DOCKET FILE COPY ORIGINAL

ORIGINAL

WILKINSON, BARKER, KNAUER & QUINN, LLP

Washington, DC
Frankfurt, Germany

2300 N Street, NW
Washington, DC 20037-1128

telephone: 202.783.4141
facsimile: 202.783.5851

April 27, 1998

EX PARTE OR LATE FILED

RECEIVED

APR 27 1998

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Magalie Roman Salas
Secretary
Federal Communications Commission
1919 M Street, N.W.
Room 222
Washington, D.C. 20554

Re: *Amendment of Parts 21 and 74 To Enable Multipoint Distribution Service and Instructional Television Fixed Service Licensees To Engage In Fixed Two-Way Transmissions -- MM Docket No. 97-217 and RM-9060: EX PARTE COMMUNICATION*

Dear Ms. Salas:

While the Petitioners[1/] had hoped that their March 6, 1998 letter would resolve all of the outstanding issues in this docket, I must respond on behalf of the Petitioners to the certain of the arguments advanced in an *ex parte* letter submitted on behalf of the Catholic Television Network ("CTN") on April 9, 1998 (the "CTN Letter").

Since the early 1980s, CTN has frequently opposed proposed rule revisions that, when ultimately implemented by the Commission over CTN's objections, have resulted in a renaissance of the Instructional Television Fixed Service ("ITFS"). Thanks to the wireless cable industry's financial and operational support, there are now hundreds of new ITFS stations on the air today. Despite this record, and despite the fact that the vast majority of ITFS interests commenting in this proceeding have called upon the Commission to promote the rapid introduction of two-way services without the imposition of onerous conditions, CTN continues to oppose proposals designed to advance the ITFS. However, rather than respond

---

[1/] While CTN correctly notes that two of the original 113 Petitioners (both members of CTN) have withdrawn their support for the Petitioners proposals, it is telling that, despite all of CTN's efforts to drive a wedge between the wireless cable and educational community, ITFS support for the Petitioners remains so strong. Even with those two withdrawals, the Petitioners include approximately sixty educational entities. Moreover, the overwhelming majority of ITFS licensees participating separately in this proceeding, including the National ITFS Association, have expressed support for the adoption of rules based upon the Petitioners' proposals.

No. of Copies rec'd 0+1

in kind to the harsh tenor of the CTN Letter, with its shrill *ad hominem* attacks[2] and mischaracterizations of the Petitioners' arguments,[3] the Petitioners will instead focus their response on clarifying the record with respect to the substantive issues still being debated before the Commission.

The Availability Of Cross-Polarization To Mitigate Interference. Recall that in their Comments in response to the *Notice of Proposed Rulemaking*, the Petitioners demonstrated that the risk of interference to ITFS receive sites due to block downconverter ("BDC") overload (interference resulting from the licensee's use of a BDC that does not fully filter out transmissions on bands other than the licensed band) is minuscule, that twelve techniques exist

---

[2] For example, CTN attempts to dismiss the technical arguments advanced by the Petitioners in their March 6, 1998 letter to the Commission Secretary because the Petitioners chose not to annex to its filings statements by consulting engineers that are largely redundant of the arguments advanced in the principal filing. The validity of the Petitioners' arguments must ultimately be judged by their technical merits, not by whether the proponent submits unnecessary paperwork. Petitioners are confident that the Commission's technical staff will recognize the technical merit of Petitioners' proposals, whether or not the Petitioners submit additional paperwork by Petitioners' consulting engineers. Nonetheless, the Commission should be aware that the Petitioners' March 6, 1998 letter, as well as this letter, were prepared in conjunction with George W. Harter, III of Hardin & Associates, Inc. and S. Merrill Weiss of The Merrill Weiss Group -- two of the most respected technical experts in the wireless cable industry. Mr. Harter is a principal in Hardin & Associates, the largest and one of the most respected engineering firms in the wireless cable area. Mr. Harter has over a decade of experience in the engineering of wireless cable systems both domestically and internationally, including the engineering of some of the most technically sophisticated systems operating today. Mr. Weiss is an internationally-recognized authority on the issues associated with the use of the airwaves for the transmission and reception of digitally-modulated signals. Because the credentials of both these gentlemen are a matter of record before the staff, the Petitioners have not found it necessary to tout the expertise of their consulting engineers at every turn. The work of Messrs. Harter and Weiss speaks for itself.

