

## **ENGINEERING EXHIBIT**

### **Displacement Application of Digital Low Power Television Station Construction Permit**

prepared for

#### **Gray Television Licensee, LLC**

W23EF-D Tallahassee, FL

Facility ID 183593

Ch. 15 15 kW Nondirectional

*Gray Television Licensee, LLC* (“Gray”) is the proposed assignee of unbuilt digital Low Power Television station W23EF-D, Channel 23, Tallahassee FL, Facility ID 183593 (assignment file# 0000139123). W23EF-D is currently authorized to operate pursuant to a Construction Permit (“CP”, file# 0000013251) with 5 kW effective radiated power (“ERP”), nondirectional. The authorized Channel 23 facility is displaced by a full-service television station that was reassigned to a new channel. *Gray* herein seeks a displacement CP to change to Channel 15, a different transmitting location, and increased ERP and antenna height.

The existing Channel 23 CP is displaced due to interference received from WTWC-TV, Facility ID66908, Tallahassee FL. WTWC-TV was reassigned to Channel 22 at the incentive auction<sup>1</sup> and is now licensed on Channel 22 at a site located 30.0 km from W23EF-D. Table 1 supplies a summary of the incoming interference to the W23EF-D, showing that W23EF-D would experience 5.68 percent interference from WTWC-TV.

As proposed herein, the proposed Channel 15 facility will utilize the tower structure associated with FCC Antenna Structure Registration number 1031203, located 5.9 km (3.6 miles) from the W23EF-D CP site and 22.4 km (13.9 miles) from the site originally authorized for W23EF-D (BNPDTL-20091019ACC). The proposed Channel 15 facility will utilize an existing broadband antenna which is top-mounted on the tower and no change to the overall structure height will result. The tower structure and broadband antenna are owned by *Gray*. The site is located

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<sup>1</sup>*Incentive Auction Closing and Channel Reassignment Public Notice*, DA 17-317, released April 13, 2017.

more than 75 miles (121 km) from the reference coordinates of the markets listed in Appendix A of DA 09-1487<sup>2</sup>.

The proposed antenna is a Dielectric model TUM-O4-10/40H-1-R having elliptical polarization. The horizontally ERP is 15 kW and the vertically polarized ERP is 6.45 kW using a “full service” out of channel emission mask. The antenna will be shared with *Gray’s* stations WNXG-LD (Ch. 33, Fac ID 187680, Tallahassee FL) and WCTV (aux Ch. 20, Fac ID 31590, Thomasville GA), as well as with WVUP-CD (Ch. 30, Fac ID 3032, Tallahassee FL).

Figure 1 depicts the 51 dBμ coverage contour of the proposed facility as well as those of the existing W23EF-D authorization (0000013251) and the original CP (file# BNPDTL-20091019ACC) facility, demonstrating compliance with §73.3572 for a minor change.

Interference study per OET Bulletin 69<sup>3</sup> shows that the proposal complies with the FCC’s interference protection requirements toward all digital television, television translator, LPTV, and Class A stations. The results, summarized in Table 2, show that any new interference does not exceed the FCC’s interference limits (0.5 percent to full power and Class A stations, and 2.0 percent to secondary stations) to any facility except with respect to WJHG-TV which does not present a conflict for the proposal.

WJHG-TV (NBC, Ch. 15, Fac ID 73136, Panama City FL, file# 0000068516) would receive 2.84 percent new interference, which exceeds the 0.5 percent limit towards full-service television stations. According to FCC TVStudy analysis, the interference would occur at locations beyond WJHG-TV’s DMA (Panama City, FL) in areas that in the Tallahassee FL DMA. The areas

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<sup>2</sup>“Commencement of Rural, First-come, First-served digital licensing for Low Power Television and TV Translators Beginning August 25, 2009 and Commencement of Nationwide, First-come, First-served Digital Licensing for Low Power Television and TV Translator Services Beginning January 25, 2010,” Public Notice, DA 09-1487, Released June 29, 2009.

