This Engineering Statement is prepared to accompany the foregoing Opposition to a Petition to Deny renewal of experimental authorization Call Sign KI2XEE, FCC File No. 0100-EX-RR-1999, held by Maritime Telecommunications Network, Inc. ("MTN").

I, Daniel J. Collins, being a duly qualified and experienced telecommunications engineer doing business at 299 Madison Avenue, Morristown, New Jersey 07962, under penalty of perjury, do hereby state the following:

I have reviewed: (a) the foregoing Opposition to Petition to Deny; (b) *Mobile Satellite-Based Communications Services by Crescomm Transmission Services, Inc., and Qualcomm Incorporated*, Joint Order of the Chief, International Bureau and the Chief, Office of Engineering and Technology, DA 96-650, 11 FCC Rcd 10944 (1996); (c) the applicable Federal Communications Commission regulations, including Section 25.251 and Section 101.103 of the Commission's Rules; (d) the applicable International Telecommunications Union Radio Regulations and Recommendations; and (e) technical documents prepared by qualified experts within relevant working groups considering the technical feasibility of proposed shipboard earth station operations in the 5,925 to 6,425 MHz band.

The following notes are offered to clarify what appears to be some confusion on the subject of frequency coordination for earth stations as opposed to microwave stations, and in particular the use of different coordination distances for each type of system.

NOTES ON FREQUENCY COORDINATION DISTANCES AND CONTOURS

In discussions on interference-related issues involving C-band satellite earth stations operated aboard vessels (so-called "ESVs"), there appears to be some confusion about the application of coordination distance to different types of systems.

The coordination distance around a station is used to identify all other shared-band systems that should be included in the analysis of potential interference and should be included in the notification-response frequency coordination process.

The following will explain the different coordination distances used for point-to-point microwave systems and for satellite earth stations, and will provide references to regulations and/or industry practice as appropriate.

Point-to-Point Microwave Systems

The following addresses the coordination of point-to-point microwave systems with other point-to-point microwave systems.

According to FCC Rule Section 101.103(d)(1), "Proposed frequency usage must be prior coordinated with existing licensees, permittees and applicants *in the area ...*" (emphasis

added). The phrase “in the area” has existed in the FCC’s microwave frequency coordination regulations since July 15, 1971, when prior coordination became a formal requirement.

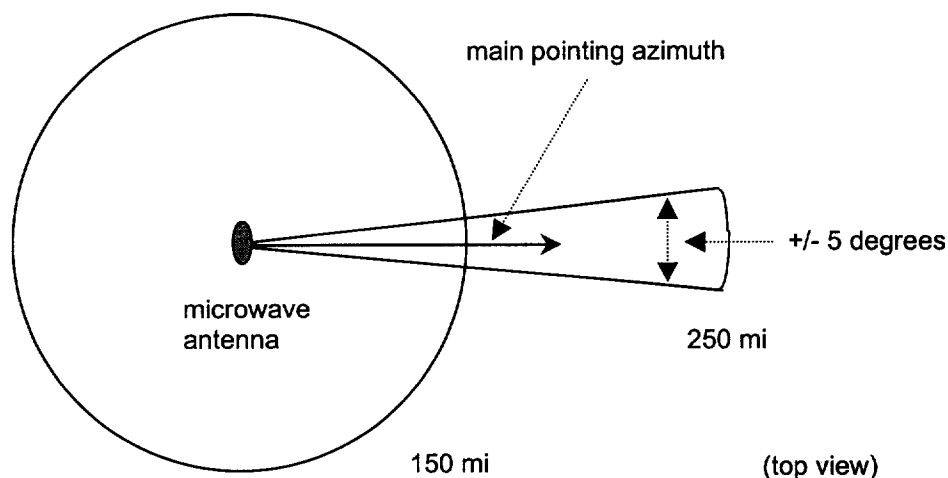
The microwave community – chiefly the former Bell System, Western Union and GTE – had actually been coordinating proposed frequency use with each other since the mid-1950s, realizing that such was necessary to avoid interference and system performance degradation. That community had also set its own standards and procedures for the analysis of potential interference – including the coordination distance around each proposed microwave station. Initially, the community agreed to use a radial (circular) distance of 175 miles. With experience, however, they learned that terrain blockage on longer paths almost always served to keep interference to acceptable limits. Thus, the players agreed to modify the coordination distance to 150 miles. By the early ‘60s, with more experience analyzing long distance interference paths, they agreed to again reduce the coordination distance to 125 miles. This figure became so engrained in the minds of frequency coordinators throughout the ‘70s and early ‘80s that many if not most of them thought the FCC Rules specified that distance. The Rules, as explained earlier, do not and never did; they say “in the area”. (Note that during this entire period, individual coordinators or companies may have used coordination distances somewhat more conservative than the above figures, sometimes applying a larger figure for work in areas where more mountainous terrain allowed for a greater potential for line-of-sight on longer-distance interference paths.)

