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ROSENMAN & COLIN LLP  
1300 19TH STREET, N.W.  
WASHINGTON, D.C. 20036

TELEPHONE: (202) 463-4640  
FACSIMILE: (202) 429-0046  
WEB SITE: <http://www.rosenman.com>

November 22, 1996

FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF SECRETARY

NEW YORK OFFICE  
575 MADISON AVENUE  
NEW YORK, NY 10022-2585

William F. Caton, Acting Secretary  
Federal Communications Commission  
Washington, D.C. 20554

NEW JERSEY OFFICE  
ONE GATEWAY CENTER  
NEWARK, NJ 07102-5397

Re: **MM Docket No. 87-268**  
**Advance Television Systems**

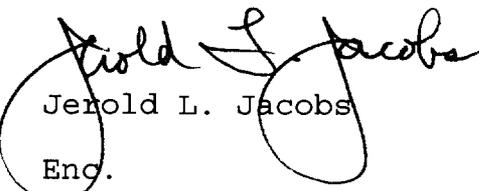
SPECIAL COUNSEL  
JEROLD L. JACOBS

Dear Mr. Caton:

On behalf of our client, Island Broadcasting Co., transmitted herewith for filing are an original and nine (9) copies of its "Comments of Island Broadcasting Co." in response to the Sixth Further Notice of Proposed Rule Making in the above-referenced Docket.

Please direct any communications or inquiries concerning this matter to the undersigned.

Very truly yours,

  
Jerold L. Jacobs

Enc.

cc: Keith A. Larson, Assistant Chief  
Saul Shapiro  
Roger Holberg  
Robert Eckert (All FCC - By Hand) (All w/enc.)

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

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FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF SECRETARY

In the Matter of )  
)  
Advanced Television Systems )  
and Their Impact Upon the ) MM Docket No. 87-268  
Existing Television Broadcast )  
Service )

TO: The Commission

**COMMENTS OF ISLAND BROADCASTING CO.**

**ISLAND BROADCASTING CO.** ("Island"), licensee of Low Power Television ("LPTV") Stations WXNY-LP, Long Island City, New York, WNYX-LP, Plainview, Hicksville, and Mineola, New York, and WNXV-LP, Brownsville, New York, by its attorneys, pursuant to §1.415 of the Commission's Rules, hereby submits Comments on LPTV-related aspects (specifically Paragraphs 70 and 71) of the Sixth Further Notice of Proposed Rule Making, 11 FCC Rcd 10968 (1996). In support whereof, the following is shown:

**INTRODUCTION**

Island and its Technical Director, Richard D. Bogner, have previously filed comments in this Docket on several occasions, focusing on ATV allotment and assignment policy and methodology questions, especially as they relate to how the Commission can maximize the number of LPTV stations that will receive ATV (or, now, DTV) allotments in the forthcoming DTV Table of Allotments. Since 1985, Island has been providing a diverse array of live creative LPTV programming to ethnic and minority viewing audiences in the New York City metropolitan area and Long Island via what are now three LPTV stations. In addition, Mr. Bogner is well-known as a master designer and former manufacturer of broadcast antennas (the "Bogner" in Bogner Broadcast Equipment Corp.). He also has participated in Commission rule-making and broadcast application proceedings and in broadcast trade association advisory groups for many years.

Island's Comments herein reflect a combination of its practical experience as an LPTV licensee and of Mr. Bogner's extensive technical involvement with the entire broadcast spectrum. Moreover, consistent with previous Commission policy pronouncements, Island takes seriously, and unabashedly supports, the Commission's efforts to "save LPTV," even as it marches forward in this proceeding with primary focus on full power television's transition to DTV.

