

ENGINEERING EXHIBIT

Incentive Auction Channel Reassignment

Application for Digital Television Station Auxiliary Antenna Construction Permit

prepared for

Hampton Roads Educational Telecommunications Assoc., Inc.

WHRO-TV Hampton-Norfolk, VA

Facility ID 25932

Ch. 31 625 kW 294 m

Hampton Roads Educational Telecommunications Assoc., Inc. (“HRETA”) is the licensee of digital television station WHRO-TV, Facility ID 25932, Hampton-Norfolk, VA. Reassignment of WHRO-TV from Channel 16 to Channel 31 was specified in the *Incentive Auction Closing and Channel Reassignment Public Notice* (DA 17-317, released April 13, 2017). A Construction Permit (“CP”, file# 0000081777) authorizes construction of the WHRO-TV post-auction facility on Channel 31. *HRETA* herein seeks authorization for an auxiliary antenna for WHRO-TV on its post-auction Channel 31.

The reassignment CP authorizes WHRO-TV to operate with a nondirectional antenna at 1000 kW effective radiated power (ERP) and 375 meters height above average terrain (HAAT). The proposed auxiliary antenna is side-mounted on the same tower structure as the authorized main antenna, and will operate on Channel 31 at 625 kW ERP (directional) and an antenna HAAT of 294 meters. The subject antenna is presently authorized for use as an interim facility on WHRO-TV’s pre-auction Channel 16 (see STA file# 0000087206).

The WHRO-TV tower structure is associated with FCC Antenna Structure Registration number 1057874. No change to the overall structure height will result from this proposal.

The proposed antenna is an elliptically polarized directional RFS model SBB-EPD-24C160 (26.3 percent vertical polarization). The maximum horizontally polarized ERP is 625 kW and the maximum vertically polarized ERP is 164 kW. The vertically polarized component will not

exceed the horizontally polarized component at any azimuth. The directional antenna's azimuthal patterns are depicted in Figures 1 and 1A for horizontal and vertical polarization, respectively. The antenna's elevation pattern is supplied in Figures 2 and 2A.

Figure 3 shows that the 41 dB μ 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 10 percent antenna relative field in downward elevations (pattern data shows less than 10 percent relative field at angles 15 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 3.1 μ W/cm², which is 0.8 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.

Engineering Exhibit
Hampton Roads Educational
Telecommunications Assoc., Inc. (WHRO-TV)
(page 3 of 3)



List of Attachments

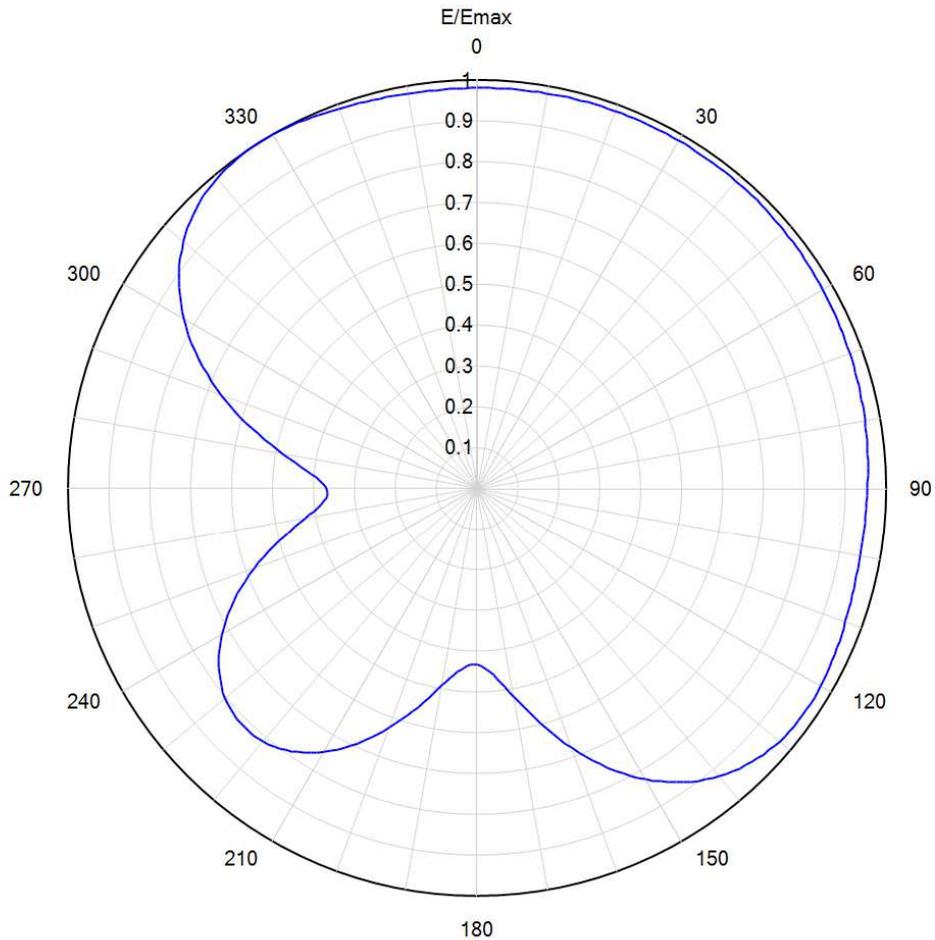
- | | |
|--------------|-----------------------------|
| Figure 1, 1A | Antenna Azimuthal Pattern |
| Figure 2, 2A | Antenna Elevation Pattern |
| Figure 3 | Proposed Auxiliary Contours |

