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MAR 25 1993

FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

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

In the Matter of )  
 )  
Amendment of Parts 5, 21, 22, 23, 25, ) RM-8165  
73, 74, 78, 80, 87, 90, 94, 95 and 97 )  
of the Rules to Establish a Radio )  
Astronomy Communications Zone in )  
Puerto Rico )

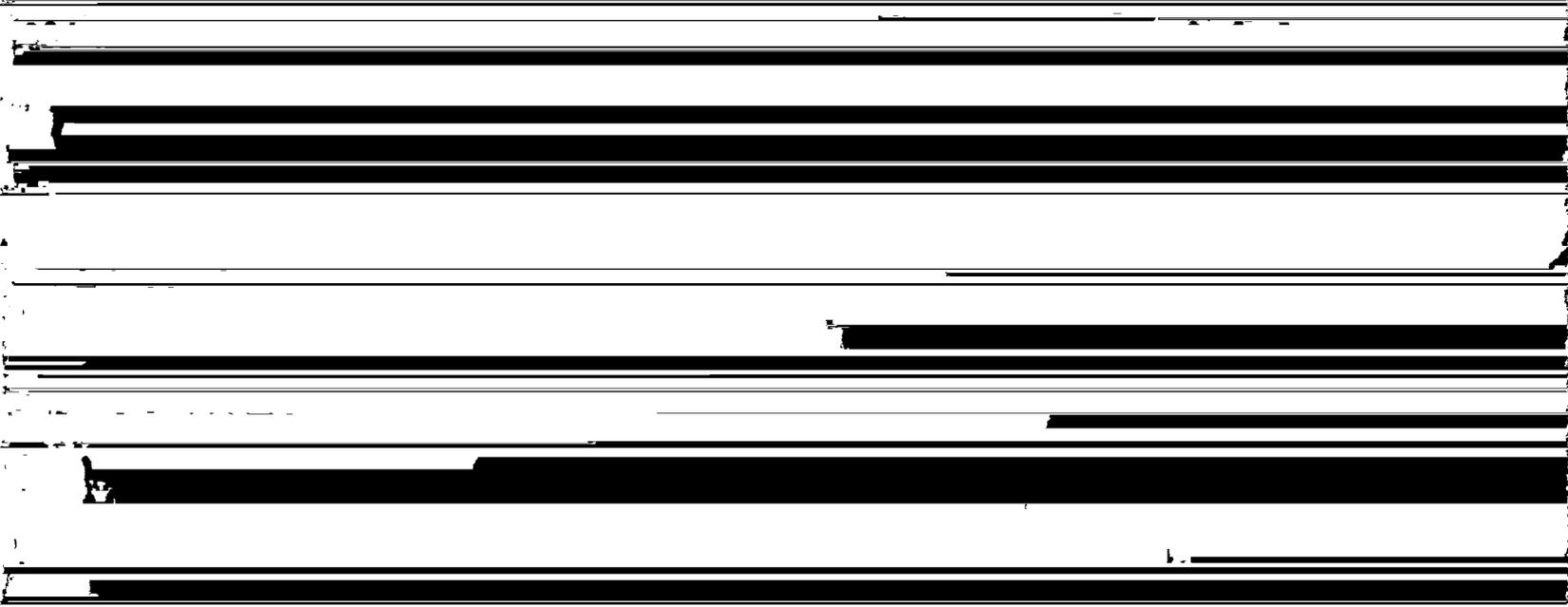
TO: The Chief, Policy and Rules Division

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COMMENTS OF  
THE ASOCIACION DE RADIODIFUSORES DE PUERTO RICO

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Christopher D. Imlay  
BOOTH, FRERET & IMLAY



## SUMMARY

The Asociacion de Radiodifusores de Puerto Rico (the Radio Broadcasters Association of Puerto Rico, or "PRBA") submits its Comments in response to a Petition for Rule Making filed November 30, 1992 by Cornell University.

