

## **ENGINEERING EXHIBIT**

### **Incentive Auction Channel Reassignment**

### **Application for Digital Television Station Auxiliary Antenna Construction Permit**

prepared for

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

WAVE(DT) Louisville, KY

Facility ID 13989

Ch. 36 476 kW 330 m

*Gray Television Licensee, LLC* (“Gray”) is the licensee of digital television station WAVE(DT), Facility ID 13989, Louisville KY. Reassignment of WAVE from Channel 47 to Channel 36 was specified in the *Incentive Auction Closing and Channel Reassignment Public Notice* (DA 17-317, released April 13, 2017). A Construction Permit (“CP”, file# 0000034345) authorizes construction of the WAVE post-auction facility on Channel 36. *Gray* herein seeks authorization for an auxiliary antenna for WAVE on its post-auction Channel 36.

The CP authorizes WAVE to operate with a directional antenna at 890 kW effective radiated power (ERP) and 391 meters height above average terrain (HAAT). The proposed auxiliary facility will utilize an antenna side-mounted on the same tower structure as the authorized main antenna, and will operate on Channel 36 at 476 kW ERP (directional) and an antenna HAAT of 330 meters.

The WAVE tower structure is associated with FCC Antenna Structure Registration number 1230057. No change to the overall structure height will result from this proposal.

The proposed antenna is a horizontally polarized directional Dielectric model TFU-24WB C160H. The directional antenna’s azimuthal pattern is depicted in Figure 1 and the elevation pattern is supplied in Figures 2 and 2A.

Figure 3 shows that the 41 dB $\mu$  noise limited service contour of the proposed auxiliary facility does not extend beyond that of the authorized main facility. Thus the proposal complies with §73.1675(a).

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

The proposed operation 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 considering 15 percent antenna relative field in downward elevations (pattern data shows less than 15 percent relative field at angles 20 to 90 degrees below the antenna), the calculated signal density near the tower at two meters above ground level attributable to the proposed facility is 7.5  $\mu\text{W}/\text{cm}^2$ , which is 1.8 percent of the general population/uncontrolled maximum permitted exposure limit. This is 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.

#### List of Attachments

Figure 1	Antenna Azimuthal Pattern
Figure 2, 2A	Antenna Elevation Pattern
Figure 3	Proposed Auxiliary Contours

### **Chesapeake RF Consultants, LLC**

Joseph M. Davis, P.E.      September 25, 2019  
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703-650-9600

