

ENGINEERING EXHIBIT

Application for Digital Television Station Auxiliary Antenna Construction Permit

prepared for

Gray Television Licensee, LLC

WANF(DT) Atlanta, GA

Facility ID 72120

Ch. 19 753 kW 331 m

Gray Television Licensee, LLC (“Gray”) is the licensee of digital television station WANF(DT), Facility ID 72120, Channel 19, Atlanta GA. WANF is licensed (file# 0000152289) to operate with a nondirectional antenna at 1000 kW effective radiated power (ERP) and 329 meters height above average terrain (HAAT). *Gray* herein seeks authorization for an auxiliary antenna for WANF. The proposed auxiliary antenna will operate at 753 kW ERP (directional) and an antenna HAAT of 331 meters from a separate transmitting location.

Gray proposes to utilize an existing broadband shared antenna as the WANF auxiliary facility. The shared antenna is top-mounted on a separate tower structure located 7.2 km from the licensed WANF facility. The auxiliary facility’s tower structure is associated with FCC Antenna Structure Registration number 1206253. No change to the overall structure height will result from this proposal.

The proposed auxiliary antenna is a directional RFS model PEPL48U2221. The antenna provides for adjustable vertical polarization and will be configured for horizontal polarization only. The directional antenna’s azimuthal and elevation patterns are depicted in Figures 1 and 2, respectively.

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

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 $2.3 \mu\text{W}/\text{cm}^2$, which is 0.7 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.

List of Attachments

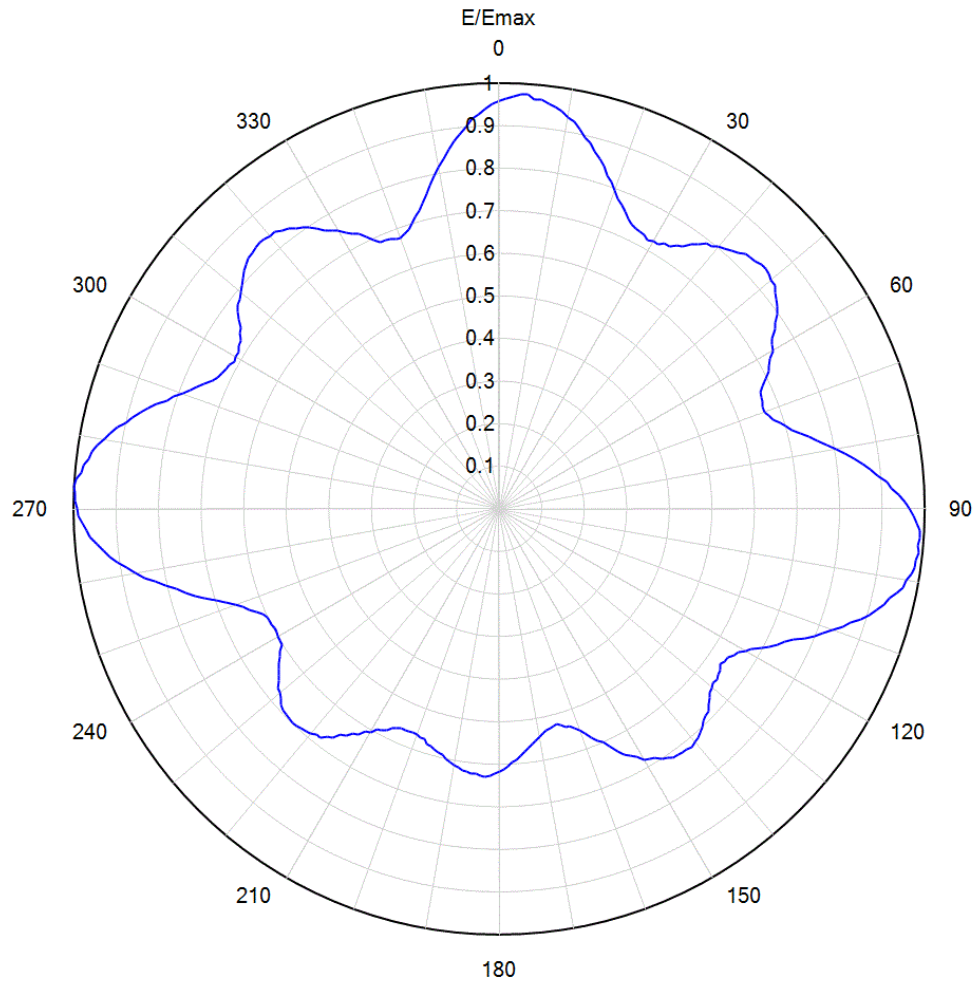
Figure 1	Antenna Azimuthal Pattern
Figure 2	Antenna Elevation Pattern
Figure 3	Proposed Auxiliary Contours
Form 2100	Saved Version of Engineering Sections of FCC Form at Time of Upload