The Cornell petition seeks to establish a notification procedure for virtually all new FCC licensed communications facilities in Puerto Rico and any modification of existing facilities. PRBA, the principal representative of radio broadcasters in the Commonwealth of Puerto Rico, opposes the Petition and requests that it not be considered the basis for further rule making. The Petition seeks to establish a de facto spectrum reallocation throughout Puerto Rico at variance with the degree of protection afforded the Arecibo Observatory under the Table of Frequency Allocations. The notification procedure would provide a distinct burden for telecommunications facilities in Puerto Rico and the Observatory cannot become the determining factor by which the merits of existing or future radio communications facilities affecting the social and technological development of the Commonwealth of Puerto Rico are judged.

There are reasonable alternatives to the proposal and the Petition contains no objective standards for determining the existence of interference. Accordingly, the Petition is defective and should be dismissed forthwith.

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COMMENTS OF  
THE ASOCIACION DE RADIODIFUSORES DE PUERTO RICO

The Asociacion de Radiodifusores de Puerto Rico (the Radio Broadcasters Association of Puerto Rico, or "PRBA"), by counsel and pursuant to Section 1.415(a) of the Commission's Rules [47 C.F.R. §1.415(a)] hereby respectfully submits its comments in response to the Petition for Rule Making (the Petition) filed on or about November 30, 1992 by Cornell University (Cornell) and placed on public notice January 19, 1993.<sup>1</sup> In response to the petition,

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<sup>1</sup> Comments on this petition were, thus, due February 18, 1993, and reply comments due March 5, 1993. However, these comments are filed contingent upon a grant of a motion for leave to submit late-filed comments, submitted to the Commission March 12, 1992. In that motion, PRBA noted that its representatives had sent to the Commission, via Federal Express on February 17, 1993, a letter requesting leave to submit comments out of time, but that letter was apparently misplaced and no action was taken thereon. In addition, coordination of these comments between PRBA, counsel for PRBA, and its consulting engineer, John F.X. Brown, P.E., has taken additional time. It is respectfully requested that these comments be received and considered with the rest of the docket material. PRBA, of course, expects that Cornell will submit a reply to these comments, and will agree to whatever time is required for it to do

which seeks to establish a notification procedure for virtually all new FCC-licensed communications facilities in Puerto Rico and any modification of existing facilities, PRBA states as follows:

### I. Interest of PRBA

1. PRBA is the principal representative of radio broadcasters in the Commonwealth of Puerto Rico. The instant petition was discussed at the February and March monthly meetings of PRBA. A committee was established to express to the Commission the views of PRBA and its members to the Commission. The members of the committee include numerous professional engineers regularly engaged in the practice of radio engineering in Puerto Rico.<sup>2</sup>

### II. Introduction

2. Puerto Rico is, as recognized by Cornell, a relatively small island, approximately 100 miles by 35 miles. It is obvious

Cornell of any and all new or modified communications facilities in the entire Commonwealth of Puerto Rico, and its surrounding islands, which are highly populated and include large urbanized areas. The petition seeks to establish a Radio Astronomy Communications Zone in Puerto Rico, thus to require written notification to the Arecibo Observatory, operated by Cornell, of the proposed facilities or modification of existing ones. Such notification would include all technical information necessary for the Arecibo Observatory to determine whether the construction or changes might, based on some unspecified criteria, cause harmful interference to the radio astronomy facility. If so, the Observatory would be able to file objections (apparently petitions to deny the application) within 20 days of the notification. The Commission would then adjudicate the matter.

3. Cornell has described the Observatory, its importance to scientific research, its achievements, its geographical location, terrain, and it claims that the site "has direct line-of-sight (or "nearly" line-of-sight, whatever that means) to 70 percent of the island territory. This claim has been drawn into question by the Society of Broadcast Engineers, in comments and terrain profile graphs previously submitted in this proceeding. Cornell also describes the remedial already in progress to broaden the

III. The Petition Seeks to Establish a De Facto

radio astronomy frequency allocations.<sup>3</sup> Its petition suggests restrictions grossly in excess of what is justified by Cornell.<sup>4</sup>

5. It is of course true that the Observatory would have the right to learn for itself of applications for new or modified facilities which it may find objectionable absent the proposed notification procedure. The establishment of such a notification procedure, however, is in and of itself an acknowledgement that there is some entitlement to protection, outside the frequency bands allocated by international treaty to radioastronomy, from Commission licensees. No basis for such preferred status is contained in the four corners of the Cornell petition, however.