<sup>3</sup>FCC Office of Engineering and Technology Bulletin number 69, *Longley-Rice Methodology for Evaluating TV Coverage and Interference*, February 6, 2004 (“OET-69”). This analysis employed the FCC’s current “TVStudy” software with the default application processing template settings, 1 km cell size, and 1 km terrain increment. Comparisons of various results of this computer program (run on a Mac processor) to the FCC’s implementation of TVStudy show excellent correlation.

subject to new interference are within the service area of NBC network affiliate WTWC-TV (Ch. 22, Tallahassee FL). *Gray* is also the licensee of WJHG-TV and consents to interference exceeding 0.5 percent from the W23EF-D displacement facility.

A statement of consent by *Gray* to the interference caused to WJHG-TV is provided as a separate attachment. Accordingly, the proposal complies with §74.793 regarding interference protection to digital television, low power television, television translator, and Class A television facilities.

### **Human Exposure to Radiofrequency Electromagnetic Field (Environmental)**

The proposed facility was evaluated for human exposure to RF energy using the procedures outlined in the FCC's OET Bulletin Number 65. Based on OET-65 equation (10) and 10 percent antenna relative field in downward elevations (pattern data shows 10 percent or less relative field at angles 10 to 90 degrees below the antenna), the calculated power density attributable to the proposed facility at locations near the transmitter site at a height of two meters above ground level is  $0.1 \mu\text{W}/\text{cm}^2$ , which is 0.03 percent of the general population / uncontrolled maximum permissible exposure limit. This is well below the five percent threshold limit described in §1.1307(b) regarding sites with multiple emitters, categorically excluding the applicant from responsibility for taking any corrective action in the areas where the proposal's contribution is less than five percent.

The general public will not be exposed to RF levels attributable to the proposal in excess of the FCC's guidelines. RF exposure warning signs will continue to be posted. With respect to worker safety, the applicant will coordinate exposure procedures with all pertinent stations and will reduce power or cease operation as necessary to protect persons having access to the site, tower, or antenna from RF electromagnetic field exposure in excess of FCC guidelines. This exhibit is limited to the evaluation of exposure to RF electromagnetic field. No increase in structure height is proposed.

**Engineering Exhibit**  
**Gray Television Licensee, LLC (W23EF-D)**  
(page 4 of 4)

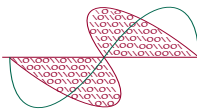


List of Attachments

|          |                                     |
|----------|-------------------------------------|
| Figure 1 | Coverage Contour Comparison         |
| Table 1  | Ch. 23 TVStudy Displacement Summary |
| Table 2  | TVStudy Analysis of Proposal        |

**Chesapeake RF Consultants, LLC**

|                       |                    |              |
|-----------------------|--------------------|--------------|
| Joseph M. Davis, P.E. | April 16, 2021     |              |
| 207 Old Dominion Road | Yorktown, VA 23692 | 703-650-9600 |