## **PROPOSED CHANGES IN UHF-NTSC TABOOS FOR LPTV**

The planned two step conversion to DTV, coupled with the repacking plan to ch 7-51 only, place an absolute priority on optimum use of every Hz of spectrum. We can no longer afford blanket, super-safe taboos! It is necessary to carefully analyze every part of every restriction placed on use of all spectrum. If it can be shown to be "probable" that no interference will occur, or no "meaningful" interference will occur, an LPTV should be given the right, at the full risk of the LPTV, to "test the waters". This is especially true since 1) any interference found will be reduced or eliminated quickly by one means or another, (ultimately by the LPTV going off), and 2) any small interference will end when the interim period ends.

About thirty UHF-TV channels can be received regularly in the N.Y. City area, and a very large number of taboo violations exist. Many of these are significant and affect full power stations as well as low power stations. However, reception tests show very little evidence of interference, and what is seen is minor, especially using newer receivers. It is recommended that certain taboos be modified, or reinterpreted on a case by case basis, and these will now be discussed.

### **1) adjacent channel taboo**

Eleven pairs of adjacent channels can now be received in N.Y. City. Measurements indicate that the currently permitted 15dB maximum difference between adjacent channels is sound, although with weak signals up to 20 dB can be tolerated.

It is proposed that an LPTV application be accepted for filing if the applicant demonstrates that 1) the LPTV signal will not exceed the signal of an adjacent channel NTSC full service station by more than 15 dB in any area in which the full service station signal is significantly received over the air and 2) the LPTV signal will not be more than 20 dB different in level from the signal received by an LPTV operating on an adjacent channel in any area in which the potential victim LPTV is, or is predicted to be, significantly viewed over the air.

It is recognized that colocation, or near colocation, with a full service station may be required, and that the LPTV risks being overwhelmed by the adjacent channel full service station. However, the LPTV must decide if the potential viewership which can receive acceptable picture and sound is sufficient to make it worthwhile. There will be no chance of interference to a full service station.

## **2) oscillator (+7 Channel) taboo**

At least six oscillator taboo violations exist in the N.Y. City area, most involving one low power station, but two of these involve pairs of full service stations (Ch 47 & 54 and ch 43 & 50) which share large coverage areas of significant viewing, and have coexisted successfully for decades.

This interference occurs between two TV receivers tuned to channels 7 apart, the upper channel receiving interference. Current taboos require 100 Km spacing LPTV to full service, and significant LPTV to LPTV separation between stations. Tests indicate clearly that newer receivers radiate much lower signal levels; for example a new medium screen size Sony receiver shows no interference whatever to adjacent receivers set seven channels higher (at UHF). This oscillator interference only exists when older receivers are physically close (e.g. under 50 feet apart) and receiving over the air signals seven channels apart, and even then the interference is minor.

It is proposed that this taboo be eliminated for LPTV to LPTV (or an LPTV station be given the option to "accept" such interference). It is also proposed that an LPTV application be accepted for filing if the applicant demonstrates that a full service station seven above is not significantly viewed over the air in the area in which the LPTV applied for is likely to be significantly viewed over the air. Based on the above, there is negligible risk, and the probability of interference will diminish as newer receivers are used.

## **3) Aural Image (-14 Channel) taboo**

Six examples exist in the N.Y. City area wherein major areas of coverage exceed the permitted 23 dB aural image taboo by a large amount. Two of these (ch 68 & 54 and ch 55 and 41) involve full service stations, the others low power and full service stations. Of particular interest is low power ch 17 located 4 1/2 miles from full power ch 31. Measurements were made at various power levels with ch 17 at least 33 dB below ch 31, with no evidence of interference. Similar results were obtained with the two sets of full service channels cited above. It is difficult to achieve a difference greater than 33 dB and still have good clear sound on the weaker signal, but tests are continuing to achieve larger values than 33 dB.

It is proposed that this taboo be eliminated for LPTV to LPTV, (or an LPTV station be given the option to "accept" such interference). It is also proposed that an LPTV application be accepted for filing if the applicant demonstrates that a full service station on a channel 14 below will not be more than 33 dB (more if later demonstrated

to be acceptable) lower in received level at any location at which significant over the air reception of the full service station is probable. Here also the probability of interference is small, and possibly can be corrected if both stations are actually broadcasting.