Chesapeake RF Consultants, LLC

Joseph M. Davis, P.E.	December 9, 2022	
207 Old Dominion Road	Yorktown, VA 23692	703-650-9600



Horizontal Radiation Pattern



Model: PEPL48U2221
Location: Atlanta Chester Ave
Customer:
Date: October 20, 2022

Polarisation: Horizontal
Frequency: 503.00 MHz
Directivity: 1.7 (2.36 dB)
Elevation Angle: 0.80 degrees
Horizontal Unit Pattern:
File = az_h_imm_unit_503.pat

Note: Pattern Tolerance +/-5% of Emax



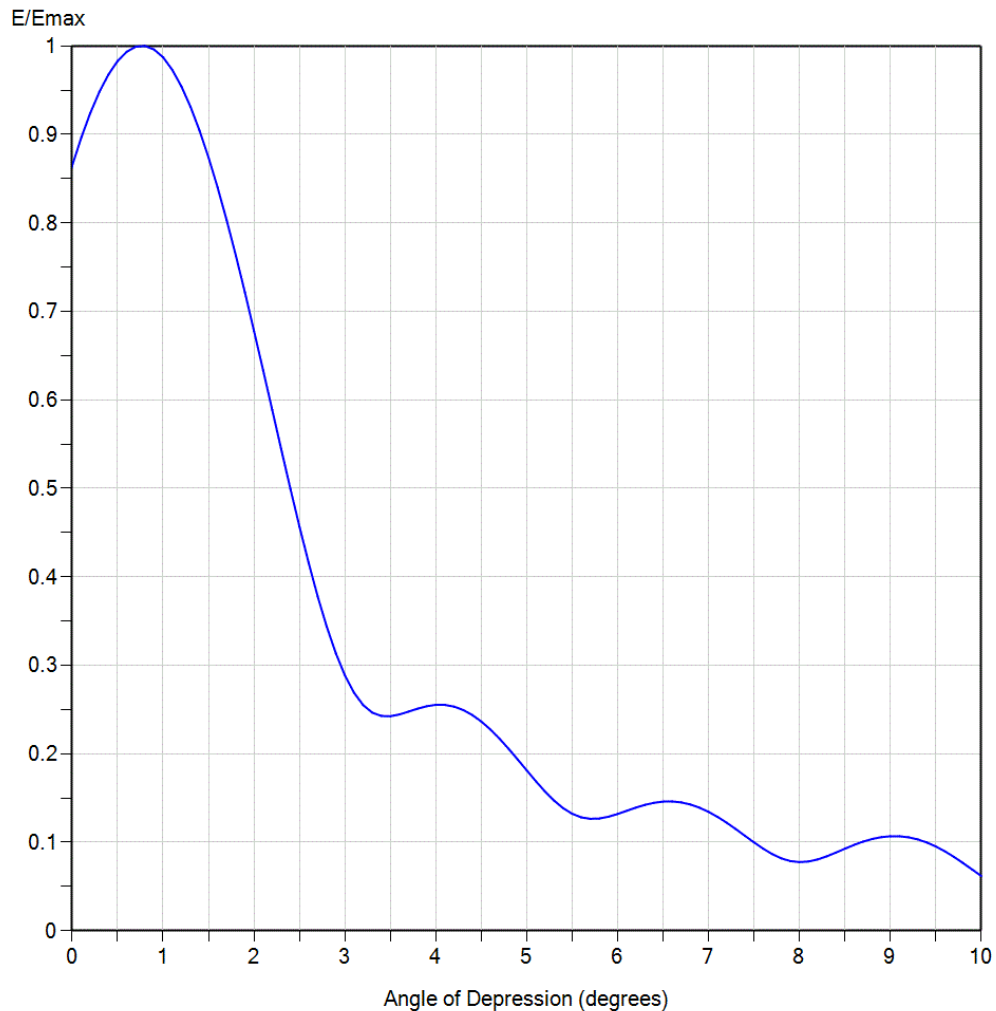
Figure 1
Auxiliary Antenna Azimuthal Pattern
WANF(DT) Atlanta, GA
Facility ID 72120
Ch. 19 753 kW 331 m