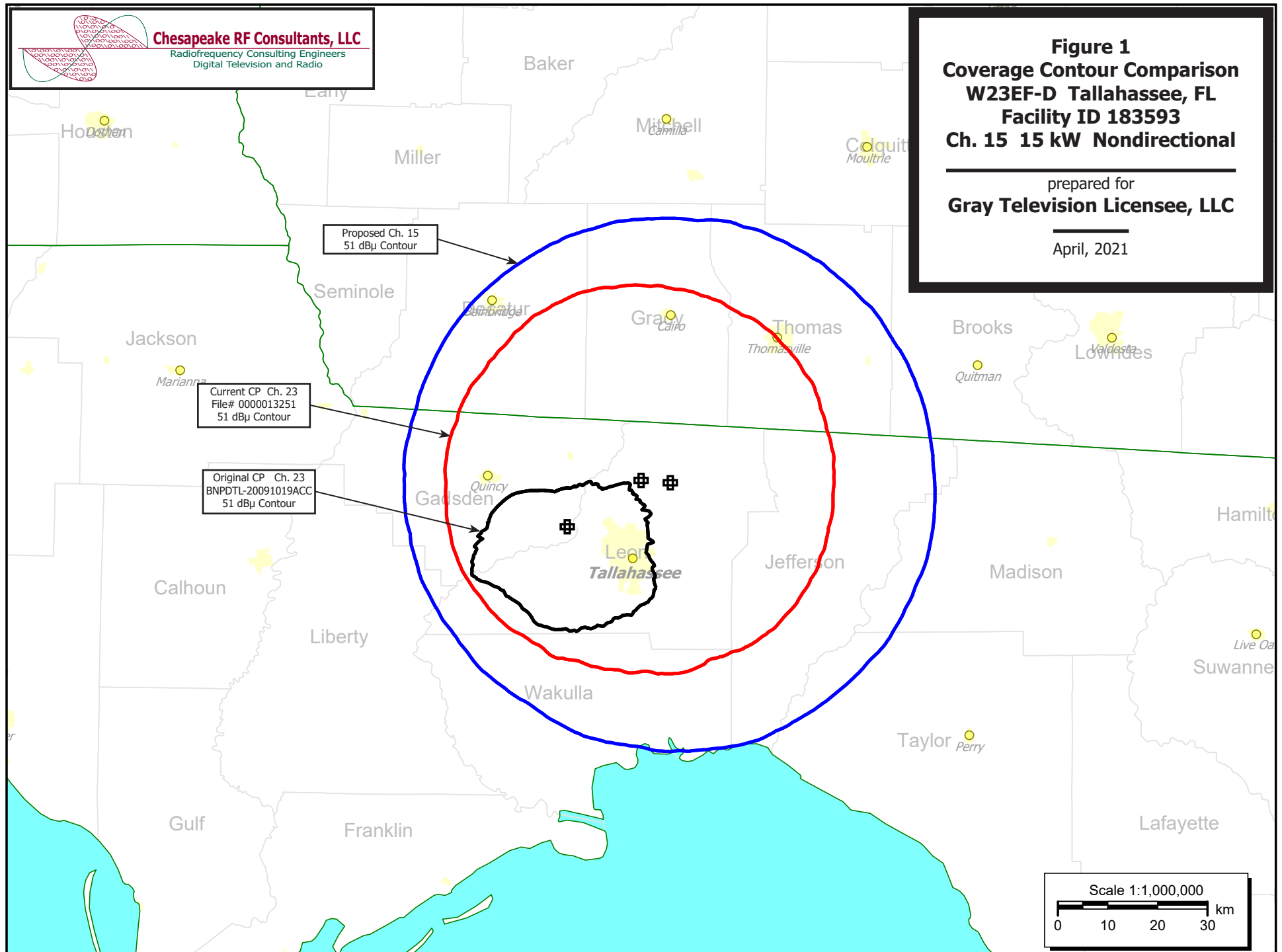


**Chesapeake RF Consultants, LLC**  
Radiofrequency Consulting Engineers  
Digital Television and Radio

**Figure 1**  
**Coverage Contour Comparison**  
**W23EF-D Tallahassee, FL**  
**Facility ID 183593**  
**Ch. 15 15 kW Nondirectional**

prepared for  
**Gray Television Licensee, LLC**

April, 2021



Interference received from WTWC-TV Repack Ch. 22 Tallahassee FL

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Interference to proposal scenario 2  
6.13% interference received