[3] CTN incorrectly contends that "the Petitioners initially conceded that CTN was correct that brute-force overload is potentially a serious threat to ITFS operations." CTN Letter, at 3. As support for that proposition, CTN cites to a statement at page 90 of the Petitioners' Comments that the "Petitioners cannot say that such interference will never occur if the rules proposed in the Petition are adopted." However, *the very next sentence* of the Petitioners' filing states that "the potential [for BDC overload] is minuscule." Comments of the Petitioners, MM Docket No. 97-217, at 90 (filed Jan. 9, 1998)[hereinafter cited as "Petitioners Comments"]. The Petitioners' concession that BDC overload may occur in isolated instances hardly supports the claim that the Petitioners conceded it is a "serious threat."

for eliminating that interference should it occur, and that CTN's call for crippling restrictions on the licensing of response stations is unnecessary overkill.[4] The CTN Letter now argues that one of those techniques, cross-polarization, cannot be relied upon as an effective tool for mitigating interference, contending that "Petitioners themselves have now demonstrated that this is impossible because of the need to alternate polarization of the sectors of a response station hub . . . ."[5] That is not what the Petitioners have said.

The Petitioners have never represented that response station hubs will have to utilize alternate polarization between adjacent antenna sectors. While the use of a sectorized antenna system alternating polarization between adjacent sectors is certainly one way a system can be designed, it is not the only way. To support its contention, CTN cites to page 2 of the "Example of Proposed Two-way System Interference Analysis" that accompanied the Petitioners' Reply Comments as Exhibit 2 (the "Interference Analysis Example"). The Interference Analysis Example was submitted by the Petitioners for a simple purpose -- to demonstrate to the Commission and parties to this proceeding that interference analyses of the sort proposed by the Petitioners could be readily conducted utilizing existing, commercially-available software. To accomplish that task, the author (George W. Harter, III of Hardin & Associates, Inc.) put forth a specific configuration for a proposed response station hub and led the reader through the various steps that would be required for the proponent of such a station to demonstrate that the response stations associated with the proposed hub would not interfere with co-channel or adjacent channel facilities. As explained in the portion of page 2 cited by CTN, the response station hub put forth by Mr. Harter in the Interference Analysis Example employed a system utilizing sectorized antennas that were alternately-polarized -- a hub design Mr. Harter chose in order to provide the reader with the most complex scenario and thus the best opportunity to learn how even the most complex analyses can be conducted utilizing existing software products. *The Interference Analysis Example does not say, and cannot be reasonably read to imply, that sectorized antennas, much less sectorized antennas with alternate polarizations, will necessarily be utilized by hubs at all.*

That error is compounded by the assertion that "this [alternate polarization] design directly contradicts Petitioners' initial comments, where, at Page 92, Footnote 123, Petitioners insisted that all ITFS stations in a given area would operate with the same polarization, and that Response Stations would then use the opposite polarization so as to minimize the interference to ITFS receive sites."[6] In fact, the Petitioners have never proposed that response

---

[4] *See* Petitioners Comments, at 71-105.

[5] CTN Letter, at 4.

[6] CTN Letter, Engineering Exhibit, at ¶ 4.

stations be required to be cross-polarized to adjacent channel stations. Indeed, long ago the Petitioners advised the Commission that "cross-polarization may not be possible in all cases."[7]

What the Petitioners did say at footnote 123 was that:

> the Commission's records reflect that in the vast majority of markets, all ITFS stations are licensed to operate from the same site utilizing the same polarization. Thus, it would not be difficult to cross-polarize response stations relative to the downstream ITFS stations in a market.[8]

The Petitioners stand by that comment. Because in most markets the existing downstream facilities all utilize a common polarization, the use of cross-polarization of upstream response transmissions will be a tool that will generally be available for use in those extremely rare cases where BDC overload is a risk. While some system designers may choose to employ a design that features a sectorized antenna with alternating polarizations (if they can do so and still avoid interference), others will undoubtably employ a single sector or use multiple co-polarized sectors. Thus, cross-polarization between response stations and downstream ITFS operations will often be possible.