#### 4) Intermodulation (+/- 2,3,4,5 channel) taboo

Interference from this source can be created by many combinations of received signals, but the most common and severe is two signal third order intermodulation. This situation has been analyzed and approximate mathematical models derived, from which the current 32 Km taboo was determined. Many channel combinations involving full service station as cause, victim, or both, exist in the N.Y. City area. In some cases interference is predicted and observed; in other cases no interference is predicted and none is observed. An example of the former is full service channels 47 & 50, about 13 miles apart, predicting to interfere strongly at the full service ch 52 B grade, and confirmed by tests (this channel combination also causes interference to full service ch 43 and 54, and low power ch 44 & 53). An example of the latter (i.e. no predicted interference) involves full service ch 50 and low power Channel 53 both received strongly in the city grade area of full service ch 47. No interference was observed on ch 47, as expected from the mathematical analysis (based on FCC Report LAB-74-01 Project Number 2229-63, June 1974; and B.C. Docket 78-253, Sept 1980).

Because the methodology developed in the above referenced reports is supported by tests, and because the example in which no interference was predicted or observed clearly violates the current taboo, it is proposed here that an LPTV applicant be permitted to demonstrate, using these methods, that the specific situation proposed will not cause objectionable interference.

A brief summary of the calculations, based on the above referenced FCC reports, which show that LPTV ch 53 can operate less than 32 Km from full service channel 50 without causing interference, will now be given: W53AA, ch 53, operates on the Empire State Bldg., 13 1/2 miles from full service WNJN channel 50. Since twice the ch 50 visual carrier frequency minus the ch 53 visual carrier frequency equals the ch 47 (WNJU) visual carrier frequency, intermodulation interference is predicted to occur on full service ch 47, and current rules would not permit ch 53 LPTV to operate, even with a waiver request.

Channel 53 operates at 6.8 Kw ERP with an approx. 90 degree beam facing NE, and ch 50 is 13 1/2 miles west of ch 53 and ch 47 is 3 miles south of ch 53. The ERP of ch 50 is 33 dbk at 1000' : ERP of ch 47 is 37 dbk at 1400'. An approximate

determination of potential interference at any chosen location involves determination of the signal levels from each station at that location, using 50/10 curves and the formula  $P=(F \text{ dB} + \text{ERP dbk} - K) \text{ dbm}$  where  $K = -75.1 - 20 \log F \text{ mhz} + 3.3 = -128$  in this case. Using this equation, the P level found for ch 47 is the maximum desired level, and figure 4 b of the second reference is used to determine the maximum level of undesired signal,  $P_u$  (from the "mean" curve). Equation (5) of the same reference states that  $2P_a + P_b = 3P_u$ , and since the factor 2 is here associated with the ch 50 level,  $P_a$  relates to ch 50, and  $P_b$  relates to ch 53. Solving,  $P_{b\text{max}} = 3P_u - 2P_a$ , which gives the maximum allowable level of ch 53 for each case. Four locations were chosen for analysis: 1) 1 mile from ch 47 north toward ch 53, at which  $P_{ch50} = -28\text{dbm} = P_a$ ;  $P_{ch47 \text{ desired}} = 11 \text{ dbm}$  from which  $P_{ch47 \text{ undesired}} = -4\text{dbm}$ ;  $P_b \text{ max.} = 44 \text{ dbm}$ , and  $P_b \text{ actual} = -53\text{dbm}$ , much below maximum; 2) 1 mile from ch50 toward ch53, at which  $P_{ch50} = 7\text{dbm} = P_a$ ;  $P_{ch47 \text{ desired}} = -21 \text{ dbm}$ , from which  $P_{ch47 \text{ undesired}} = -11\text{dbm}$ ;  $P_b \text{ max.} = -47\text{dbm}$ , and  $P_b \text{ actual} = -79\text{dbm}$ , much below maximum; 3) at Queens-Nassau line and Little Neck Bay, in beam of ch53 13 miles away, at which  $P_{ch50} = -39\text{dbm} = P_a$ ;  $P_{ch47 \text{ desired}} = -24\text{dbm}$ , from which  $P_{ch47 \text{ undesired}} = -12 \text{ dbm}$ ;  $P_b \text{ max.} = -42\text{dbm}$ , and  $P_b \text{ actual} = -57 \text{ dbm}$ , much below maximum; 4) 1 mile from ch53 due east, in main beam of ch53, at which  $P_{ch50} = -31 \text{ dbm} = P_a$ ;  $P_{ch47 \text{ desired}} = -3\text{dbm}$ , from which  $P_{ch47 \text{ undesired}} = -6 \text{ dbm}$ ;  $P_b \text{ max.} = 44\text{dbm}$ , and  $P_b \text{ actual} = -24\text{dbm}$ , much below maximum. In all locations, the actual predicted level of  $P_b$ , the signal due to LPTV ch53, is very much below the calculated allowable level to cause intermodulation interference. Two locations were chosen in the ch53 beam, one close and one far, and one location was chosen near ch50 and one near ch47. This is sufficient to show that nowhere will there be predicted intermodulation interference, based on the approximate model used. This proves that the blanket 32 km current taboo is "sufficient but not necessary," and that a case by case study is warranted. The example chosen shows that ch53 will probably not interfere with ch47, confirmed by measurement, despite being only 13 1/2 miles (22Km) from ch50.