Chesapeake RF Consultants, LLC

| | | |
|-----------------------|--------------------|--------------|
| Joseph M. Davis, P.E. | June 15, 2020 | |
| 207 Old Dominion Road | Yorktown, VA 23692 | 703-650-9600 |



Azimuth Pattern



Model: SBB-EP-24C160

Location:

Customer:

Date: June 15, 2020

Rotation Angle: 45 degrees

Note: Pattern Tolerance +/-5% of Emax

Polarization: Horizontal

Frequency: 575.00 MHz

Directivity: 1.4 (1.50 dB)

Elevation Angle: 0.75 degrees

Horizontal Unit Pattern:

File = C160 Hpol_585.pat



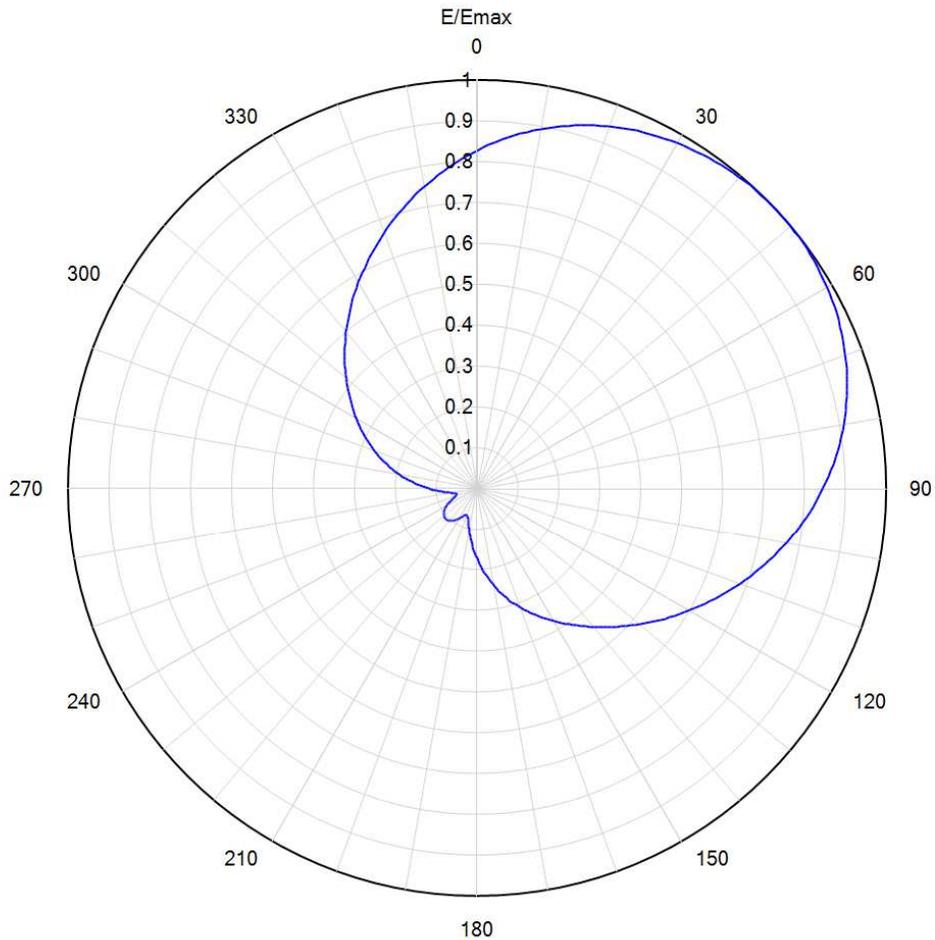
Figure 1
Auxiliary Antenna Azimuthal Pattern
Horizontal Polarization
WHRO-TV Hampton-Norfolk, VA
Facility ID 25932
Ch. 31 625 kW 294 m

