

**MULLANEY ENGINEERING, INC.**

9049 SHADY GROVE COURT  
GAITHERSBURG, MD 20877

**ENGINEERING EXHIBIT EE-1:**

**SOUTHERN TV CORPORATION**  
**W41CR, HINESVILLE-RICHMOND HILLS, GA**  
**LIC: CH 39z 97.5 kW (Max-DA) 83.0 m RCAMSL**  
**CP: CH 41- 17.5 kW (Max-DA) 82.4 m RCAMSL**  
**PROP: CH 41- 26.9 kW (Max-DA) 83.4 m RCAMSL**

**10 March 2006**

**FCC FACILITY ID NUMBER 69450**

IN SUPPORT OF  
AN APPLICATION FOR MODIFICATION OF  
DTV DISPLACEMENT RELIEF CONSTRUCTION PERMIT  
TO CHANGE TRANSMITTING ANTENNA AND  
MAXIMUM EFFECTIVE RADIATED POWER  
BPTTL-20020507AAW



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**DECLARATION**

I, Alan E. Gearing, declare and state that I am a graduate electrical engineer with a Bachelor of Science degree in Electrical Engineering from SUNY University at Buffalo; that I am a registered professional engineer in the District of Columbia (since 1979); and that I have provided engineering services in the areas of broadcasting and radio communications since 1973. My qualifications as an expert in radio engineering are a matter of record with the Federal Communications Commission. I am a senior engineer with the firm of Mullaney Engineering, Inc., consulting broadcast and radio communications engineers with offices in Gaithersburg, Maryland.

The firm of Mullaney Engineering, Inc., has been retained by SOUTHERN TV CORPORATION, to prepare the instant engineering exhibit and the associated Section III of FCC Form 346 in support of *an Application for Modification of DTV displacement relief Construction Permit [BPTTL-20020507AAW] to change transmitting antenna and maximum effective radiated power* of LPTV station W41CR, Hinesville-Richmond Hills, Georgia [FCC FACILITY ID NUMBER 69450].

All facts contained herein are true of my own knowledge except those stated to be on information and belief, and as to those facts, I believe them to be true. I declare under penalty of perjury that the foregoing is true and correct.



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Alan E. Gearing, P.E.  
District of Columbia Number 7406  
Executed on the 10<sup>th</sup> day of March 2006

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**NARRATIVE STATEMENT:**

**I. INTRODUCTION:**

This narrative statement, and the engineering exhibit of which it is a part, have been prepared on behalf of Southern TV Corporation (Southern), licensee of LPTV station W39BV, channel 39, Hinesville-Richmond Hills, Georgia [FCC FACILITY ID NUMBER 69450]. Station W39BV is currently licensed to operate on NTSC channel 39 with a maximum effective radiated power (ERP) of 97.5 kW and an antenna radiation center height above mean sea level (RCAMSL) of 83 meters. (See FCC File No. BLTT-19950523ID.) Southern also holds an outstanding construction permit to modify W39BV's operation to channel 41 with a maximum ERP of 17.5 kW and an RCAMSL of 82.4 meters. (See FCC File No. BPTTL-20020507AAW, which also assigned call sign W41CR to the modified facility.)

The proposal to move Southern's Hinesville LPTV station from channel 39 to channel 41 was triggered by the authorization of WSAV-TV to institute DTV operation on channel 39 at Savannah, Georgia (See FCC File Nos. BPCDT-1991025ADX and BMPCDT-20040109AAE). WSAV-TV has commenced digital operations on channel 39 (See FCC File No. BLCDDT 20050705AAP) and W39BV is currently operating on Channel 41

under Special Operating Authority (STA) with temporary call sign W41CR (See FCC File No. BSTA-20060106ABN and FCC letter dated January 18, 2006). Southern now *proposes to modify* its outstanding construction permit on Channel 41 to *specify the facilities authorized in BSTA-20060106ABN*. Under the terms of §73.3572 of the FCC Rules, the **instant proposal qualifies as a minor modification to the outstanding Channel 41 construction permit** and is therefore acceptable for filing [See **ENGINEERING DISCUSSION** below]. As demonstrated herein, the proposed modified operation fully complies with all applicable FCC Rules and policies. No prohibited interference would be caused to any other existing or previously filed facility. In addition, the proposed facilities will be in complete compliance with the current FCC guidelines for exposure to radiofrequency electromagnetic fields<sup>1</sup>.