|                    | Call         | Chan            | Svc    | Status  | City, State     | File Number       | Distance                |
|--------------------|--------------|-----------------|--------|---------|-----------------|-------------------|-------------------------|
| Desired:           | W23EF-D      | D23             | LD     | CP      | TALLAHASSEE, FL | BLANK0000013251   |                         |
| Undesireds:        | WTWC-TV      | D22             | DT     | LIC     | TALLAHASSEE, FL | BLANK0000118579   | 30.0 km                 |
|                    | WRGX-LD      | D23             | LD     | LIC     | DOTHAN, AL      | BLDTL20130531ATB  | 146.2                   |
|                    | WKBJ-LD      | D23             | LD     | CP      | LIVE OAK, FL    | BLANK0000051650   | 260.9                   |
|                    | W23FF-D      | D23             | LD     | CP      | MADISON, FL     | BNPDTL20090825AHQ | 70.0                    |
|                    | WTLF         | D24             | DT     | LIC     | TALLAHASSEE, FL | BLCDT20030303ABF  | 17.5                    |
| -----              |              |                 |        |         |                 |                   |                         |
|                    | Service area | Terrain-limited |        | IX-free | Percent IX      |                   |                         |
|                    | 5146.6       | 373,138         | 5139.5 | 372,930 | 4366.2          | 350,078           | 15.05 6.13              |
| -----              |              |                 |        |         |                 |                   |                         |
| Undesired          |              |                 |        |         | Total IX        | Unique IX         | Prcnt Unique IX         |
| WTWC-TV D22 DT LIC |              |                 |        |         | 739.2           | 21,543            | 689.8 21,168 13.42 5.68 |
| WRGX-LD D23 LD LIC |              |                 |        |         | 25.5            | 150               | 6.1 0 0.12 0.00         |
| W23FF-D D23 LD CP  |              |                 |        |         | 55.0            | 1,534             | 27.0 1,309 0.52 0.35    |
| WTLF D24 DT LIC    |              |                 |        |         | 3.0             | 0                 | 1.0 0 0.02 0.00         |

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## Table 2 W23EF-D TVStudy Analysis of Proposal

(page 1 of 3)



tvstudy v2.2.5 (4uoc83)  
 Database: localhost, Study: W23EF-D\_prop-15, Model: Longley-Rice  
 Start: 2021.04.15 14:42:03

Study created: 2021.04.15 14:42:03

Study build station data: LMS TV 2021-04-13

Proposal: W23EF-D D15 LD APP TALLAHASSEE, FL  
 File number: W23EF-D prop-15  
 Facility ID: 183593  
 Station data: User record  
 Record ID: 3590  
 Country: U.S.

Build options:  
 Protect pre-transition records not on baseline channel

Search options:  
 Baseline record excluded if station has CP

Stations potentially affected by proposal:

| IX  | Call      | Chan | Svc | Status | City, State       | File Number       | Distance |
|-----|-----------|------|-----|--------|-------------------|-------------------|----------|
| No  | WFRW-LD   | D14  | LD  | CP     | ENTERPRISE, AL    | BLANK0000054045   | 152.0 km |
| No  | W14DH-D   | D14  | LD  | CP     | CHIPLEY, FL       | BNPDTL20090825AVP | 131.4    |
| No  | WTBZ-LP   | D14z | LD  | CP     | GAINESVILLE, FL   | BLANK0000054883   | 204.6    |
| No  | WFOX-TV   | D14  | DT  | LIC    | JACKSONVILLE, FL  | BLANK00000120746  | 254.4    |
| No  | W14ET-D   | D14  | LD  | CP     | PANAMA CITY, FL   | BLANK00000074403  | 142.1    |
| Yes | W48DV-D   | D14  | LD  | CP     | TALLAHASSEE, FL   | BLANK00000071780  | 12.2     |
| No  | WCEG-LD   | D14  | LD  | CP     | ALBANY, GA        | BLANK00000071915  | 97.1     |
| No  | WPMI-TV   | D15  | DT  | LIC    | MOBILE, AL        | BLANK00000120999  | 325.8    |
| No  | WBXM-CD   | D15  | DC  | LIC    | MONTGOMERY, AL    | BLANK00000113013  | 281.1    |
| No  | WOTF-TV   | D15  | DT  | LIC    | DAYTONA BEACH, FL | BLANK00000097961  | 333.6    |
| No  | WNFT-LD   | D15  | LD  | LIC    | GAINESVILLE, FL   | BLDTL20110714ACG  | 188.6    |
| No  | WNFT-LD   | D15  | LD  | CP     | GAINESVILLE, FL   | BLANK00000106078  | 188.6    |
| No  | WUJX-LD   | D15  | LD  | LIC    | JACKSONVILLE, FL  | BLANK00000121572  | 254.4    |
| No  | W36EC-D   | D15  | LD  | CP     | Lakeland, FL      | BLANK00000131306  | 361.0    |
| No  | WZRA-CD   | D15  | DC  | LIC    | OLDSMAR, FL       | BLANK00000136366  | 294.2    |
| No  | W44DL-D   | D15  | LD  | CP     | PANAMA CITY, FL   | BLANK00000071933  | 157.7    |
| No  | WAGC-LD   | D15  | LD  | CP     | ATLANTA, GA       | BLANK00000054666  | 359.6    |
| No  | WDDZ-LD   | D15  | LD  | CP     | AUGUSTA, GA       | BLANK00000036283  | 358.6    |
| No  | WPHJ-LD   | D15+ | LD  | LIC    | BAXLEY, GA        | BLANK00000125982  | 268.6    |
| Yes | WRBL      | D15  | DT  | LIC    | COLUMBUS, GA      | BLCDT20061013ABV  | 202.0    |
| No  | WGGD-LD   | D15  | LD  | LIC    | GAINESVILLE, GA   | BLDTL20121213AIK  | 396.0    |
| No  | W15DG-D   | D15  | LD  | CP     | LENEX, GA         | BNPDTL20100510ABH | 107.5    |
| No  | W16CP-D   | D16  | LD  | CP     | CHIPLEY, FL       | BNPDTL20090825AVY | 131.4    |
| No  | WCJB-TV   | D16  | DT  | LIC    | GAINESVILLE, FL   | BLCDT20071119AJB  | 208.3    |
| No  | W16CX-D   | D16  | LD  | LIC    | PANAMA CITY, FL   | BLANK00000013958  | 157.1    |
| Yes | WJHG-TV   | D16  | DT  | LIC    | PANAMA CITY, FL   | BLANK00000068516  | 116.5    |
| No  | DDW38EM-D | D16  | LD  | APP    | ALBANY, GA        | BLANK00000052733  | 117.3    |
| No  | WRDP-LD   | D16  | LD  | CP     | COLUMBUS, GA      | BLANK00000074337  | 202.0    |

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D15  
 Mask: Full Service  
 Latitude: 30 34 28.00 N (NAD83)  
 Longitude: 84 12 9.00 W  
 Height AMSL: 303.7 m  
 HAAT: 0.0 m  
 Peak ERP: 15.0 kW  
 Antenna: Omnidirectional  
 Elev Pattn: Generic  
 Elec Tilt: 0.50

48.8 dBu contour:  
 Azimuth ERP HAAT Distance  
 0.0 deg 15.0 kW 254.1 m 55.4 km

**Table 2 W23EF-D TVStudy Analysis of Proposal**  
(page 2 of 3)



|       |      |       |      |
|-------|------|-------|------|
| 45.0  | 15.0 | 256.7 | 55.6 |
| 90.0  | 15.0 | 252.7 | 55.4 |
| 135.0 | 15.0 | 263.5 | 56.0 |
| 180.0 | 15.0 | 268.3 | 56.3 |
| 225.0 | 15.0 | 258.2 | 55.7 |
| 270.0 | 15.0 | 259.7 | 55.8 |
| 315.0 | 15.0 | 264.1 | 56.0 |

Database HAAT does not agree with computed HAAT  
Database HAAT: 0 m Computed HAAT: 260 m

Distance to Canadian border: 1241.5 km

Distance to Mexican border: 1345.0 km

Conditions at FCC monitoring station: Powder Springs GA  
Bearing: 352.5 degrees Distance: 368.7 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:  
Bearing: 304.9 degrees Distance: 2173.3 km

No land mobile station failures found

Proposal is not within the Offshore Radio Service protected area

Study cell size: 1.00 km  
Profile point spacing: 1.00 km

Maximum new IX to full-service and Class A: 0.50%  
Maximum new IX to LPTV: 2.00%