prepared for
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June, 2020



Azimuth Pattern



Model: SBB-EP-24C160
 Location:
 Customer:
 Date: June 15, 2020
 Rotation Angle: 45 degrees

Polarization: Vertical
 Frequency: 575.00 MHz
 Directivity: 2.8 (4.41 dB)
 Elevation Angle: 0.75 degrees
 Horizontal Unit Pattern:

Note: Pattern Tolerance +/-5% of Emax

File = C160 Vpol_585.pat

Figure 1A
Auxiliary Antenna Azimuthal Pattern
Vertical Polarization (Ref = 26.3%)
WHRO-TV Hampton-Norfolk, VA
Facility ID 25932
Ch. 31 625 kW 294 m

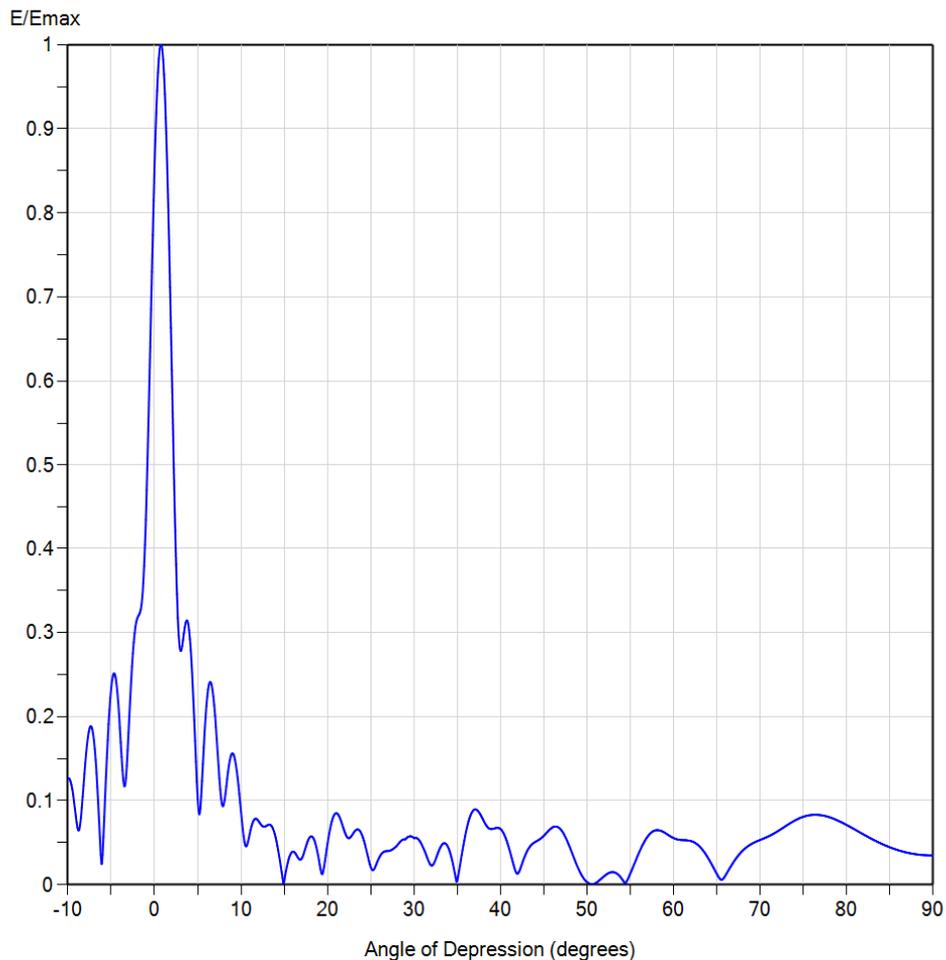
prepared for
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June, 2020