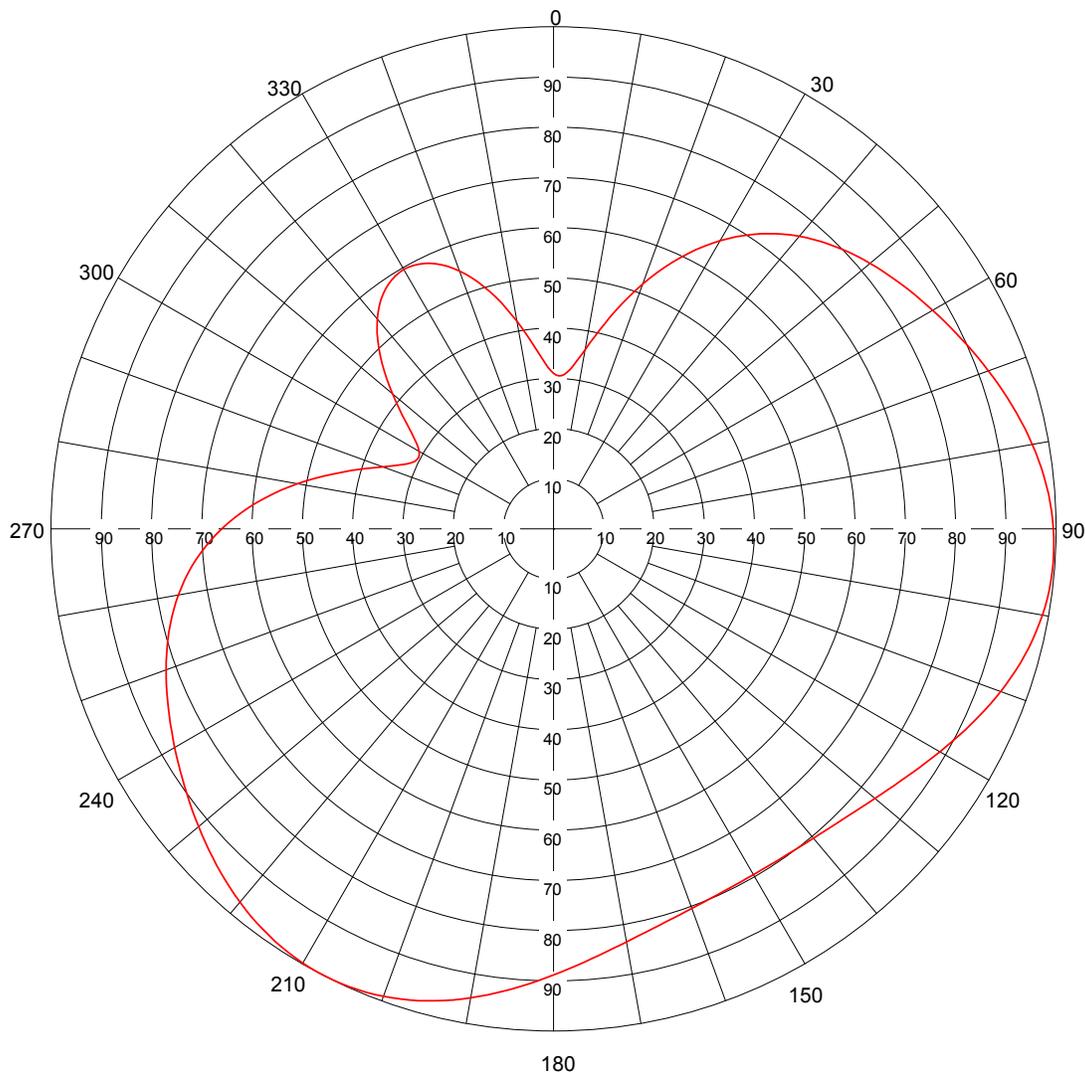
### AZIMUTH PATTERN

Gain  
Calculated / Measured

**1.68 (2.25 dB)**  
**Calculated**

Frequency  
Drawing #

**605 MHz**  
**WB-C160H**



**Figure 1**  
**Auxiliary Antenna Azimuthal Pattern**  
**WAVE(DT) Louisville, KY**  
**Facility ID 13989**  
**Ch. 36 476 kW 330 m**

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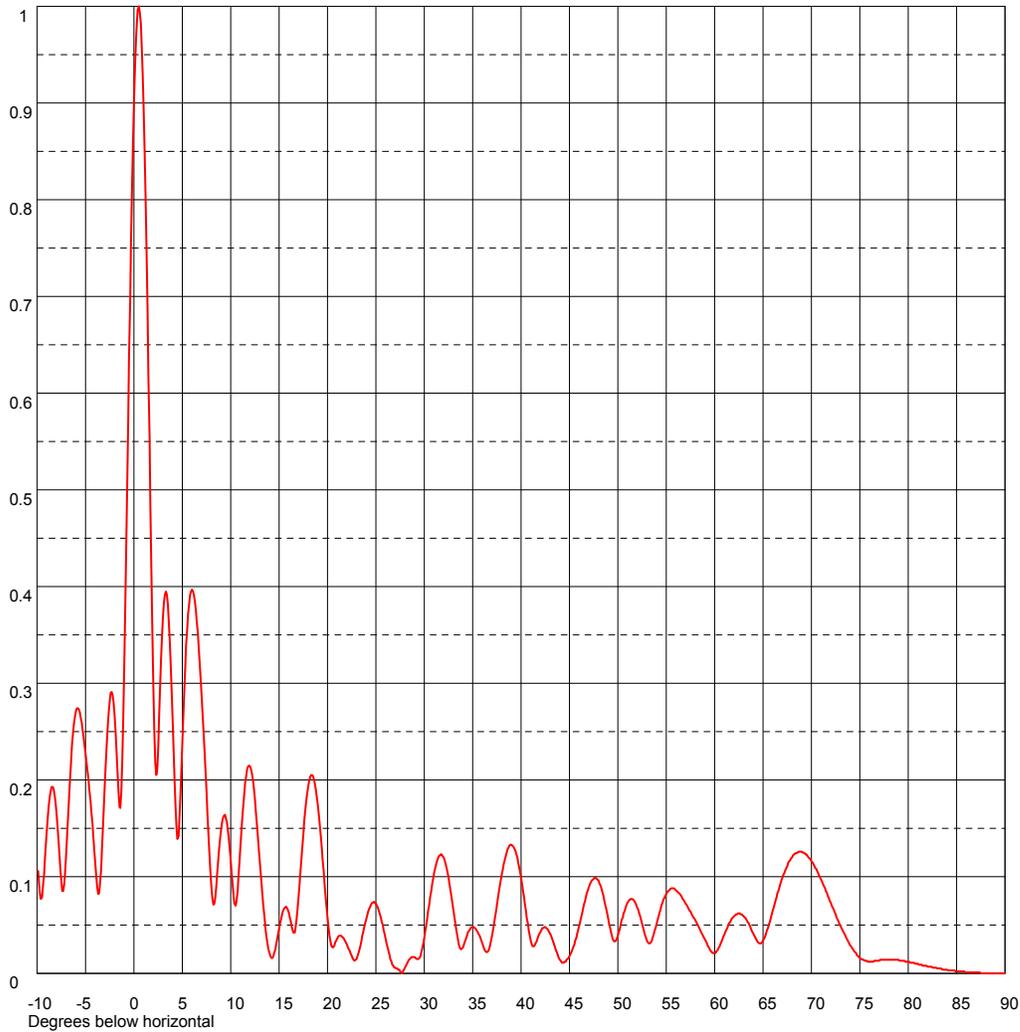
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September, 2019