6. Neither is there stated in the petition a proposed means of evaluating a particular application. It is anticipated, from a review of the petition, that Cornell would judge an application with a very conservative eye, since it measures up to the 16th harmonic of FM stations, and the Observatory is admittedly affected by emissions well below the maxima for communications facilities

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<sup>3</sup> It is assumed for these purposes that Cornell is not attempting to claim that it is entitled to any protection at all from interference on frequencies allocated to radio services other than radioastronomy. If it is, its petition is not in proper form, as it would under those circumstances be asking for amendment of the table of allocations, Section 2.106 of the Commission's Rules, which is not requested in its petition. Passive experiments by the Observatory, while perhaps scientifically useful, are nonetheless not entitled to any protection from licensed radio services operating in accordance with FCC rules in authorized frequency

under Commission rules. The potentially extreme demands of Cornell are revealed throughout its proposal, and perhaps highlighted by the proposed inclusion of Culebras and La Mona Islands, 153 km. (95 miles) and 123 km. (76 miles) away, respectively, from the Observatory. Without any technical justification for the proposed restriction, or any basis for determining how an application would be evaluated if notification is given by a particular licensee, the petition is, on its face, deficient and not subject to further action, pursuant to Section 1.405 of the Rules [47 C.F.R. §1.405] because it fails to disclose sufficient reasons in favor of the action proposed.

7. Meanwhile, the proposal provides a distinct burden for all telecommunications facilities in Puerto Rico. Because Cornell will continue to utilize increasingly sensitive receiving instruments as technology evolves, and because the already mature telecommunications structure in Puerto Rico continues to improve and expand, these conflicting demands will continually be at odds. The predictable result of grant of the instant petition will be that, in practice, Cornell will have a blank check to approve or disapprove future communications development in the entire territory of Puerto Rico. It is not the policy of the United States to relegate Puerto Rico's communications infrastructure to levels of development below that in the states, nor to permit de facto reallocation of radio spectrum on a wholesale basis to a radio observatory. This is especially true where the only effect of the denial of the petition, according to the petitioner, is the

possibility that the observatory will have to make measurements twice, to assure that test results are not skewed by terrestrial radio noise. This it will have to do regardless, inasmuch as the possibility of aeronautical, marine, terrestrial mobile, and intermittent fixed spurious radio noise cannot be eliminated.

8. While the Arecibo Radio Observatory, which has certainly benefitted from the favorable topography provided by its site in the Commonwealth, is a valuable scientific tool, it cannot become the determining factor by which the merits of existing or future radio communications facilities affecting the social and technological development of the Commonwealth of Puerto Rico are judged.

#### **IV. There Are Reasonable Alternatives to the Proposal**

9. When the Observatory at Arecibo was constructed in the early 1960s, its structural design was logically based on the known structural technology at the time. The main criteria used in selecting the present site was apparently the unique terrain topography which exhibits a natural parabolic contour of large enough dimensions to facilitate the support of its reflector. Since then, three decades of intense scientific and technological development have elapsed. It is highly likely that the structural demands of the Observatory can be met today by means other than the structural support allowed by the natural terrain, at places that would afford a much more quiet radio environment. The relocation of the Observatory is a more equitable response to the concerns

expressed by Cornell than the disruption of the mature telecommunications structure in Puerto Rico, and the preclusion of the expansion of telecommunications services to the people of Puerto Rico.

10. It is also suggested that Cornell investigate the possibility of completely shielding the receiving platform from external interference. This would appear possible, given the geometry of the site, and of the observatory structure, and would also allow considerably greater protection to the Puerto Rican people from RF radiation from the facility. This, and other alternatives can and should be investigated by Cornell, as in the long run, they offer better solutions to the inevitable future

by a notification requirement. In addition to the foregoing, PRBA has certain specific concerns about the proposal.

12. First of all, Cornell asserts that all that is requested is notification of proposed actions, in order to give the Observatory an opportunity to explore alternatives with affected applicants. It is suggested that these alternatives would include power reduction, site relocation, use of directional antennas and the like, and lead to elimination or sufficient reduction of possible deleterious effects (whatever they may be). This statement is unrealistic in the extreme. It fails to take into account the economic considerations inherent in planning for new and modified broadcast facilities; the serious lack of availability of land in Puerto Rico; the inability of stations to locate wherever might be convenient for the Observatory due to short-spacing and intrusion into protected contours for AM, FM, and common carrier mobile service facilities; and the present state of spectrum congestion, which is extremely limiting already. Of these existing difficulties, perhaps the most limiting is land availability for transmitter sites. There is a statute applicable throughout the

industry, in terms of site location alternatives, that Cornell would appear to assume in its petition.