Elevation Pattern



| | | | |
|---------------|-------------------|---------------------------|------------------|
| Model: | SBB-EPD-24C160 | Frequency: | 575.00 MHz |
| Polarization: | <u>Horizontal</u> | Directivity (Main Lobe): | 22.3 (13.48 dBd) |
| Location: | Norfolk sidemount | Directivity (At Horizon): | 16.2 (12.10 dBd) |
| Customer: | ATC | Beam Tilt: | 0.75 degrees |
| Date: | October 22, 2018 | Azimuth Angle: | 283 degrees |



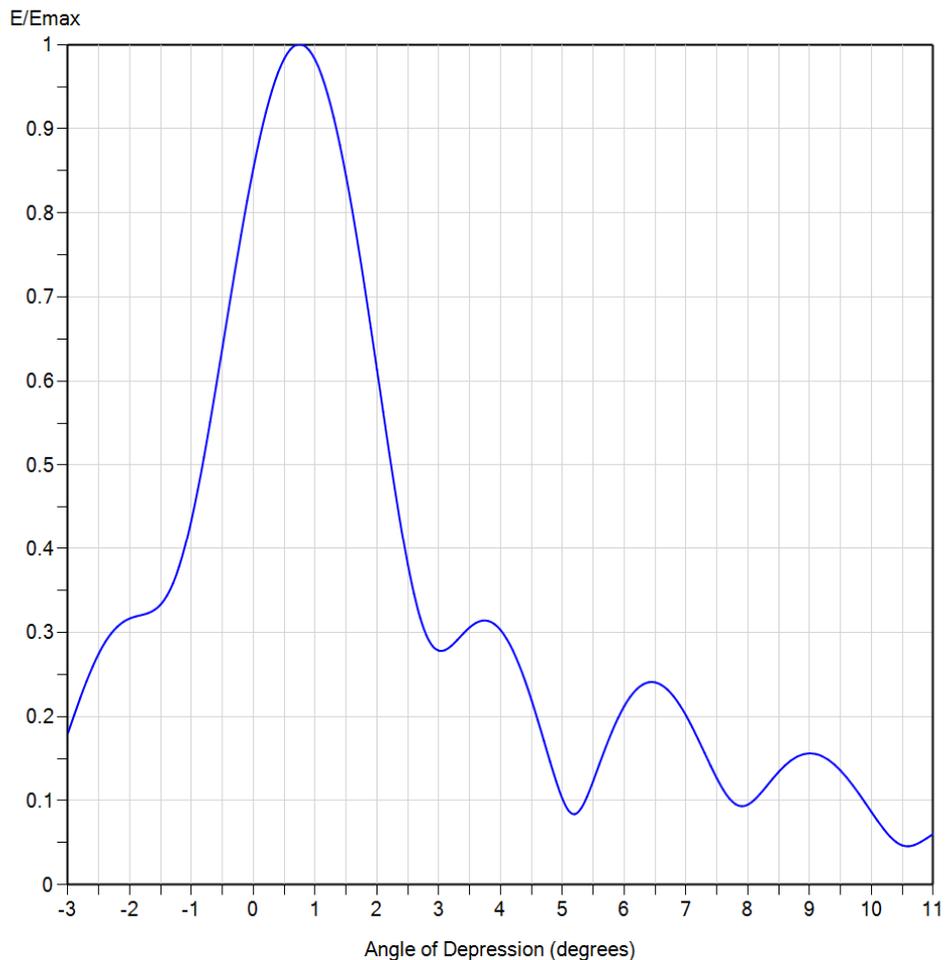
Figure 2
Auxiliary Antenna Elevation Pattern
WHRO-TV Hampton-Norfolk, VA
Facility ID 25932
Ch. 31 625 kW 294 m

prepared for
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Telecommunications Assoc., Inc.

June, 2020



Elevation Pattern



Model: SBB-EPD-24C160
Polarization: Horizontal
Location: Norfolk sidemount
Customer: ATC
Date: October 22, 2018

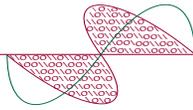
Frequency: 575.00 MHz
Directivity (Main Lobe): 22.3 (13.48 dBd)
Directivity (At Horizon): 16.2 (12.10 dBd)
Beam Tilt: 0.75 degrees
Azimuth Angle: 283 degrees



**Figure 2A - Detail
Auxiliary Antenna Elevation Pattern
WHRO-TV Hampton-Norfolk, VA
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prepared for
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June, 2020



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

Figure 3
Proposed Auxiliary Contours
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