In the late ‘80s, with the large population of microwave stations, some operators began to notice a small (but significant) number of identifiable interference problems caused by other microwave stations at distances somewhat greater than 125 miles (and, as such, which had not been included in the coordination). It was determined that these problems occurred when two well-separated microwave stations’ antennas were pointed within a few degrees of each other (effectively “boresight-to-boresight”). In those circumstances, the terrain losses on long paths still applied as before, but it wasn’t sufficient to offset the fact that there was virtually no antenna discrimination at both the interfering transmitter and interfered-with receiver. (The reason this problem had not been identified earlier is that the probability of its occurrence is directly related to the total number of stations in operation; simply put, it took until the late-‘80s for the population of microwave stations to reach a point that made very long distance, boresight-to-boresight situations a more significant probabilistic reality.)

By this time, the National Spectrum Managers Association (NSMA) had been created by frequency coordinators in the US to provide an open industry forum to address and resolve technical and procedural issues on an “engineer-to-engineer” basis. The mission of the NSMA is to develop industry recommendations to supplement the FCC’s coordination regulations to make frequency coordination more effective and efficient.

In 1990, the NSMA issued an industry recommendation (Recommendation 3.90.026, “Coordination Contours for Terrestrial Microwave Systems”), which changed the long-held 125-mile radial coordination distance for microwave systems in the following manner: within five degrees on either side of the main pointing azimuth of the antenna, the coordination distance is 250 miles, and for all other azimuths the distance is 150 miles. (See illustration on the next page.) This combination results in a “keyhole”-shaped coordination contour around a microwave station, and this recommendation has

been followed by the industry for nearly a decade now – while the FCC regulations still say “in the area”.



The coordination of a microwave station (as illustrated above) would include all other same-band microwave stations within the contour limits of the 150/250-mile keyhole shape.

Satellite Earth Stations

Some satellite services share the same frequency allocations with point-to-point microwave systems, and because of the potential for interference from one system to another, coordination is necessary.

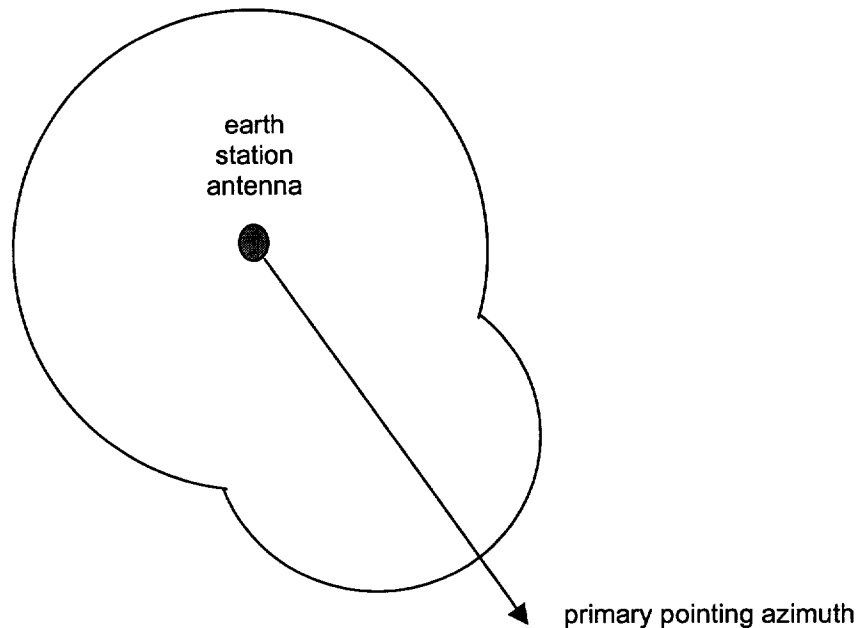
Satellite earth station transmitters can cause interference to point-to-point microwave receivers, and point-to-point microwave transmitters can cause interference to earth station receivers. The coordination distance around a satellite earth station, however, is not a single number or standard set of numbers, as has been the case with microwave systems, nor is earth station coordination distance a parameter that has been set by industry practice and agreement.