13. The additional burden and limitations inherent in the Cornell petition will make any planning for new or modified radio facilities in Puerto Rico impossible, or at least much worse than circumstances are now. And it squarely places, as a regulatory plan, all obligation for resolution of claimed, or anticipated interference (again, it is not clear whether this is solely within radioastronomy frequency allocations, or in other frequency allocations of other radio services- an issue Cornell would apparently prefer to be left vague) on the communications licensee. The cost of interference resolution is not something that Cornell is willing to accept, but neither is it willing to declare in advance what it deems acceptable by way of interference (and thus allow a communications licensee to avoid the expense and delay inherent in responding to petitions to deny). It would appear that the Observatory must tolerate interference, even in radioastronomy bands, which is not "harmful interference" as defined in Section 2.1 of the Commission's Rules.<sup>5</sup> See, e.g., Footnote 547 of the Radio Regulations, cited in 47 C.F.R. §2.106. Cornell has not established that it suffers harmful interference from licensed radio services, other than one or two anecdotal incidents which

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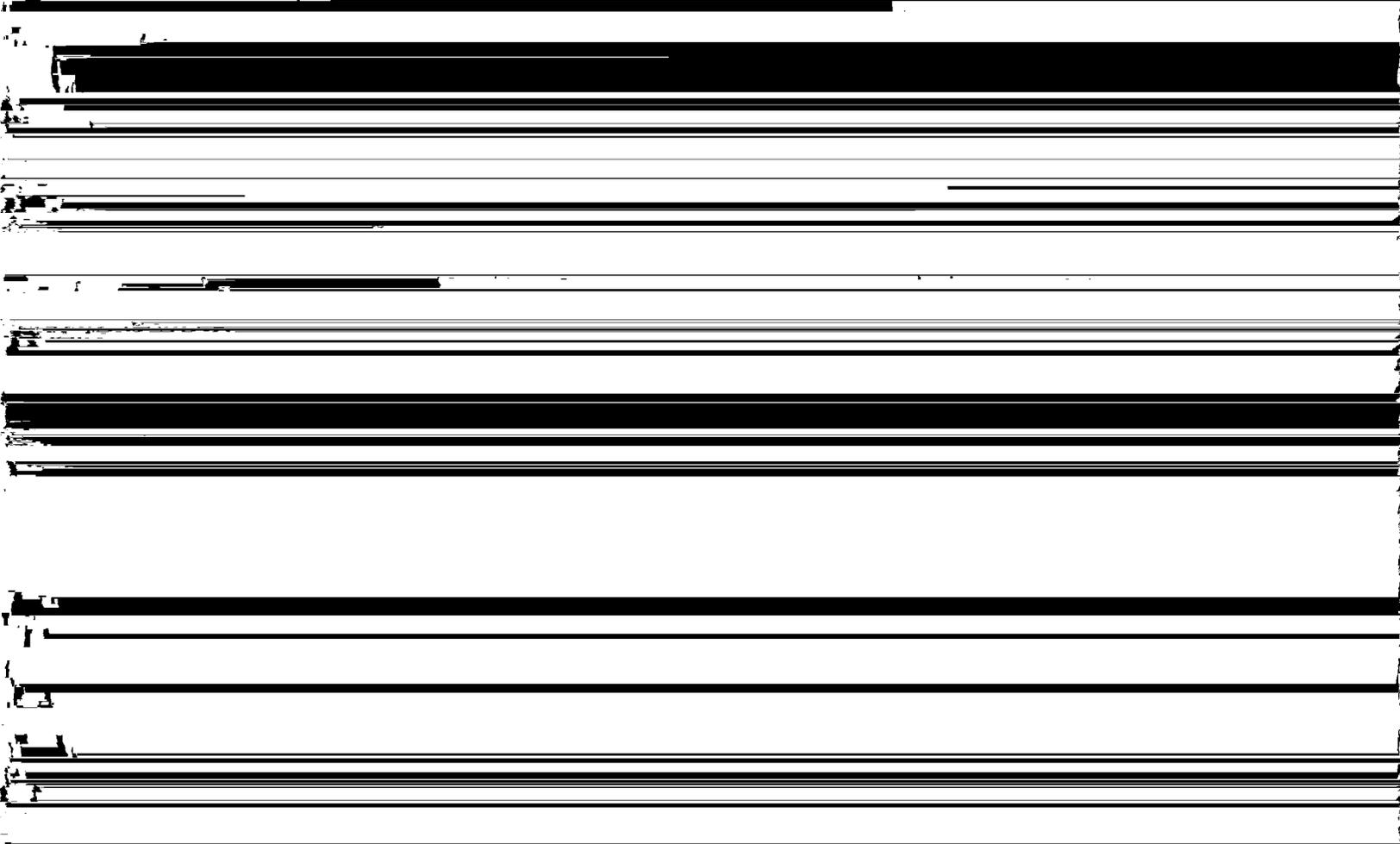
<sup>5</sup> Harmful interference for purposes of radioastronomy is defined as interference which seriously degrades, obstructs, or repeatedly interrupts a radiocommunication service operating in accordance with the International Radio Regulations.