prepared for
Gray Television Licensee, LLC

December, 2022



Vertical Radiation Pattern



Model: PEPL48U2221
Location: Atlanta Chester Ave
Customer:
Date: October 20, 2022

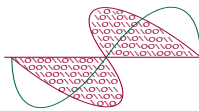
Polarisation: Horizontal
Frequency: 503.00 MHz
Directivity: 22.9 (13.60 dBd)
Beam Tilt: 0.75 degrees
Azimuth Angle: 273 degrees



Figure 2
Auxiliary Antenna Elevation Pattern
WANF(DT) Atlanta, GA
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Chesapeake RF Consultants, LLC
Radiofrequency Consulting Engineers
Digital Television and Radio

Figure 3
Proposed Auxiliary Contours
WANF(DT) Atlanta, GA
Facility ID 72120
Ch. 19 753 kW 331 m

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Proposed Auxiliary
753 kW 331 m Directional
48 dBu
(Principal Community)
41 dBu
(Noise Limited Service Contour)

Licensed Facility
File# 0000152289
1000 kW 329 m Nondirectional
41 dBu Contour

Atlanta, GA

Main Site

Auxiliary Site

Scale 1:1,500,000

0 20 40 60 km

Channel and
Facility
Information

Section	Question	Response
Proposed Community of License	Facility ID	72120
	State	Georgia
	City	ATLANTA
	DTX Channel	19
	Designated Market Area	Atlanta
Facility Type	Facility Type	Commercial
	Station Type	Auxiliary
Zone	Zone	2

Antenna Location
Data

Section	Question	Response
Antenna Structure Registration	Do you have an FCC Antenna Structure Registration (ASR) Number?	Yes
	ASR Number	1206253
Coordinates (NAD83)	Latitude	33° 44' 40.9" N+
	Longitude	084° 21' 35.7" W-
	Structure Type	GTOWER-Guyed Structure Used for Communication Purposes
	Overall Structure Height	329.2 meters
	Support Structure Height	291.4 meters
	Ground Elevation (AMSL)	295.4 meters
Antenna Data	Height of Radiation Center Above Ground Level	317.6 meters
	Height of Radiation Center Above Average Terrain	330.7 meters
	Height of Radiation Center Above Mean Sea Level	613.0 meters
	Effective Radiated Power	753 kW

Antenna Technical Data

Section	Question	Response
Antenna Type	Antenna Type	Directional Custom
	Do you have an Antenna ID?	No
	Antenna ID	
Antenna Manufacturer and Model	Manufacturer:	RFS
	Model	PEPL48U2221
	Rotation	0 degrees
	Electrical Beam Tilt	0.75
	Mechanical Beam Tilt	Not Applicable
	toward azimuth	
	Polarization	Horizontal
DTV and DTS: Elevation Pattern	Does the proposed antenna propose elevation radiation patterns that vary with azimuth for reasons other than the use of mechanical beam tilt?	No
	Uploaded file for elevation antenna (or radiation) pattern data	

Directional Antenna Relative Field Values (Pre-rotated Pattern)

Degree	Value	Degree	Value	Degree	Value	Degree	Value
0	0.958	90	0.963	180	0.617	270	0.992
10	0.933	100	0.972	190	0.612	280	0.942
20	0.795	110	0.834	200	0.564	290	0.792
30	0.725	120	0.669	210	0.605	300	0.714
40	0.803	130	0.654	220	0.688	310	0.793
50	0.835	140	0.716	230	0.672	320	0.837
60	0.742	150	0.682	240	0.601	330	0.755
70	0.664	160	0.555	250	0.659	340	0.677
80	0.806	170	0.544	260	0.868	350	0.815

Additional Azimuths

Degree	V _A
94	0.992
4	0.975
273	1.000
183	0.631