Greg Best
Consulting, Inc.
5541 Vantage Vista Drive
Colorado Springs, CO 80919
719-592-9781

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 Digital Low Power Television, Television Translator, and Television Booster Stations And To Amend Rules for Digital Class A Television Stations	))))))	**MB Docket No. 03-185**

To: The Commission
Reply Comments

The following reply comments are provided on behalf of the University of New Mexico Engineering Staff. As a consultant that assists the University regarding technical and related matters concerning the broadcast industry, these comments will address the recent FCC NPRM identified above regarding digital Low Power Television/Television Translators.

CONTENTS

EXECUTIVE SUMMARY

The University of New Mexico believes the following points should be emphasized as the FCC considers implementation of Digital Low Power TV Rulemaking. The following points take into consideration the following principles:

A speedy transition of LPTV and Translator from analog operation to digital service

Minimizing the disruption of analog services.

The main issues of concern to the University of New Mexico that were highlighted and addressed many times by interested parties in the initial comments sent to the FCC concerning the Digital LPTV NPRM consists of:

- CHANNELS FOR DIGITAL TRANSMISSION USE
- IDENTIFYING PURPOSE AND PERMISSABLE USE FOR DIGITAL TRANSMITTERS AND TRANSLATORS
- INTERFERENCE METHODOLOGY AND HOW TO MAXIMIZE THE NUMBER OF CHANNELS OF THE AVAILABLE SPECTRUM
- TECHNICAL PERFORMANCE OF DIGITAL TRANSMISSION EQUIPMENT
- LICENSING AND APPLICATION PROCEDURES

There are other issues that are included in the NPRM but they are secondary to the ones identified above and it is the opinion of the engineering staff of the University of New Mexico that it is most important to resolve the ones listed. Each issue is addressed individually in the following sections along with some depth of discussion concerning each topic.

KEY ISSUES

USE OF CHANNELS 52-69

It will be extremely difficult to optimize use of the available spectrum during the digital transition given the number of existing analog LPTV, Class A, and translator licensees. All channels including channels 52-69 should be utilized where possible. Those analog stations already operating on channels 52-69 should be allowed to continue to operate on a secondary basis as long as no interference occurs. Use of channels 52-69 should also be allowed for paired digital channels where possible and again assuming operation is on a secondary basis and no interference occurs to primary services whether they are broadcast related or other service providers. When the re-packing of the spectrum allocated to TV broadcasting occurs for the full service TV stations has been completed, then all analog and digital LPTV, Class A, and translators may be moved into the core channels 2-51.

INTERFERENCE WITH OTHER LICENSEES, PERMITTEES, AND APPLICANTS

The FCC has asked for input on the methodology to determine interference. The Longley-Rice Model is a more accurate model than the presently used contour analysis and should be the method used. There are some modifications to the FCC OET-69 program that uses Longley-Rice to make the program more useful for LPTV analysis. The FCC has adopted a new policy regarding interference from full power TV stations to each other that uses a 2% *de minimus* interference allowance per station to a maximum of 10% from all sources. To make optimum use of the spectrum and to fit as many digital LPTV/Translator stations into the spectrum available, it is suggested to apply the same policy concerning interference from digital LPTV/Translator stations into other LPTV/Translator stations up to a maximum of 10%. So in this case, once a LPTV/Translator station has reached the maximum of 10% interference, no new interference would be allowed (i.e. all new interference must be 0.499% or less). It is recommended to utilize this same approach for Class A stations into other Class A stations. Co-located operation of adjacent channel stations should also be considered assuming the required D/U ratios are met as outlined in OET-69.

PURPOSE AND PROGRAMMING FOR DIGITAL TRANSLATORS

A definition consistent with the FCC "vision" is that a digital translator station is one that broadcasts at least one program stream provided by a primary station using the 8 VSB modulation standard. A digital translator will have essentially the same function as an analog translator in that it passes through at least one of the program streams provided by a primary station. A digital translator may choose to pass the entire 6 MHz signal through or it may choose to decode one program stream and to pass it on to its intended audience. Local message insertions should be permitted but not required.

TECHNICAL PERFORMANCE OF TRANSMISSION EQUIPMENT AND CONVERSION OF USE OF EXISTING ANALOG TRANSMISSION EQUIPMENT

Heterodyne And Regenerative Translators and Frequency Tolerance

It is proposed to allow both heterodyne and regenerative types of digital translators. The choice of which type to be used should be left up to the system designer as long as interference and frequency stability requirements are met. KNME-TV highly recommends that a pilot carrier frequency tolerance standard by employed for new digital LPTV/Translators. This tolerance should be the same as specified in the ATSC standards referenced within FCC Rule part 73.682(d) or + or – 1KHZ at the maximum. This standard can be easily accomplished technically. KNME-TV also strongly feels that requiring offsets for existing analog LPTV/Translators should implemented. This could possibly be required upon filing of all applications and/or establishing a future implementation deadline date. Requiring precision offsets for analog co-channel operations will allow additional channels to be employed and further the efficient use of spectrum. Those entities not capable of converting due to budget or not necessary due to very remote and/or low power operations could seek a waiver on a case by case basis.