were successfully resolved on an ad hoc basis. There is no justification for the proposed rules contained in the petition.

14. The Cornell petition also contains highly restrictive

broadcast service, and would promote additional, unnecessary delays in application processing. Since there is no real evidence of interference, save for perhaps an immediately adjacent full power television facility, and no indication anywhere in the petition that there is likely to be harmful interference from any given facility, the better route is to address any harmful interference in radioastronomy frequency allocations at such time as any interference is received. The proposed procedure is overkill.

16. Finally, PRBA notes the onset of new technology which promises to revolutionize communications in Puerto Rico and elsewhere, including new digital radio broadcasting techniques, HDTV, and new personal communications systems. To the extent that Puerto Rico is to be restricted in the implementation of these new communications services and techniques in order to protect the ~~inherent~~ interference fears of Campbell is unfair in the extreme to



exists to paralyze the communications industry in Puerto Rico by misdirected efforts to protect the Arecibo antenna. Furthermore, Cornell University, the National Science Foundation, and NASA have the economic and intellectual resources available to protect and enhance the facilities without crippling or impairing other areas of social activity and development. The easy way out for Cornell will in this instance lead to the stifling of human achievement in other areas, and will surely inhibit the dissemination of ideas among the people of Puerto Rico.

18. If, as Cornell asserts, the purpose of the petition is to implement a means of coordination of communications facilities,

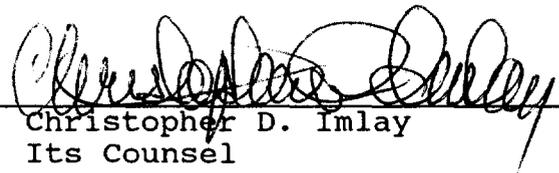
then the interest of relief is unnecessary regulation. The PPR would

focus its attention, and exhaust non-regulatory alternatives to the concerns of the Observatory, such as volunteer frequency coordination with groups of communications licensees such as PRBA, which would provide the Arecibo Observatory with information about new facilities and the ability to contact applicants to resolve any interference concerns on a case-by-case basis, based on agreed-upon standards for determining interference potential.

Respectfully submitted,

The Asociacion de Radiodifusores  
de Puerto Rico

BY

  
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March 25, 1993



ENGINEERING STATEMENT

of

John F.X. Browne, P.E.

on behalf of

Asociacion de Radiodifusores de Puerto Rico

I. Introduction

This engineering statement has been prepared in support of comments to be filed with the Commission by the Asociacion de Radiodifusores de Puerto Rico\* in the matter of Amendment of Parts 5, 21, 22, 23, 25, 73,74, 78, 80, 87, 90, 94, 95 and 97 of the Rules to Establish a Radio Astronomy Zone in Puerto Rico (RM-8165). PRBA is especially concerned about its members' licensed operations under Parts 25, 73, 74 and 90 of the Rules.