## II. **ENGINEERING DISCUSSION:**

### **PROPOSED ANTENNA SYSTEM AND TOWER**

The proposed channel 41 antenna (previously used on channel 39) consists of four vertically stacked Scala PR-TV Paraflector antennas. Two of the antennas will be pointed along a bearing of 80 degrees true and two will be pointed along a bearing of 260 degrees true. The feed element for each antenna has been replaced with one cut for operation on channel 41. Figure 1 shows the un-rotated horizontal plane pattern for the antenna array operating on channel 41 (as supplied by the manufacturer) and Figure 2 shows the corresponding vertical plane pattern (also supplied by the manufacturer). The tower that the antenna is mounted on has been registered with the FCC and assigned Antenna Structure

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<sup>1</sup> Since no new tower construction is involved, the instant proposal is believed to be **categorically excluded from environmental processing - including Section 106 review** - pursuant to the provisions of §1.1306 of the Commission's Rules. A more detailed discussion of environmental factors is included under the heading **ENVIRONMENTAL CONSIDERATIONS** below.

Registration Number 1033736. The antenna array is mounted with its radiation center at a height of 56 meters AGL (83.4 meters AMSL).

With the above directional antenna and a 1 kW transmitter (plus taking into account transmission line loss) maximum ERP toward the radio horizon will be 26.9 kW. Since the proposed antenna does not employ beam tilt, the maximum ERP in any horizontal or vertical angle will also be 26.9 kW.

#### COVERAGE CONSIDERATIONS

Figure 3 is a map comparing the 74 dBu coverage for the authorized channel 41 operation and the modified operation specified herein. From the map it is readily apparent that substantial overlap exists between the proposed and authorized 74 dBu protected contours and therefore, the instant proposal qualifies as a **minor change**

#### ALLOCATION CONSIDERATIONS

Compliance with the FCC's allocation criteria was determined through the use of a modified version of the FCC's LPONE computer program, supplemented with use of the *Longley-Rice terrain dependent propagation methods* as described in OET Bulletin No. 69 (February 2004). The modified LPONE program incorporates the revised NTSC taboos and the appropriate D/U ratios for protection of DTV facilities. (See the *Sixth Report & Order* and the *Memorandum Opinion and Order On Reconsideration of the Sixth Report and Order* in MM Docket No. 87-268.) In addition, the modified LPONE program includes the discrimination provided by the directional receive

antenna discussed in OET Bulletin 69<sup>2</sup>. Appendix A herein is a printout from the modified LPONE program. Appendix B is a printout of the results of an OET 69 Longley Rice analysis. The proposed maximum ERP toward the radio horizon (26.9 kW) was employed in the allocation study. The two Appendices demonstrate that no prohibited interference is predicted.

**ENVIRONMENTAL CONSIDERATIONS**

Since the instant proposal involves use of an existing antenna with no construction involved (other than changing the antenna feed elements), the only

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<sup>2</sup> A UHF receive antenna will provide up to 6 dB of additional attenuation for NTSC reception and up to 14 dB of additional attenuation for DTV reception, depending upon the relative angle from the receive point to: 1) the full service transmitter site (desired); and 2) to the proposed LPTV site (undesired).

