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Before the
Federal Communications Commission
Washington, DC 20554

In the Matter of

Amendment of Parts 73 and 74 of the)
Commission's Rules To Establish Rules for) **MB Docket No. 03-185**
Digital Low Power Television, Television)
Translator, and Television Booster Stations)
And To Amend Rules for Digital Class A)
Television Stations)

To: The Commission

REPLY COMMENTS OF GREG BEST CONSULTING, INC

Greg Best Consulting, Inc. ("GBC") hereby submits its reply comments in response to the Commission's Notice of Proposed Rule Making ("Notice") in the above-captioned proceeding, FCC 03-198, released August 29, 2003, and published at 68 FR 55566 (Sep. 26, 2003).

GBC appreciates the efforts that the commenters have made to consider the Commission's NPRM in such detail. These reply comments will set forth GBC's views on proposals made in response to the NPRM and on the NPRM itself.

These comments are again based on the following principles:

A speedy transition of LPTV and Translator operation to digital service

Minimizing the disruption of analog services.

Appropriate NPRM section numbers may be addressed with each reply comment.

Section 12. Comments were made that there is a divergence of the direction of Class A/LPTV and translator functions. GBC acknowledges that there have always been some differences. These differences have to more do with the programming side of the licenses versus the equipment technical characteristics and interference requirements. Therefore, parameters addressing the permissible use of each type of service may need to be separate items or utilize separate rules. However, the technical equipment performance of the equipment and interference issues may be covered under a common set of rules.

Section 13. GBC's earlier comments are echoed here. Based on other comments, GBC would recommend that the commission identify a timeline as they have done for full service TV and organize a transition to DTV for these secondary services. While translators, LPTV, and boosters are considered secondary sources, they provide a great opportunity to become full service broadcasters, and they provide the public with an immense benefit of programming choice.

Section 14. Commenters have agreed on leaving the decision to utilize a digital regenerative translator or digital heterodyne translator to the system designer. GBC believes there is a place for both types of

equipment. Until the price of the regenerative translator is essentially equivalent to the heterodyne translator, the option of a heterodyne has a benefit.

Section 20. The distinction between a digital translator and a digital LPTV station should be maintained. LPTV stations that originate local programming typically add more value to the community of license and therefore could be treated with a higher priority. I believe the definition of a digital LPTV station is one that originates 3 or more hours of programming per day. In general, when two incumbents apply for the same digital channel the LPTV applicant could be given priority.

Section 23-25. I believe that it is acceptable to broadcast "A & S" services along with a free over the air video program but not without it. The use of spectrum for broadcasting has always had a foundation of serving the public interest and without a free over-the-air program, that foundation is lost.

Section 28. I agree with using channels 2-13 and 14 through 69 (except channel 37) for new digital TV stations. For those existing analog LPTV and translator stations operating on channels 52-59, I support allowing existing analog licensees to convert to digital (on channel conversion), and continue the policy of allowing them to operate indefinitely on a secondary non-interfering basis.

Section 28 -30. There is much divergence among commenters on use of channels above 51. The present situation where there are still MX applications in the 52-69 channels from the August 2000 window has exacerbated this concern. The commission must make a serious attempt to resolve this situation. Options include granting no new analog licenses, declaring a time period permitting MX applications to be resolved with the consequence of no new license being awarded if no agreement is reached, reducing CP time down to one year, and others. Applicants for a LPTV analog license have to ask themselves if it makes sense to acquire such a license if analog is disappearing in the near future. Most of the applicants already have existing licenses so it is more likely that they will need to use their financial resources converting existing licenses to digital rather than acquiring more analog licenses.

GBC re-emphasizes its belief that in-core channels are desirable. However, to fit as many digital services in the available spectrum, the FCC should allow the uses of channels above 51. GBC re-emphasizes its belief that the use of these channels will provide benefits of:

- Less channel "churn" and disruption to the public
- N-1 situations for stations to utilize common antennas

GBC believes that if there are problems with interference from secondary services to primary services, the FCC should exercise its enforcement and punitive powers to promptly resolve the situation.