Moreover, cross-polarization is only one of twelve techniques that the Petitioners have identified as being available to mitigate BDC overload interference. Where the response station hub licensee elects to utilize antenna sectors with alternate polarizations, it should be free to do so, so long as the Commission's interference protection rules can be met through use of the other techniques. Again, it cannot be repeated enough that the risk of BDC overload to ITFS receive sites is virtually non-existent, that there are a host of mechanisms available for mitigating any interference, and that if interference nonetheless occurs due to response station operations, the offending transceivers will have to cease operating! CTN's "belt and suspenders" approach is an unnecessary intrusion into the deployment of response stations that would cripple wireless cable's ability to compete in the very competitive marketplace for two-way services (and continue its support of the ITFS community).

Response Station Transmission Antennas. It is also in error for CTN to contend that the Interference Analysis Example "reveals that the Petitioners specified a different antenna

---

[7] Petitioners Comments, at 94.

[8] *Id.*, at 92 n. 123.

in their brute-force calculations than they intend to use in practice" and therefore suggest that the studies previously submitted by the Petitioners are somehow invalid.[9]

In creating the Interference Analysis Example, Mr. Harter examined a system where the sole class of response stations would employ a Conifer Model DL2400 antenna.[10] He chose this antenna, not because it is typical of that which will be used in the actual construction of response station facilities, but because, in the very words of the Interference Analysis Example, it presents a "worst case antenna pattern" for purposes of cochannel and adjacent channel interference calculations.[11] The Commission should recall that the rules proposed by the Petitioners call for applicants for response station authorization hubs to conduct cochannel and adjacent channel interference studies employing the combined antenna pattern for each class, which is a conservative measure designed to assure interference protection. The record simply does not support the conclusion that the Conifer Model DL2400 antenna will be "typical"[12] based on the use of its pattern by Mr. Harter.

The implication that the specification of an antenna in the Interference Analysis Example with a pattern broader than the FCC reference antenna somehow undercuts the Petitioners' prior refutation of the risk of BDC interference is also wrong.[13] *The tables at pages 83, 85, and 89 of the Petitioners Comments establish that the potential for BDC interference is virtually immeasurable, regardless of whether the response station uses the FCC reference antenna, a 31 dBi antenna, a 24 dBi antenna, or a 12 dBi antenna.*

The showings with respect to the 12 dBi antenna are particularly relevant here, for the antenna pattern employed by Mr. Harter in developing those tables, that for a Channel Master Model 4331, is virtually indistinguishable from that of the Conifer Model DL2400. Attachment A hereto is an antenna profile on which Mr. Harter has overlapped the pattern for the antenna used in preparing the Petitioners Comments and the Conifer Model DL2400. As this graphically illustrates, the two are quite similar. In other words, Mr. Harter's use of the Conifer Model DL2400 is fully consistent with the analyses that have previously been provided to the Commission for the Channel Master Model 4331 12 dBi gain antenna.

---

[9] CTN Letter, at 3.

[10] CTN is correct in recognizing that the antenna had been mis-identified in the Interference Analysis Example due to a typographical error.

[11] Petitioners Reply Comments, Interference Analysis Example, at 4.

[12] CTN Letter, at 4.

[13] *See id.* at 3.

Interestingly, as is demonstrated by the tables at pages 83, 85 and 89 of the Petitioners Comments, the 12 dBi antenna (and, by inference, the Conifer Model DL2400) is *less likely* to produce BDC overload than the FCC reference antenna![14] Thus, were it true that the Conifer Model DL2400 will be the "typical" response station transmitting antenna, the potential for BDC overload interference would be even less of an issue than if the FCC reference antenna were employed.