### ELEVATION PATTERN

RMS Gain at Main Lobe	<b>21.1 (13.25 dB)</b>	Beam Tilt	<b>0.50 Degrees</b>
RMS Gain at Horizontal	<b>17.1 (12.33 dB)</b>	Frequency	<b>605 MHz</b>
Calculated / Measured	<b>Calculated</b>	Drawing #	<b>24W211050-90</b>



**Figure 2**  
**Auxiliary Antenna Elevation Pattern**  
**WAVE(DT) Louisville, KY**  
**Facility ID 13989**  
**Ch. 36 476 kW 330 m**

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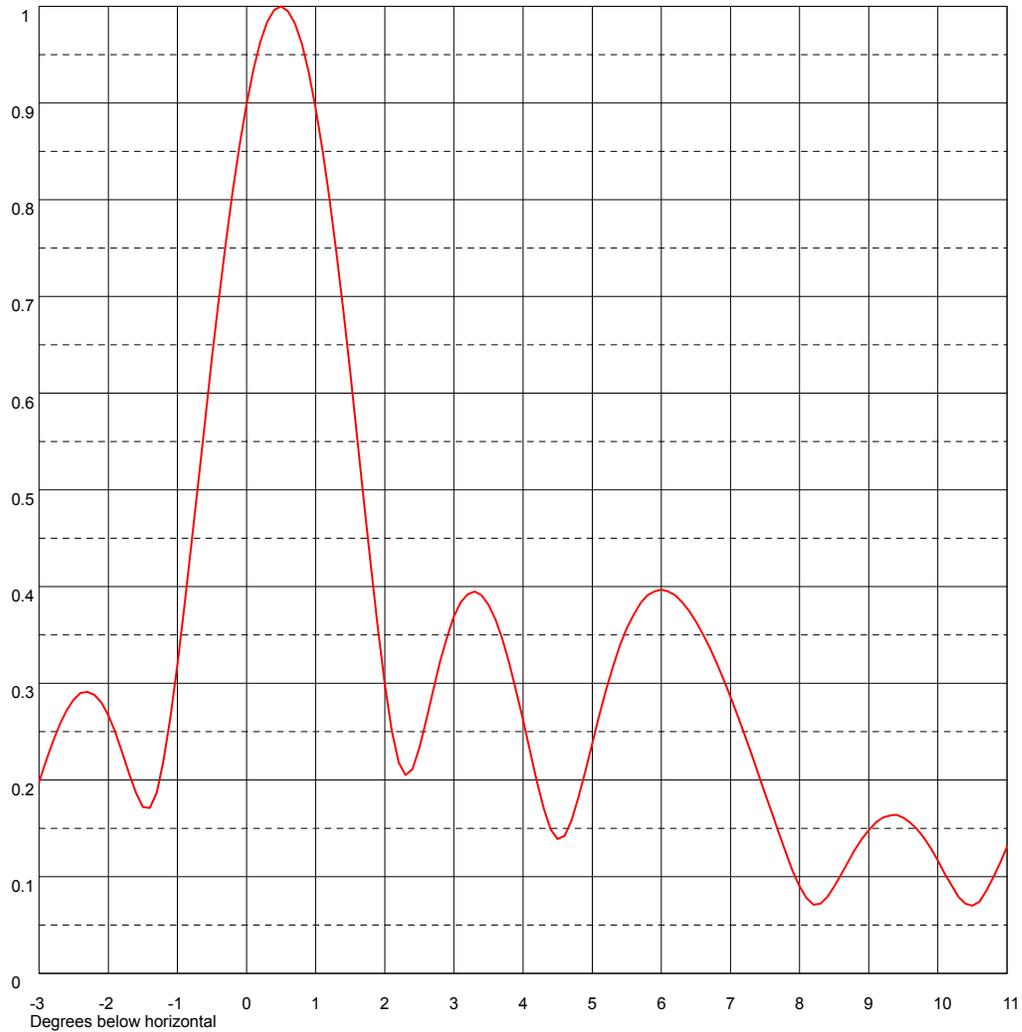
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### ELEVATION PATTERN

RMS Gain at Main Lobe	<b>21.1 (13.25 dB)</b>	Beam Tilt	<b>0.50 Degrees</b>
RMS Gain at Horizontal	<b>17.1 (12.33 dB)</b>	Frequency	<b>605 MHz</b>
Calculated / Measured	<b>Calculated</b>	Drawing #	<b>24W211050</b>



**Figure 2A - Detail  
 Auxiliary Antenna Elevation Pattern  
 WAVE(DT) Louisville, KY  
 Facility ID 13989  
 Ch. 36 476 kW 330 m**

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**Figure 3**  
**Proposed Auxiliary Contours**  
**WAVE(DT) Louisville, KY**  
**Facility ID 13989**  
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