Sections 34-40. GBC re-emphasizes its belief that the protection should be executed on the basis of D/U ratios. I also agree on using the D/U ratios as proposed by Section 38 for co-channel situations. Many commenters have proposed the use of the "simple" mask or the stringent (identified as #1B in the Sgrignoli paper) mask as identified in Sgrignoli's paper. GBC believes that new digital equipment and conversion of analog equipment need to be treated differently.

Commenters have not addressed the fact that a very large portion of the existing analog equipment in the field will **not** meet the requirements of even the "simple" mask due to the transmitter "shoulder" performance. No amount of filtering can practically compensate for the adjacent channel interference introduced by the power amplifier "shoulder" (i.e. 500 kHz segment just outside the digital channel) performance of 30 dB (relative to the flat portion of the 8-VSB spectrum). The evidence of this performance was documented in earlier comments from GBC. So, even assuming the "simple" mask would be adopted, a very large portion of the transmission power amps (which typically is the most expensive part of a transmitter) will have to be replaced. Hence, that is why GBC proposed separate emission masks for existing and new equipment while still adhering to D/U ratios for interference analysis. In other words, if the existing equipment emission mask is met but there is still adjacent channel interference, the power of the offending station must be reduced until the interference is not

predicted to occur. The use of existing equipment is significantly more cost effective rather than requiring new generation power amplifiers to be employed.

Therefore, I believe it is in the public interest for existing licensees who convert an analog license to a digital LPTV or translator license to be allowed to “grandfather” those licenses into the modified emission mask (Figure 10). Some incentive needs to be provided to upgrade equipment as soon as possible to permit more efficient use of spectrum. Therefore I would recommend that this mask would only be available to use for a period of a maximum of 5 years. As an alternative, the license renewal cycle could require a showing that transmission equipment has been upgraded to the New Equipment performance requirements (identified below)

Nearly all present generation translator and LPTV power amplifiers being shipped today are capable of meeting the “shoulder” levels identified in the “Simple” and the “Stringent” Masks. The administration of two emission masks is feasible but complex. The stringent mask provides for more efficient use of spectrum and the ability to allocate more channels. It is proposed that new digital heterodyne translators meet the “Simple” Mask (as defined in the Sgrignoli paper) and that re-generative translators and LPTV transmitter that create the 8-VSB signal from a transport stream meet the “Stringent” (identified as #1B in the Sgrignoli paper) mask. As time goes on, the cost of regenerative translators will drop and the benefits of using all regenerative translators will outweigh any disadvantages so that there could be a “sunset” on the “Simple” mask.

To summarize the emission masks proposed, they are broken down into distinct categories.

GRANDFATHER CONVERSION OF EXISTING EQUIPMENT

Conversion of existing equipment must meet the following mask. (This mask would no longer be valid after 5 years (or at next renewal of the license) of adoption of the rules.)

$$A \text{ (dB)} = 41 + (\square F^2/1.44) \quad \square F \text{ from 0 to 6 MHz}$$

$$A \text{ (dB)} = 66 \text{ dB} \quad \square F \text{ greater than 6 MHz}$$

A (dB) is referenced to the total average power in the 6 MHz channel

EQUIPMENT PLACED INTO SERVICE AFTER ADOPTION OF NEW RULES

New Heterodyne Translators must meet:

$$A \text{ (dB)} = 47 + (\square F^2/1.44) \quad \square F \text{ from 0 to 6 MHz}$$

$$A \text{ (dB)} = 71 \text{ dB} \quad \square F \text{ greater than 6 MHz}$$

New Regenerative Translators and LPTV transmitters must meet:

$$A \text{ (dB)} = 11.5 * (\square F + 3.6) \quad \square F \text{ from 0 to 6 MHz}$$

$$A \text{ (dB)} = 76 \text{ dB} \quad \square F \text{ greater than 6 MHz}$$

$\square F$ is measured from the channel edge

A (dB) is measured relative to the total average power in the 6 MHz channel

Section 41-49

Sections Concerning Interference Prediction Methodology.