In short, the Petitioners have provided the Commission with evidence from leading technical experts in the wireless cable field that no matter which of a wide range of antennas is employed at a response station, the potential for BDC overload is infinitesimal (and, of course, is non-existent where, as is the case in most markets, all facilities are co-located). The Petitioners have not underestimated the potential for interference, but have provided the Commission with extremely conservative analyses that are, if anything, overly protective.[15]

Adjacent Channel Interference – The Petitioners do not now and never have disagreed with CTN that a response station can cause adjacent channel interference under some circumstances. Indeed, that is why the Petition that commenced this proceeding proposed rules under which an applicant for a station hub authorization would be required to demonstrate 0 dB adjacent channel interference protection, and specified a conservative methodology for conducting the studies necessary to make that demonstration.

However, the Petitioners do not accept CTN's insistence that, merely because adjacent channel interference is a theoretical possibility, there always must be a 6 MHz guardband between the channels used for response stations and channels used for ITFS transmissions. The Petitioners have previously demonstrated that, without resorting to a spectrally inefficient

---

[14] CTN presumes that the Conifer antenna will be more likely to cause BDC interference than the FCC reference antenna because of its broader main beam. However, while the Conifer antenna may have a broader main beam, the higher gain of the FCC reference antenna actually causes it to pose a slightly greater threat of BDC interference (although still an insignificant threat).

[15] The Petitioners must emphasize once again that the analyses of potential BDC interference presented in their Comments and summarized in the referenced tables do not employ all of the interference-mitigation techniques that have been identified. Plus, they assume line-of-sight between all response stations and all ITFS stations, despite the fact that building and terrain blockage is likely to screen out any BDC interference that might otherwise occur. Moreover, they assume an ITFS station that is not collocated, although in most markets all MDS and ITFS stations have co-located. Thus, in the actual operating environment, the risk of BDC interference is substantially less than presented by the Petitioners in their theoretical discussions.

guardband, it is possible to design a two-way service that complies with the 0 dB adjacent channel interference protection standard by using existing techniques and equipment and careful engineering.

Moreover, without repeating in full the arguments advanced in the Petitioners' March 6, 1998 letter to the Commission, that letter establishes three undisputable principles: (1) CTN's latest proposal would artificially limit the amount and location of spectrum that could be devoted to response station use, likely making it impossible to develop viable commercial ventures in many markets; (2) because CTN would permit only the licensee of MDS channel E4 to operate response stations absent the conversion of a neighboring ITFS facility to full time commercial use, no ITFS licensees could deploy a two-way system either for itself or for a lessee unless a neighboring ITFS licensee agreed to devote adjacent channels solely to commercial transmissions; and (3) CTN's proposal would limit each ITFS licensee to only one channel for return paths, which may prove inadequate, particularly for those ITFS licensees that intend to use two-way capabilities for symmetrical services such as video conferencing.[16]

Response Station Power Limits. The Petitioners have now twice fully demonstrated the inadequacy of the 18 dBW EIRP limitation on response station power proposed in the *NPRM*.[17] CTN, however, continues to contend that "[s]ince there is no reason why response

---

[16] The Petitioners must respond to CTN's accusation of that the Petitioners engaged in "name-calling" for having pointed out in its March 6th filing that CTN has substantially changed its position regarding the mandatory "guardband." The record is clear that CTN most certainly has changed its position on just how a guardband would operate. In its initial comments in response to the *NPRM*, CTN clearly and unambiguously proposed that no response station could operate within 6 MHz of an ITFS station, regardless of whether that ITFS station was actually being used for ITFS or commercial transmissions. Specifically, CTN stated that "[t]o provide a 6 MHz guardband for Plan B, upstream transmissions in the 2.5 GHz band could simply be restricted to the 36 MHz of spectrum identified as E2, E3, E4, F1, F2, F3."CTN Comments, at 18. Similarly, the engineering statement accompanying those comments states that "if there were an ITFS D-Group in the area," "MDS Channel E1 would be precluded from upstream operations because of the requirement for a 6 MHz guardband to ITFS Channel D4." CTN Comments, Engineering Statement, at ¶ 15. In CTN's Reply Comments in this proceeding, however, it substantially departed from that position, and now contends that the guardband should only be required if the adjacent channel is used for downstream transmission of ITFS programing, but not if the adjacent ITFS channel is used for commercial downstream transmissions. Of course, the Petitioners continue to believe that CTN's proposal is unnecessarily restrictive and that no mandatory guardband is required.