OET Bulletin No. 69 states that the assumed receiving antenna pattern is a fourth-power cosine function of the angle between the lines joining the desired and undesired stations to the reception point, or

$$dB = 20\log_{10}[COS^4(Angle)]$$

| Angle (deg) | Amount of Discrimination (dB) |      |       |
|-------------|-------------------------------|------|-------|
|             | Equation                      | NTSC | DTV   |
| 0           | 0.0                           | 0.0  | 0.0   |
| 5           | -0.1                          | -0.1 | -0.1  |
| 10          | -0.5                          | -0.5 | -0.5  |
| 15          | -1.2                          | -1.2 | -1.2  |
| 20          | -2.2                          | -2.2 | -2.2  |
| 25          | -3.4                          | -3.4 | -3.4  |
| 30          | -5.0                          | -5.0 | -5.0  |
| 35          | -6.9                          | -6.0 | -6.9  |
| 40          | -9.3                          | -6.0 | -9.3  |
| 45          | -12.0                         | -6.0 | -12.0 |
| 50          | -15.4                         | -6.0 | -14.0 |
| 55+         | ----                          | -6.0 | -14.0 |

environmental issue to be considered is §1.1307(b). As demonstrated below, the proposed W41CR operation is categorically excluded from further consideration since it would contribute less than 5% of the applicable exposure guideline value at ground level. The following analysis is based upon Edition 97-01 (August 1997) of OET Bulletin No. 65, "Evaluating Compliance With FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields".

The current FCC guidelines for exposure to radiofrequency electromagnetic fields involve a two tier evaluation. The "controlled" tier involves areas which have restricted access whereas the "un-controlled" tier involves areas which have unrestricted access, i.e. open to the general public. The maximum permissible exposure (MPE) limits for both tiers are frequency dependent. For TV channel 41 (632-638 MHz) the controlled area MPE limit is 2.12 mW/cm<sup>2</sup> and the un-controlled area MPE limit is 0.423 mW/cm<sup>2</sup>.

Equation 2 from Section 3 (Television Broadcast Stations) of Supplement A to OET Bulletin 65, provides a means for predicting the expected power density at a given distance from the antenna radiation center. Assuming a maximum relative field factor in the downward direction of 0.1<sup>3</sup>, the calculated power density at 2 meters above ground level for the proposed W41CR operation would be 0.0018 mW/cm<sup>2</sup>. This value is much less than 5% of the un-controlled guideline value of 0.423 mW/cm<sup>2</sup>. Hence, pursuant to the provisions of §1.1306 and §1.1307 the proposed operation is excluded from further consideration.

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<sup>3</sup> Pursuant to Section 3 of Supplement A to OET Bulletin 65: "... typical values of F for UHF antennas are about 10% and some more expensive antennas have an F of about 5% for downward radiation..." In fact, the vertical plane radiation pattern data available from the manufacturer for the Scala 4xPRTV-41/HV Paraflector Array (see Figure 2 herein) shows that for depression angles at or below approximately 15 degrees, the elevation pattern relative field remains well below a value of 0.1 (i.e. 10%).

Access to the tower currently is restricted and appropriate warning signs are posted to ensure safety. Workers employed to climb the tower or work in a potential over-exposure location will not be permitted to enter the work area until cleared by the station manager or other responsible person. Furthermore, procedures are in effect for instances when authorized personnel enter the restricted area to ensure that appropriate measures are taken to assure worker safety with respect to exposure to radiofrequency electromagnetic fields. These procedures include reducing the average exposure by spreading out the work over longer periods of time or scheduling work when the stations are at reduced power or are shut down.

**III. SUMMARY:**

Southern, licensee of LPTV station W39BV at Hinesville-Richmond Hills, Georgia, proposes to modify its outstanding construction permit for operation on channel 41 (BPTTL-20020507AAW with assigned call sign W41CR) to change the proposed transmitting antenna and maximum effective operating power. The proposed modifications qualify as a minor change under the terms of §73.3572 of the FCC Rules.

As demonstrated herein, operating as proposed W41CR will not cause prohibited interference to any existing station, previously filed proposal, or assigned DTV operation. In all other the respects, the instant proposal also is in full compliance with the Commission's Rules.



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Alan E. Gearing, PE

SOUTHERN TV CORPORATION  
W41CR, Hinesville-Richmond Hills, GA  
March 2006

**MULLANEY ENGINEERING, INC.**

**APPENDIX A**

Allocation Study  
[Modified LPONE Output]

SOUTHERN TV CORPORATION  
W41CR, Hinesville-Richmond Hills, GA  
March 2006

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**APPENDIX B**

Allocation Study

[OET Bulletin No. 69 Analysis]