Several commenters have supported the use of the Longley-Rice (L-R) interference methodology as described in OET-69. These commenters have also suggested several modifications to the program. GBC supports the suggestions made by du Treil, Lundin, and Rackley regarding shrinking the cell size to 1 km for analysis, including the effects from intermodulation under strong signal situations, and utilizing the maximum ERP at any vertical and horizontal angle. GBC supports other comments to

modify the program regarding the ability to have more applicable default beam tilt values (such as 1 degree), the ability to include a custom vertical pattern (like the horizontal pattern capability), or a method to specify the number of bays that creates a separate default vertical pattern for lowband, highband, and UHF frequency ranges, and a minimum value of non-desired radiation (or null) of 20 dB in both horizontal and vertical patterns. GBC also supports the use of OET-69 interference analysis for analog LPTV and translator analyses.

GBC re-emphasizes its proposal (which is supported by NTA) regarding the use of *de minimus* interference among digital LPTV and translator stations. A 2% *de minimus* interference standard should be applied for digital LPTV and translators into other LPTV and translator stations, analog or digital, to a maximum of 10% interference from all sources including full service stations. It is understood that there are already some stations receiving more than 10 % interference. The use of the *de minimus* interference should apply to "same class" service. In other words, digital Class A to other Class A and digital LPTV/translator to other LPTV/translator stations.

If a combination of full service, LPTV, Class A, and translator stations are already predicted to cause 10% or more interference to a digital LPTV station, then new applicants would not be permitted to contribute any more interference (with the clarification that the FCC rounds the interference--meaning that 0.499 % interference rounds to zero and 10.499 % rounds to 10%). FCC should also amend the class A rules to permit a 2% *de minimus* interference from digital Class A into analog Class A to a maximum of 10% from all sources. GBC also supports the recommendation made to use the existing protected population as a reference base for these calculations.

Section 55. The earlier proposal from GBC can be clarified as within +/-3 seconds of one degree in longitude and the same amount in latitude. If it can be shown that wider distances still allow the TOV, TOA, and DTV threshold limits to be met, then those situations can be granted based upon a waiver.

Section 57. GBC agrees with the position several commenters have made supporting the requirement for an offset for all analog LPTV, Class A, and translator stations. Also, I believe it is beneficial to apply a NTSC into DTV co-channel offset of 28.615 kHz with a tolerance of +/- 1 kHz.

Section 71-79. It is proposed to limit the frequency tolerance of a digital Class A, LPTV, or translator to +/- 1 kHz. Commenters have suggested that the type certification is required. GBC supports that conclusion for modification kits provided by manufacturers. For new digital transmitters, the determination of compliance to the rules will likely be using a narrow range of test equipment and it GBC would propose that type verification can be used instead. For transmitters that are being modified by the user, documentation that the emission mask, power output regulation, frequency tolerance, power metering circuits, method of identification (for translators), etc. must be supplied with the license to cover application, and that the construction permit application document how compliance with the same parameters will be achieved. End users are least likely to have the same sophisticated equipment as manufacturers due to the expense of such equipment. If conversion of existing analog equipment is not done with good engineering practice, there is a greater likelihood of producing interference. So the burden of proof of compliance should be accordingly higher.

Section 85 through 90. A method of identifying the unique digital translator should be required. Methods to accomplish this can be creative and unique but must be identified in the license application if different than currently allowed.

Section 92. Commenters have proposed the "grandfathering" of converted analog equipment via letter to the Commission. GBC observes that without "qualified" personnel verifying that FCC technical performance rules are being met, there is a **much** greater chance of interference. When modifications to existing systems obtain compliance with the proposed grandfathering requirements, it is imperative that a "qualified person" provide evidence that the changes made ensure compliance with the outlined requirements. The major item of concern is the emission mask. Another concern is regarding the phase noise performance of local oscillators within the transmission system.

Section 118-122 Some commenters have proposed the delay of authorizing digital booster stations until a standard for Single Frequency Networks (SFN) or Distributed Transmission (DX) systems can be implemented. GBC supports the establishment of a digital booster service with this NPRM based on booster coverage remaining inside the primary station protected contour. As SFN or DX standards are developed then the commission should determine whether it is appropriate to introduce those standards into the rules and modify the digital booster service rules as required. I believe the same interference technical analysis applied to digital Class A, LPTV, and translators should be applied to applications for digital boosters.

ATTACHMENTS

Figure 10 is a proposed emission mask for “grandfathering” existing equipment

FIGURE 10 Modified “Simple” Mask