DISPLACEMENTS

Out of core analog stations

Displacements of existing analog channels should still be given priority. However, KNME-TV feels that those applications filed for new channels in the 2000 window, for out of core analog facilities, and who subsequently have received C.P.'s should not be allowed to displace still pending major change of new applications filed also during the 2000 window for in core channels. To allow this to occur would be penalizing those entities that diligently engineered their applications for in-core channels. Still pending applications need to be protected from spectrum speculators.

Conversion of Existing Equipment.

There is merit in allowing the conversion of analog Class A & LPTV transmitters and translators for digital transmission. It is significantly more cost effective rather than requiring new generation power amplifiers to be employed at all sites. Measurements have been carried out on existing analog LPTV and translator power amplifiers to see if the mask levels indicated in the "Sgrignoli" paper can be met. The performance obtained from most existing translators is about 6 dB short of meeting those mask levels. This means that power must be reduced an additional 6 dB in order to meet interference objectives at a co-located site. The conversion process should require documentation that interference levels will be met when the application is submitted. A less stringent mask is proposed when existing equipment is converted for digital transmission.

New Equipment

The present generation of translator and LPTV power amplifiers is capable of meeting the shoulder level associated with the "Simple" and the "Stringent" Mask. The administration of two emission masks is feasible but complex and requires additional consideration. The stringent mask provides for more efficient use of spectrum and the ability to allocate more channels. In this case, it appears that some distinction can be made between the types of transmission equipment employed. 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" mask (identified as #1B in the Sgrignoli paper). It is estimated that the cost of substituting a filter capable of meeting the stringent mask versus the simple mask is on the order of $700.

To summarize the emission masks proposed, with reference to the total average power in the 6 MHz channel, 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 (dB) = 41 + (□F^2/1.44) □F from 0 to 6 MHz

A (dB) = 66 dB □F greater than 6 MHz

Equipment Placed Into Service After Adoption Of New Rules

New Heterodyne Translators must meet:

A (dB) = 47+ (□F^2/1.44) □F from 0 to 6 MHz

A (dB) = 71dB □F greater than 6 MHz

New Regenerative Translators and LPTV transmitters must meet:

A (dB) = 11.5 * (□F + 3.6) □F from 0 to 6 MHz

A (dB) = 76 dB □F greater than 6 MHz

□F is measured from the channel edge
A (dB) is measured relative to the total average power in the channel

APPLICATION PRIORITY AND PROCESSING ISSUES

Incumbent LPTV, Class A, and translator licensees, permittees, and applicants should receive priority regarding applications for digital licenses. Construction permits for translators should be 3 years. Some method to avoid the overload of applications present during the last two filing windows must be enacted. Perhaps limiting the number of applicants via regional windows or some other means will allow reasonable processing. After all incumbents have had the opportunity to apply for any digital channels, then new parties may apply.

SUMMARY AND CONCLUSION

The significant issues addressed in the pertinent sections above will encourage a speedy transition to digital that takes into account the need to minimize disruption to existing analog services. KNME-TV is interested in providing the public with programming and content that takes advantage of the benefits of digital transmission as it serves 1.1 million people in the states of New Mexico and Arizona via its' main transmitters and 30 analog translators. We believe it is very important that the FCC consider these issues and recommendations as outlined above as it prepares to implement rules permitting digital LPTV, Class A, and Translator services.

QUALIFICATIONS OF TECHNICAL CONSULTANT GREG BEST

Greg Best is President of Greg Best Consulting, Inc. His firm performs broadcast consulting services for a large variety of customers and serves the RF communications industry in general. Greg earned his BSEE degree from the University of Missouri-Rolla and MSEE degree from Illinois Institute of Technology. Greg has 27 years experience in the design, marketing, and product management of RF communications equipment. His corporate experience includes 16 years with the Broadcast Division of Harris where he was responsible for TV transmitter design and management. While there, he was responsible for coordinating the development of the Platinum Series VHF TV transmitter, as well as many other VHF and UHF TV transmitters. He has also worked for Motorola on the original 800 MHz AMPS cellular phone system transmitter development and for IFR Systems Test and Measurement division developing 3 GHz spectrum analyzers. He has published papers on TV Transmitter Multichannel Sound and others on TV Transmitter Design Architecture. Greg is a registered Professional Engineer, member of the Association of Federal Communications Consulting Engineers, IEEE, and SBE. He is an adjunct professor at Colorado Technical University. And Greg is currently a contributing member on the DTV RF Measurement Standards Committee and serves as an associate editor for the IEEE Transactions on Broadcasting.