The coordination distance around an earth station is determined via its particular technical parameters (e.g., transmit power, antenna gain along the horizon) and application of a mathematical analysis in the regulations of the International Telecommunications Union (ITU). (Note that until recently, the FCC's Part 25 regulations echoed the related ITU regulations, but since have been replaced by a simple directional reference to the applicable ITU regulations.)

The distance is a result of a complex calculation that applies ITU-specified microwave interference objectives and modeled technical parameters, and the earth station's

particular technical parameters, to determine the necessary path loss to make the calculated interference acceptably low. Then, because path loss is a function of path distance, the calculation converts the result to a minimum coordination distance.

This calculation is repeated for all azimuths around the earth station, because the earth station antenna gain along the horizon is not uniform. The result of mapping the necessary coordination distance at all azimuths around an earth station results in a "coordination contour" that is typically egg-shaped, as illustrated below.



The coordination distance at any azimuth is represented in this illustration by the distance from the earth station to the edge of the contour drawn around it. The coordination of an earth station would consider all of the microwave stations within the described coordination contour.

Depending on the technical parameters of the earth station, the coordination distances at different azimuths may range as high as several hundred kilometers, and the ITU has specified a "default minimum" of 100 kilometers (applicable to those cases where the technical calculations result in a figure less than 100 kilometers).

Closing Notes

A microwave station may receive interference from (or cause interference to) another microwave station or an earth station; however, the methods used to calculate coordination distances and the particular distances used in microwave system coordination and earth station coordination are different (as are the interference protection objectives used in each case).

In all cases but one, the determination of which other particular stations to include in a coordination effort depend on the coordination distance associated with the station being coordinated. For microwave coordination with other microwave stations, the 150/250-mile "keyhole" contour is used. Similarly, when an earth station is being coordinated with shared-band microwave stations, the earth station's coordination contour is used.

The one case that is different involves the coordination of a microwave station with shared-band earth stations. In that case, the determination of the particular earth stations to include in the analysis depends on whether the microwave station is within the coordination contour of each individual earth station in the area. This is the only case in which the determination of stations to include depends on the coordination contours of the stations *being coordinated with*, rather than a coordination distance associated with the station being coordinated.



Daniel J. Collins
VP – RF Planning and Engineering
Edwards and Kelcey, Inc.

APRIL 5, 1999

Date

ATTACHMENT C

**LETTER FROM STACEY CATO,
FREQUENCY PROTECTION COORDINATOR ON BEHALF OF CDMS, *ET AL.*,
TO TOM DETRICK, EK WIRELESS,
FREQUENCY COORDINATOR FOR MTN,
DATED MARCH 31, 1997**



March 31, 1997

TOM DETRICK
EK Wireless
299 Madison Avenue
PO Box 1936
Morristown, New Jersey 07962-1936

RE: MARITIME TELECOMMUNICATIONS NETWORK
NEW ORLEANS, LA
YOUR PCN DATED: MARCH 12, 1997
MICRONET FILE NO.: 9707304
RESPONDING FOR: PATHNET, INC.
SOUTHERN NATURAL GAS CO. - TRANS. DEPT
CONSORTIUM DIGITAL MICROWAVE SYSTEM
CELUTEL OF BILOXI, INC. C/O CENTURY
CELLUNET, INC.

Dear Coordinator:

We have conducted an interference analysis of the above referenced proposal against all of our client's existing and prior coordinated systems and earth stations.

Our analysis indicates that no objectionable interference should result from your proposal. Thank you for your cooperation in acceptably coordinating your above referenced system with our clients.

Sincerely,

A handwritten signature in cursive script that reads "Stacy Cato". The signature is written in black ink and is positioned above the printed name of the signatory.

Frequency Protection Coordinator

CERTIFICATE OF SERVICE

I, Valerie Gilbert, hereby certify that on this 6th day of April, 1999, copies of the attached Opposition to Petition to Deny has been sent via first class U.S. mail, postage pre-paid, to the following:

Thomas J. Keller
Verner, Liipfert, Bernhard, McPherson
and Hand, Chartered
901 15th Street, N.W., Suite 700
Washington, D.C. 20005-2301

Julian L. Shephard
Verner, Liipfert, Bernhard, McPherson
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Valerie E. Gilbert