The establishment of Radio Astronomy Zone is proposed by Cornell University which operates and maintains the Arecibo Observatory (AO) in Puerto Rico. The proponent seeks to severely limit the construction of new radio facilities (or the modification of existing facilities) by requiring AO approval of such construction prior to the issuance of FCC construction permits. While AO has operated this facility since 1970, it claims that the recent proliferation of radio broadcast facilities has caused numerous cases of interference to its ultra-sensitive receiving equipment.

II. The Petition Does Not Set Forth the Basis for Its Claims of Interference

The petition only alludes to the existence of "interference" from sources such as the "13th - 16th" harmonics of FM stations, the GPS satellites and the second harmonic of a TV station. It does not quantify these "interfering" signals as to level and impact on the research activities of AO.

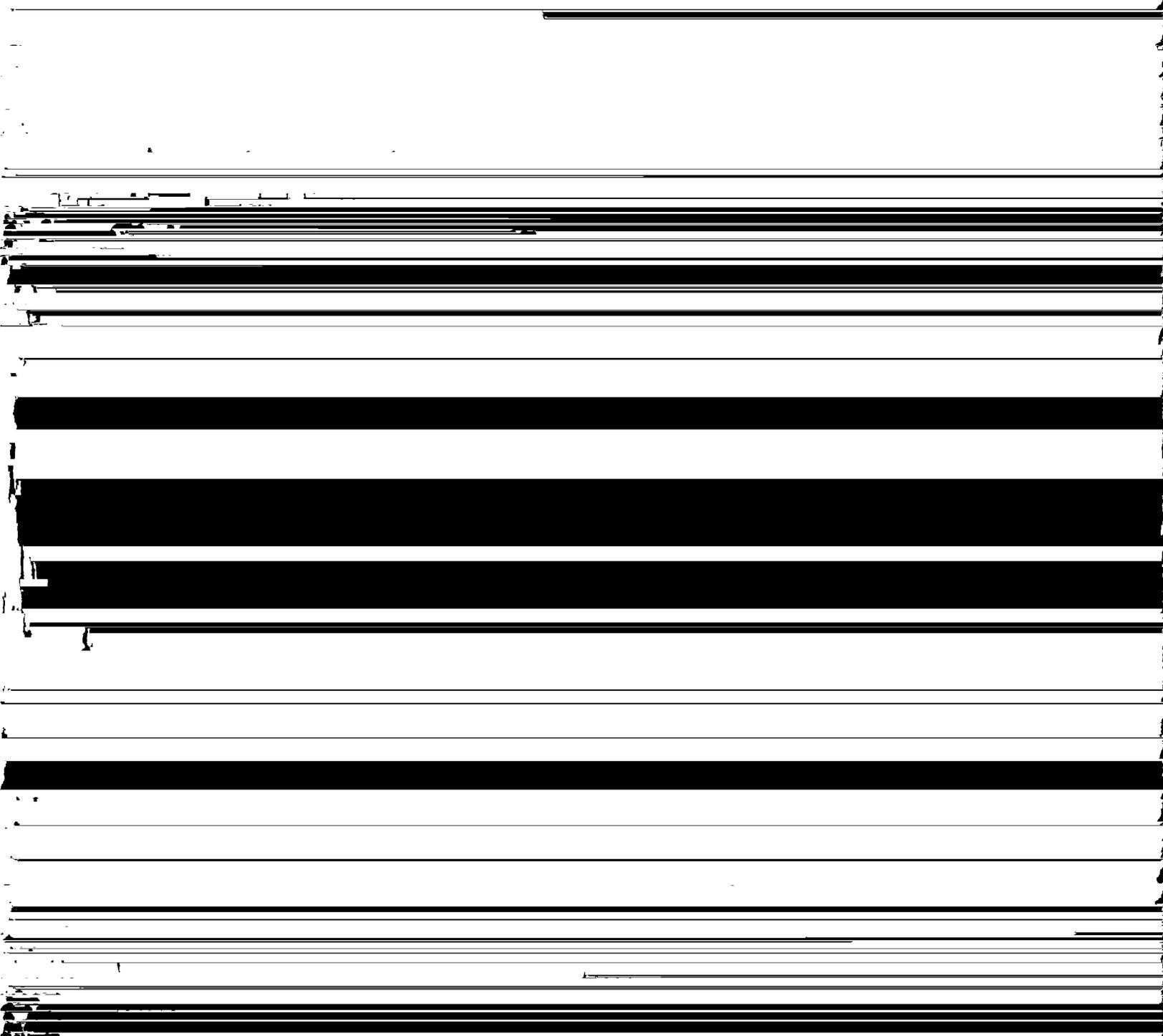
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\* The Radio Broadcasters Association of Puerto Rico (PRBA)