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Interference to BLANK0000071780 CP scenario 1

|                    | Call         | Chan            | Svc      | Status          | City, State           | File Number     | Distance                 |
|--------------------|--------------|-----------------|----------|-----------------|-----------------------|-----------------|--------------------------|
| Desired:           | W48DV-D      | D14             | LD       | CP              | TALLAHASSEE, FL       | BLANK0000071780 |                          |
| Undesireds:        | W23EF-D      | D15             | LD       | APP             | TALLAHASSEE, FL       | W23EF-D prop-15 | 12.2 km                  |
|                    | WFRW-LD      | D14             | LD       | CP              | ENTERPRISE, AL        | BLANK0000054045 | 147.0                    |
|                    | WFGX         | D14             | DT       | LIC             | FORT WALTON BEACH, FL | BLANK0000121010 | 321.7                    |
|                    | WCEG-LD      | D14             | LD       | CP              | ALBANY, GA            | BLANK0000071915 | 107.0                    |
| -----              |              |                 |          |                 |                       |                 |                          |
|                    | Service area | Terrain-limited |          | IX-free, before |                       | IX-free, after  | Percent New IX           |
|                    | 8030.1       | 402,778         | 8016.8   | 402,731         | 7827.2                | 400,345         | 7801.0 399,721 0.33 0.16 |
| Undesired          |              |                 | Total IX |                 | Unique IX, before     |                 | Unique IX, after         |
| W23EF-D D15 LD APP |              |                 | 27.2     | 624             |                       |                 | 26.2 624                 |
| WFRW-LD D14 LD CP  |              |                 | 136.4    | 834             | 93.5 698              |                 | 93.5 698                 |
| WFGX D14 DT LIC    |              |                 | 6.1      | 0               | 0.0 0                 |                 | 0.0 0                    |
| WCEG-LD D14 LD CP  |              |                 | 96.0     | 1,688           | 53.1 1,552            |                 | 52.1 1,552               |

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Interference to BLCDT20061013ABV LIC scenario 1

|                    | Call         | Chan            | Svc      | Status          | City, State       | File Number      | Distance                    |
|--------------------|--------------|-----------------|----------|-----------------|-------------------|------------------|-----------------------------|
| Desired:           | WRBL         | D15             | DT       | LIC             | COLUMBUS, GA      | BLCDT20061013ABV |                             |
| Undesireds:        | W23EF-D      | D15             | LD       | APP             | TALLAHASSEE, FL   | W23EF-D prop-15  | 202.0 km                    |
|                    | WAFF         | D15             | DT       | LIC             | HUNTSVILLE, AL    | BLANK0000111344  | 310.9                       |
|                    | WPMT-TV      | D15             | DT       | LIC             | MOBILE, AL        | BLANK0000120999  | 327.7                       |
|                    | WBXM-CD      | D15             | DC       | LIC             | MONTGOMERY, AL    | BLANK0000113013  | 140.4                       |
|                    | WTNZ         | D15             | DT       | LIC             | KNOXVILLE, TN     | BLANK0000081278  | 415.6                       |
|                    | WDMA-CD      | D16             | DC       | LIC             | MACON, GA         | BLANK0000074865  | 119.7                       |
| -----              |              |                 |          |                 |                   |                  |                             |
|                    | Service area | Terrain-limited |          | IX-free, before |                   | IX-free, after   | Percent New IX              |
|                    | 45078.3      | 1,492,912       | 44446.1  | 1,466,210       | 43085.8           | 1,390,091        | 42877.6 1,388,970 0.48 0.08 |
| Undesired          |              |                 | Total IX |                 | Unique IX, before |                  | Unique IX, after            |
| W23EF-D D15 LD APP |              |                 | 224.5    | 1,288           |                   |                  | 208.3 1,121                 |