In summary, it has been shown that four current taboos governing LPTV-NTSC application acceptability: adjacent channel, oscillator, image and intermodulation, are very likely too strict. In their current blanket form, they are unnecessarily limiting use of spectrum, a situation which can no longer be tolerated. Since any relaxation can easily and readily be remedied if proven improper, it is strongly recommended that the proposals contained herein be adopted as part of the FCC's DTV rules. If the FCC is serious about helping LPTV to survive, it will recognize that these taboo modifications represent essentially no risk to full service operation, but greatly aid LPTV to find alternate channels if displaced.

## TRANSMITTER POWER LIMITS

As stated in our discussion of proposed NTSC taboo changes for LPTV, we can no longer afford the luxury of wasting spectrum with unneeded restrictions. In addition to certain taboos, a totally devastating and totally unnecessary limitation on LPTV operation is the very low permitted transmitter output power (TPO). Since ONLY ERP (effective radiated power, the product of TPO and antenna "gain") governs coverage (and, therefore, interference), full service quite properly limits ONLY ERP. Low power, on the other hand, puts NO limit on ERP, but limits TPO severely.

It is essential that the subtle, esoteric, but enormous, difference this makes on the ability of LPTV to use spectrum be understood. In the face of the new DTV service and the second channel, use of an adjacent channel, both NTSC and DTV, is the last remaining hope for LPTV to remain a large, viable service. It is accepted that an LPTV colocated, or near colocated, with an adjacent NTSC or DTV channel can survive the interference from this adjacent channel if the LPTV is no weaker than 15 to 20 db below it. (There is virtually no chance that an LPTV could, or would be permitted to, interfere with a full service NTSC or DTV adjacent channel.)

Present taboos do not permit this collocation, and, more important, do not in practice allow the LPTV to be within the required 15 to 20 db of the full service adjacent channel. This is because, to achieve a high ERP with a limited TPO, an LPTV must use a very high gain antenna. Such an antenna is very large, very expensive, and has either narrow sector coverage, or a narrow vertical beam, or both. An LPTV operator cannot afford such an antenna, cannot find or afford a tower to hold it, and cannot live with the severe coverage restrictions of narrow beams; these beams not only cut the area covered, but reduce the signal within e.g. 10 miles of the antenna, something full service can well afford but LPTV cannot.