[17] *See* Petitioners Comments, at 55-57; Letter from Paul J. Sinderbrand, counsel to (continued...)

stations cannot use 20 dBi gain antennas, the Commission should limit the power of response station transmitters to 18 dBW EIRP as it has proposed."[18] The Petitioners disagree.

In their Comments in response to the *NPRM*, the Petitioners proposed that response station transmitters be limited to a transmitter output power of 2 watts and an EIRP of 33 dBW.[19] Attachment B to those Comments is an analysis prepared by S. Merrill Weiss, *"Power Limitations for Response Station Transmitters: An Analysis,"* establishing that those power levels are more appropriate than the 18 dBW EIRP limitation proposed in the *NPRM*. Of all the parties commenting in this proceeding, only CTN disagreed, contending that Mr. Weiss erred in assuming the use of 10 dBi gain reception antennas at response station hubs when such hubs could "equally well" employ 20 dBi antennas.[20] In their March 6th letter, the Petitioners established that, while it certainly may be that 20 dBi antennas can be used in some cases, to require their use in all cases would seriously compromise the ability of MDS and ITFS licensees to engage in two-way service. The arguments advanced by the Petitioners speak for themselves and need not be repeated here. It is worth noting, moreover, that *were the Commission to impose a +18 dBW EIRP limitation, response station path lengths would be inadequate, even with 20 dBi antennas.*

As was discussed in detail in *"Power Limitations for Response Station Transmitters: An Analysis,"* two-way systems of the type contemplated by the Petitioners will require a reliability of at least 99.99%.[21] Indeed, the Petitioners believe it is most likely that path reliability on the order of 99.999% will be required in order to meet customer needs. Moreover, the Petitioners contemplate that among the various possible modulation types available, QPSK will be the least-dense employed, with more complex techniques deployed for high volume, high speed customers.

Table 1 below illustrates a rather simple fact -- were the Commission to limit response station EIRP to +18 dBW as CTN proposes, response station ranges would be inadequate.

---

[17] (...continued)
Petitioners, to Magalie Roman Salas, at 2-3 (dated March 6, 1998).

[18] CTN Letter, at 10.

[19] *See* Petitioners Comments, at 55-57. (filed Jan. 8, 1998)[hereinafter cited as "Petitioners Comments"].

[20] *See* Reply Comments of CTN, MM Docket No. 97-217, Joint Engineering Statement, at ¶10 (filed Feb. 9, 1998)[hereinafter cited as "CTN Reply Comments"].

[21] Weiss, "*Power Limitations for Response Station Transmitters: An Analysis*," at A3.

even where 20 dBi antennas are employed at response station hubs. Specifically, Table 1 below shows for QPSK, 16-QAM and 64-QAM the distance in miles at which 99.99% and 99.999% reliability can be achieved if response stations are limited to +18 dBW EIRP and 20 dBi response station hub antennas are deployed.

Table 1 — Distance (miles) vs. Availability Using 20 dB Response Station Hub Antennas and +18 dBW EIRP Response Stations

	QPSK	16-QAM	64-QAM
99.99%	13.786 mi	11.578 mi	9.44 mi
99.999%	10.241 mi	7.855 mi	5.959 mi

As can be seen from the table, restricting response station EIRP to +18 dBW would be unacceptable.