**Table 2 W23EF-D TVStudy Analysis of Proposal**  
(page 3 of 3)

|                    |       |        |       |        |       |        |
|--------------------|-------|--------|-------|--------|-------|--------|
| WAFF D15 DT LIC    | 196.3 | 19,535 | 162.3 | 17,637 | 162.3 | 17,637 |
| WPMI-TV D15 DT LIC | 257.1 | 2,457  | 207.7 | 1,996  | 191.5 | 1,829  |
| WBXM-CD D15 DC LIC | 827.2 | 11,321 | 763.9 | 10,759 | 763.9 | 10,759 |
| WTNZ D15 DT LIC    | 4.0   | 1,563  | 1.0   | 0      | 1.0   | 0      |
| WDMA-CD D16 DC LIC | 156.1 | 43,543 | 156.1 | 43,543 | 156.1 | 43,543 |

Interference to BLANK0000068516 LIC scenario 1

**\*\*IX: 2.84% interference caused**

**WJHG-TV is accepting 2.84% interference, see text**

| Desired:           | Call    | Chan            | Svc | Status            | City, State     | File Number      | Distance       |
|--------------------|---------|-----------------|-----|-------------------|-----------------|------------------|----------------|
|                    | WJHG-TV | D16             | DT  | LIC               | PANAMA CITY, FL | BLANK0000068516  |                |
| Undesireds:        | W23EF-D | D15             | LD  | APP               | TALLAHASSEE, FL | W23EF-D prop-15  | 116.5 km       |
|                    | WCJB-TV | D16             | DT  | LIC               | GAINESVILLE, FL | BLCDT20071119AJB | 302.0          |
|                    | WMAH-TV | D16             | DT  | LIC               | BILOXI, MS      | BLEDT20110404AGM | 343.1          |
| Service area       |         | Terrain-limited |     | IX-free, before   |                 | IX-free, after   | Percent New IX |
| 36627.6            |         | 864,213         |     | 36575.1           |                 | 859,368          | 0.58           |
|                    |         |                 |     | 36562.0           |                 | 858,490          | <b>2.84</b>    |
| Undesired          |         | Total IX        |     | Unique IX, before |                 | Unique IX, after |                |
| W23EF-D D15 LD APP |         | 218.8           |     | 25,213            |                 | 211.8            | 24,417         |
| WCJB-TV D16 DT LIC |         | 7.0             |     | 796               |                 | 0.0              | 0              |
| WMAH-TV D16 DT LIC |         | 6.1             |     | 82                |                 | 6.1              | 82             |

Interference to proposal scenario 1

| Desired:           | Call    | Chan            | Svc | Status    | City, State     | File Number      | Distance |
|--------------------|---------|-----------------|-----|-----------|-----------------|------------------|----------|
|                    | W23EF-D | D15             | LD  | APP       | TALLAHASSEE, FL | W23EF-D prop-15  |          |
| Undesireds:        | WPMI-TV | D15             | DT  | LIC       | MOBILE, AL      | BLANK0000120999  | 325.8 km |
|                    | WNFT-LD | D15             | LD  | LIC       | GAINESVILLE, FL | BLDTL20110714ACG | 188.6    |
|                    | WRBL    | D15             | DT  | LIC       | COLUMBUS, GA    | BLCDT20061013ABV | 202.0    |
|                    | WJHG-TV | D16             | DT  | LIC       | PANAMA CITY, FL | BLANK0000068516  | 116.5    |
| Service area       |         | Terrain-limited |     | IX-free   |                 | Percent IX       |          |
| 9780.1             |         | 449,242         |     | 9773.9    |                 | 448,577          | 1.40     |
|                    |         |                 |     | 9637.3    |                 | 448,577          | 0.14     |
| Undesired          |         | Total IX        |     | Unique IX |                 | Prcnt Unique IX  |          |
| WPMI-TV D15 DT LIC |         | 2.0             |     | 3         |                 | 0.00             | 0.00     |
| WRBL D15 DT LIC    |         | 135.7           |     | 640       |                 | 1.36             | 0.14     |
| WJHG-TV D16 DT LIC |         | 2.0             |     | 0         |                 | 0.01             | 0.00     |