If LPTV was allowed a larger TPO, but still, of course, was held strictly to the same interference standards as now, LPTV could easily, in many cases, raise the close-in received power level so that it could operate and survive colocated with adjacent full service channels. This spectrum is now being totally wasted, for no valid reason. The FCC can easily see to it that no increase in potential or real interference is permitted, since the FCC must, of course, approve every application. And, obviously, any interference found can summarily be eliminated. If the FCC means a word of their promise to LPTV, they will raise the TPO limit.

## PROPOSED TABOO AND POWER LIMIT RULE CHANGES

Based on the above discussions, specific rule changes are recommended below. It is believed that adoption of these changes will greatly improve the survival probability of many, if not most, potentially displaced LPTV licensees & permittees without causing any noticeable additional interference to NTSC or DTV full service TV operations in areas where they are or will be significantly viewed directly over the air.

### 1) ADJACENT CHANNEL (+/- 1 CHANNEL) PROPOSAL

An application for an NTSC LPTV or translator station will not be refused acceptance for filing due to the proximity of an NTSC license or CP on an adjacent channel if it is shown that the signal received from the proposed LPTV or translator will never be greater than 15db above the signal received from the NTSC adjacent channel at any location in which the NTSC adjacent channel is significantly viewed directly over the air.

### 2) OSCILLATOR (+7 CHANNEL) PROPOSAL

An application for an NTSC LPTV or translator station will not be refused acceptance for filing due to the proximity of an NTSC full service license or CP on a channel 7 above the LPTV/translator if it is shown that the NTSC full service station is not, or predicts not to be, significantly viewed directly over the air in the area in which the LPTV/translator is predicted to be significantly viewed directly over the air.

### 3) AURAL IMAGE (-14 CHANNEL) PROPOSAL

An application for an NTSC LPTV or translator station will not be refused acceptance for filing due to the proximity of an NTSC full service license or CP on a channel 14 below the LPTV/translator if it is shown that the full service station is not predicted to receive a signal lower than 33db below the LPTV/translator predicted received signal level in any area in which the full service station is, or is predicted to be, significantly viewed directly over the air.

### 4) INTERMODULATION (+/- 2,3,4,5 CHANNEL) PROPOSAL

An application for an NTSC LPTV or translator station will not be refused acceptance for filing due to the proximity of a full service NTSC station on a channel 2,3,4 or 5 above or below the LPTV/translator, if it is shown that two channel third order intermodulation products predict to be below the maximum allowable level, calculated based on the procedure outlined in B.C.Docket 78-253, Sept. 1980 using the mean curve

of Fig. 4b, at every location at which a potential victim channel is significantly viewed directly over the air.

#### 5) ERP LIMIT PROPOSAL

An application for an NTSC LPTV or translator will be accepted for filing with the only power limitation being specification of an ERP value in any azimuth or elevation direction which is no greater than 3 KW for low VHF, 10 KW for high VHF, and 150 KW for UHF, and meets all other interference criteria then in effect and not waived. However, such interference shall not be avoided by a predicted signal level more than 30db lower than the maximum ERP proposed, unless supported by a special showing.

In all of the above, full support for claims by an applicant concerning areas of significant viewership directly over the air, and areas in which a directive receiving antenna can be assumed, must be provided as part of the application. Any interference to a cable head end only may be cured by the LPTV or translator through use of an alternate signal delivery method, at the expense of the applicant.

#### LPTV Stations Adjacent to a DTV Station

Situations will certainly arise where an NTSC LPTV station will be on a channel which is adjacent to a DTV station. Cooperation of the DTV station should be required to minimize the impact of the adjacent channel operation.

##### Maintaining the optimum frequency difference:

The new DTV station should be required to cooperate with the LPTV station to make it possible to maintain the precise frequency separation of the two stations within the 6 Hz tolerance that minimizes the beat between the DTV carrier and the NTSC Color subcarrier which shows up as interference in the NTSC picture. The requirement for cooperation will become most critical when the NTSC LPTV station must operate with a (+) or (-) offset based upon its relationship to some other NTSC station. The DTV station should be required to set its pilot frequency (+) or (-) 10 kHz, as appropriate, from the nominal frequency for its channel. Only in this way can the NTSC station establish the optimum "delta f" from the higher DTV carrier while at the same time satisfying its offset requirement.