As is a matter of record in this proceeding, wireless cable is uniquely positioned to provide two-way wireless broadband services in rural and other under-served areas because, unlike wireless services at 24 GHz, 28 GHz or 31 GHz, wireless cable systems can serve rather large cells.[22] Two-way MDS/ITFS system designers will often be attempting to serve a given systems' 35-mile radius protected service area from a response station hub collocated with the transmission facilities (those avoiding the costs and practical difficulties associated with cellularization). A +18 dBW power limitation would result in inadequate service from response stations. Even under the most favorable conditions (the use of QPSK and a 99.99% reliability objective), the response stations will only have a range of less than 14 miles. When 64-QAM is used and a 99.999% reliability required, the path length drops to less than 6 miles. In short, adoption of an +18 dBW EIRP would cripple the ability of response station hub performance over a 35-mile service area.

* * *

In conclusion, the Petitioners can only reiterate that, because the wireless cable industry will invest hundreds of millions of dollars in the deployment of technologically-advanced two-way wireless broadband systems, it has taken great care to propose rules that assure that two-way systems will provide highly-reliable, interference-free service. At the same time, those proposed rules seek to break from the past, when wireless cable operators and educators have

---

[22] Letter from Andrew Kreig, President of Wireless Cable Ass'n Int'l, to Chairman William E. Kennard, MM Docket No. 97-217 (dated April 24, 1998).

been unable to rapidly respond to changing conditions due to application processing backlogs. Foreshadowing recent initiatives by the Commission in other services, the proposed rules rely upon MDS and ITFS applicants to carefully engineer their proposed systems, free scarce staff resources from unnecessary, but time-consuming processing of routine applications, and call for swift and sure enforcement of the Commission's rules when impermissible interference does occur. It is time for the Commission to move forward with the adoption of the Petitioners' proposals, which have drawn the support of the vast majority of commercial and educational licensees and equipment manufacturers participating in this proceeding.