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The FCC tables of allotments for FM and TV stations have been extant for decades with little significant change. Furthermore, as Cornell notes, the utilization of these allotments creates a very high density of broadcast facilities in Puerto Rico. This development is very mature and few changes of any significance (at least regarding new facilities) are possible due to

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not create a higher RF level in the band of interest. For example, an FM station located in the Arecibo area is now placing a quantifiable power flux density over the AO site and, therefore, if an FM station in Ponce or Fajardo changes site or even increases power it is highly unlikely that it would exceed the PFD created by the Arecibo station. Thus, one approach to this issue might be the establishment of current maximum RF levels placed over the site in each band\* as the threshold criteria for determining whether Cornell/AO would have to be notified of a proposal for a new or modified facility.

It must be emphasized that PRBA is suggesting only that it would have no objection to a notification condition; it is not suggesting that any rights be conferred to the AO in terms of its ability to "approve" such proposals or to enter formal objections absent the adoption of standards which are based on documentatable interference criteria.

V. The Petition Does Not Adequately Address Solutions to Spurious Signal Problems

Assuming, arguendo, that the broadcast transmitters could cause deleterious effects at the AO receiving equipment, it is clear that these effects would be the result of spurious products emanating from the transmitter (such as, harmonics or other out-of-band products) and not the carrier frequencies. Such spurious signals can be readily addressed by commercially available filters which provide large values of attenuation (e.g., bandpass filters used for Channels 14 and 69 provide attenuations in excess of 100 dB in adjacent land mobile bands). ~~Thus, solutions such as power reductions, site re-directional~~



VI. PRBA Members Would Be Willing to Permit Cornell to Install Filters on Their Transmitters to Mitigate Any Concerns Regarding Out-of-Band Spurious or Harmonic Signals

Cornell alludes to the rather significant improvements now being made to its antenna feed systems which allegedly will make them immune to the direct impact of signals above 300 MHz. However, it does not quantify these improvements which could, it seems, eliminate most of the concerns it seems to have regarding spurious signals from FM and TV broadcast facilities; if true, this would also eliminate the need for this rule making proceeding.

In the interest of assisting AO with its scientific mission the members of PRBA would cooperate with Cornell in permitting appropriate filters to be installed on their transmission equipment provided, of course, that such filters did not impair the broadcast signals nor cause any parameter variation which would be non-compliant with FCC Rules and Regulations. PRBA members would assist in planning the installation of such filters but all other costs associated with procurement, installation, testing and maintenance would have to be borne by Cornell.

VII. The Petition Neglects to Discuss the Potential Impact of its 7,900 Gigawatt Peak S-Band Transmissions on the Proposed Use of the 2300 MHz Band for Digital Audio Broadcasting

Cornell states that its 2300 MHz transmissions use a peak power of nearly 8,000 gigawatts\* ( $7.9 \times 10^{12}$  Watts). Since the Commission has proposed that digital audio broadcasting be relegated to this band any further rule making proceedings should include an analysis of the impact of the AO signal on DAB services.

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\* This is obtained from a 500 kW transmitter feeding the AO antenna which has a gain of 72 dB. Even with stated side lobe gains in the order of 70-80 dB below peak gain, the AO antenna would place a 50 kW - 500 kW signal on the horizon.

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VIII. Conclusion

For the reasons stated, the Cornell proposal should be rejected as presented  
it is devoid of specificity, does not address rather obvious solutions, if

**CERTIFICATE OF SERVICE**

I, Margaret A. Ford, Office Manager of the law firm of Booth, Freret & Imlay, do certify that copies of the foregoing COMMENTS OF THE ASOCIACION DE RADIODIFUSORES DE PUERTO RICO were mailed via U. S. Mail, postage prepaid, first class, this 25th day of March, 1993, to the offices of the following:

Christopher J. Reynolds, Esquire  
Post Office Box 2809  
Prince Frederick, MD 20678  
Counsel for Cornell University

  
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Margaret A. Ford