Further, the DTV station should be required to cooperate in such matters as locking to an external reference which is also available to the NTSC LPTV station whether this is a frequency source on a collocated site or a more remote source such as a global positioning satellite or Loran station. In short, whatever ground rules are established for the combination of a lower adjacent full service NTSC station and an upper adjacent DTV station should also apply as a minimum requirement when the lower adjacent station is an NTSC LPTV station.

#### DTV Adjacent Channel Spurious Emissions:

In most instances the LPTV station will be considerably lower in power than the adjacent DTV station. Whether the NTSC LPTV station can operate successfully is heavily dependent upon the spurious output energy from the adjacent channel DTV station.

#### Emission Mask of the DTV Station:

The adjacent DTV station should be required to provide the tightest emission mask (minimum sideband spurious energy) that the state of the art allows, and, as the state of the art improves, the DTV station should be required to install available improvements if adjacent channel spurious energy is impacting the NTSC LPTV station.

#### Linearity of the DTV Station:

The out-of-band spurious energy is partly generated by the non-linearity of the amplifiers in the DTV transmitter. Thus the transmitter linearity has a major impact on the adjacent channel spurious energy. If extra suppression of adjacent channel spurious energy is required by an NTSC station, either full service or LPTV, the DTV station should be required to operate with the highest achievable linearity. For instance running the output stage of the transmitter more nearly class A than normal will improve the linearity. However, the transmitter becomes less efficient and generates a larger power bill. A DTV licensee might be reluctant to so operate, but should be required to do so when necessary to protect an adjacent channel station.

Just because LPTV stations are secondary is no excuse for DTV stations not to be required to take all technically feasible measures to minimize interference, going beyond the normally required technical standards in the final FCC DTV rules to a higher performance standard when necessary.

## UHF RECEIVER NOISE FIGURE FOR DTV

We recommend that consideration be given to requiring a lower noise figure for DTV receivers, at least at UHF. The currently assumed value is 10db. Several manufacturers now sell preamplifiers covering the entire UHF band without tuning which are claimed to have noise figures below 3db; these sell for under \$15 in quantity.

A large number of LPTV's which survive cochannel allocations will still face one or two nearby DTV adjacent channel allocations as their major threat. The smaller the ERP difference between the weaker LPTV and the stronger DTV, the more likely the LPTV will be able to tolerate the potential interference from the adjacent channel DTV. Therefore, the lower the allocated ERP value to the DTV for replication of coverage the better from the LPTV viewpoint.

The assumed maximum receiver noise figure is a major determinant of the DTV power required. We suggest that the cost and complexity of reducing the required maximum noise figure of DTV receivers be investigated, and the lowest number be chosen consistent with other factors involved. Every db of reduction in ERP of DTV stations is a big step toward saving low power television, which the FCC is committed to try to do. And the cost may be negligible!

### CONCLUSION

Island urges that it will cost the Commission and full power TV stations almost nothing to implement the above and other similar measures to protect LPTV stations. However, Island submits that the result will undoubtedly be the saving of many licensed LPTV stations, which otherwise would be permanently displaced by the DTV Table of Allotments and forced to cease operations. Such a development would be devastating to the LPTV Service and to its audiences, is contrary to the paramount public interest, and, most importantly, is totally unnecessary. The Commission continues to receive evidence that the LPTV Service is making an invaluable contribution to local community television. It deserves the Commission's maximum preservation and protection efforts as the Commission finalizes the DTV Table of Allotments.

Respectfully submitted,

ISLAND BROADCASTING CO.

By   
Howard J. Braun  
Jerold L. Jacobs

ROSENMAN & COLIN LLP  
1300 - 19th Street, N.W. Suite 200  
Washington, D.C. 20036  
(202) 463-4640

Its Attorneys

Dated: November 22, 1996