Respectfully submitted,

Paul J. Sinderbrand

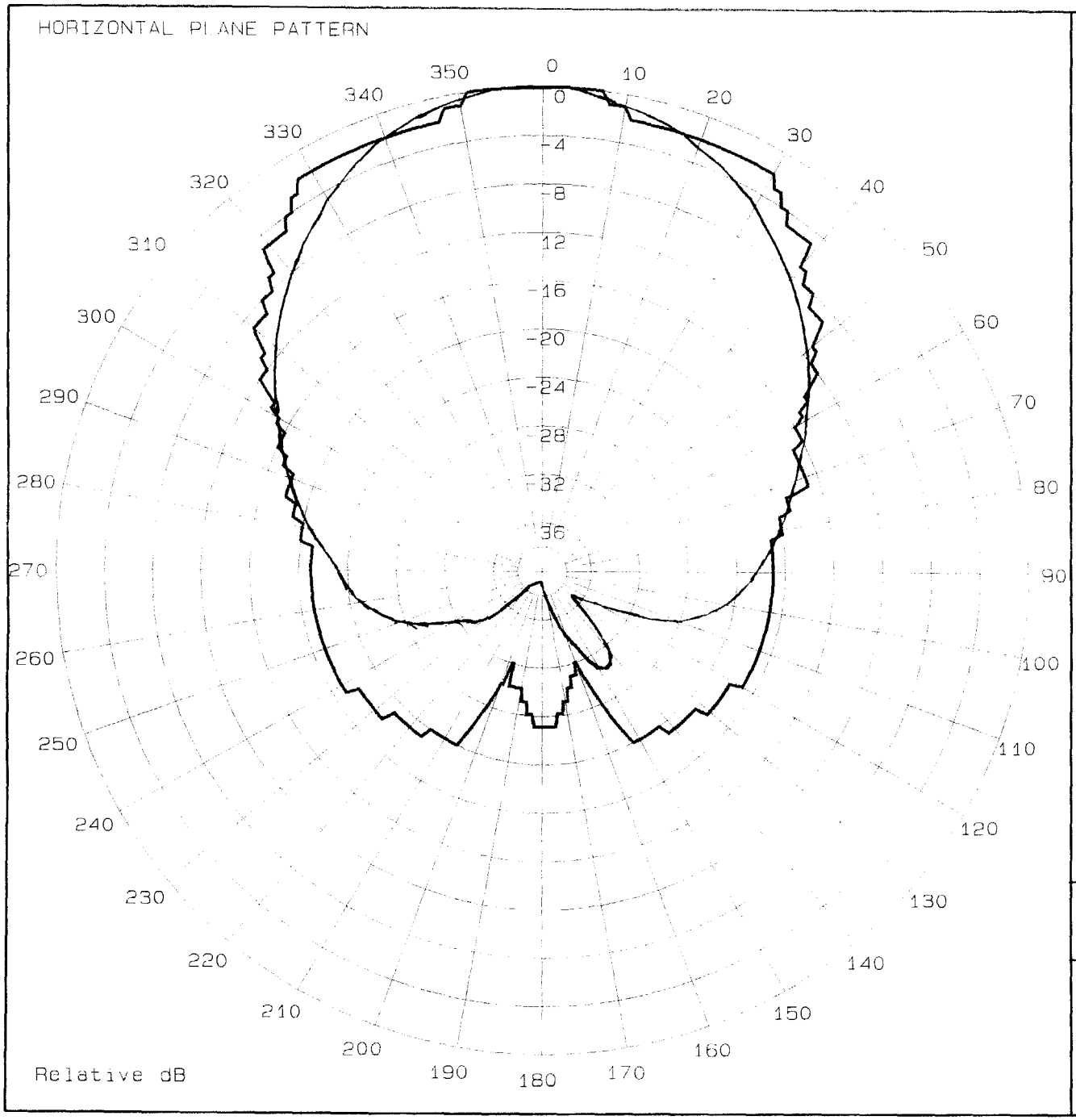
Counsel to the Petitioners

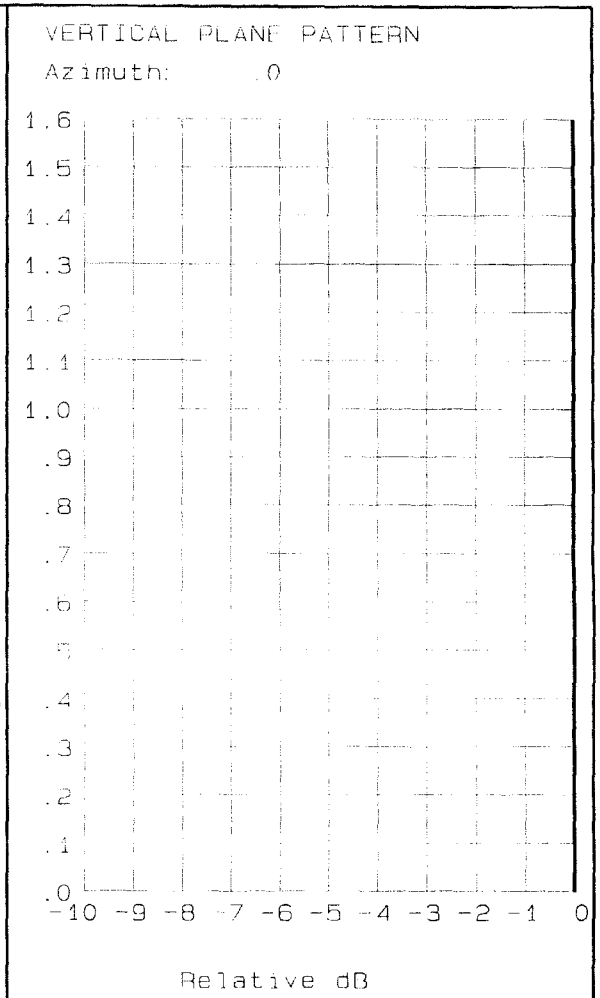
Attachment

cc: Hon. William E. Kennard
Hon. Susan Ness
Hon. Harold Furchtgott-Roth
Hon. Michael K. Powell
Hon. Gloria Tristani
Roy Stewart
Barbara Kreisman
Charles Dziedzic
Michael Jacobs
Joseph M. Johnson
Keith Larson
David Roberts

CONIFER DL 2400

CHANNEL MASTER 4331





Pattern file: d:\temp\cm4331.edx