

ENGINEERING STATEMENT  
IN SUPPORT OF AN APPLICATION  
TO CONSTRUCT REPACKED FACILITIES  
PURSUANT TO DA 17-314  
ON BEHALF OF  
INDEPENDENCE TELEVISION COMPANY  
WDRB-DT, LOUISVILLE, KENTUCKY  
CHANNEL 32 724 KW HORIZONTAL  
217.2 KW VERTICAL ND ERP 390.4 METERS HAAT  
JULY 2017

COHEN, DIPPELL AND EVERIST, P.C.  
CONSULTING ENGINEERS  
RADIO AND TELEVISION  
WASHINGTON, D.C.

COHEN, DIPPELL AND EVERIST, P. C.

City of Washington            )  
  ) ss  
District of Columbia         )


Donald G. Everist, being duly sworn upon his oath, deposes and states that:

He is a graduate electrical engineer, a Registered Professional Engineer in the District of Columbia, and is President, Secretary and Treasurer of Cohen, Dippell and Everist, P.C., Consulting Engineers, Radio - Television, with offices at 1420 N Street, N.W., Suite One, Washington, D.C. 20005;


That his qualifications are a matter of record in the Federal Communications Commission;

That the attached engineering report was prepared by him or under his supervision and direction and

That the facts stated herein are true of his own knowledge, except such facts as are stated to be on information and belief, and as to such facts he believes them to be true.

  
Donald G. Everist  
District of Columbia  
Professional Engineer  
Registration No. 5714

Subscribed and sworn to before me this 10<sup>th</sup> day of July, 2017.

  
Notary Public

My Commission Expires: 2/28/2018



This engineering statement has been prepared in support of an application to construct repacked facilities on Channel 32 pursuant to DA 17-314 on behalf of Independence Television Company, licensee of WDRB-DT, Louisville, Kentucky. The purpose of the application is to replicate as near practical the unique coverage attained by the current non-directional diplexed antenna.

Present

WDRB-DT operates on Channel 49 and WMYO-DT operates on Channel 51. With the separation of only 2 channels permits the unique design by a top-mounted single non-directional antenna thereby taking advantage of maximum unaltered radiation pattern modification.

Incentive Auction Channel Assignment and Effect Under The Constraints on Coverage

The Incentive Auction technical technique did not take this important allocation fact into consideration when it assigned WDRB-DT Channel 32 and WMYO-DT Channel 16.

Given the time constraints, WDRB-DT and WMYO-DT undertook an analysis to determine if the WMYO's channel could be modified to permit a replacement diplexed single antenna<sup>1</sup>. Based on this analysis, using TVStudy 2.2 , no alternate channel was identified which would permit maximum equivalent coverage enjoyed by the current WMYO 1000 kW non-directional 390.4 meter HAAT operation to off-the-air viewers for almost eight years. Therefore, due to the Incentive Auction assigning two channels that do not lend themselves to be diplexed from a single antenna that

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<sup>1</sup>Of a design that meets industry acceptance offered by major domestic antenna manufacturer

produce a circular pattern full replication is not probable<sup>2</sup>. In other words, due to the new channel separation, a unique single antenna solution is not possible under current antenna design criteria. Therefore, other less perfect transmitter antenna techniques were examined. The least disruptive antenna arrangement appears to be under the current filing time constraints to modify the existing tower top to create a “T” bar. The “T” bar will be designed to handle both the Channel 32 and 16 antennas and will be designed to minimize the modification of either antenna radiation pattern.

After conducting several analyses of the existing tower, WDRB-DT staff does not believe that the facilities proposed herein can be constructed on the current tower. The tower while sturdy is over 45 years old and designed under earlier structural standards. Based on current knowledge, WDRB-DT staff anticipates that a new tower of the same basic height and dimensions as the existing tower will need to be constructed on essentially the same site as the existing tower. Please see the legal exhibit attached to this application explaining WDRB-DT’s post-repack construction plan.

WDRB-DT proposes to construct DTV facilities of 724 kW horizontal polarization/ 217.2 kW vertical non-directional at a height above average terrain of 390.4 meters.

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<sup>2</sup>Consideration was given to panel antenna which while offering wideband capabilities have pattern undulations and are inherently require more maintenance over the life of the antenna. Also, a sidemounted antenna was considered, however, its pattern will be affected by the tower and the transmission line passing through the antenna aperture.

Transmitter Site and Equipment Data

There are no AM stations located within 3.2 km of the proposed WDRB-DT tower site. There are no FM operations and there is one other full-service DTV facility, WMYO-DT, within 100 meters.

The DTV antenna will be top-mounted on the tower. The WDRB-DT proposed antenna will be located on a tower having a total overall structure height above ground of 304.8 meters (1000 feet). The existing transmitter site is located at 5257 South Skyline Drive, Floyds Knob, Indiana. The registration number for the tower is 1028421.

See there is no change in overall height, FAA airspace approval is not required.

Exhibit E-1 is a vertical sketch of the existing tower and the proposed transmitting antenna configuration.

The geographic coordinates of the existing site are as follows:

North Latitude: 38° 21' 00"

West Longitude: 85° 50' 57"

NAD-27

North Latitude: 38° 21' 00"

West Longitude: 85° 50' 57"

NAD-83

Equipment Data

Antenna: ERI, Model ATW25H3-ETO-32H (or equivalent) antenna with 75° electrical beam tilt. The vertical plane pattern and other exhibits required by Section 73.625(c) are herein included as Exhibit E-2.

Transmission Line: 350 meters (1150 ft) of ERI, Type EIA rigid TL, 7-3/16", 75 ohm or equivalent with loss of 0.302 dB/100 feet

Power Data

Transmitter output		49.54 kW	16.95 dBk
Transmission line efficiency/loss		78.38%	1.058 dB
Input power to the antenna		38.83 kW	15.89 dBk
Antenna power gain,	Horizontal	18.64	12.71 dB
Main Lobe	Vertical	5.59	7.48 dB
Effective Radiated Power,	Horizontal	724 kW	28.60 dBk
	Vertical	217.2 kW	23.37 dBk

Elevation Data

Vertical dimension for Channel WDRB-DT antenna	14.8 meters 48.5 feet
Overall height above ground of the existing antenna structure (including beacon and lightning rod)	304.8 meters 1000 feet
Center of radiation of Channel 32 antenna above ground	296 meters 971 feet
Elevation of site above mean sea level	292.9 meters 961 feet

Center of radiation of Channel 32 antenna above mean sea level	588.9 meters 1932 feet
Overall height above mean sea level of existing tower and stacked antennas (including beacon)	597.7 meters 1961 feet
Antenna height above average terrain	390.4 meters 1280.8 feet

Note: Slight height differences may result due to conversion to metric.

#### Coverage

The average elevation data for 3.2 to 16.1 km along each radial are based upon the 3-second NGDC profile data and conforms very closely to the terrain information of that determined by using the 7.5 minute topographic maps on file at the Commission and has been previously established.

The F(50,90) DTV coverage contour has been computed every ten degrees in azimuth from reference to the propagation data for Channels 14-69, as published by the FCC in Figure 10b and Figure 10c, Section 73.699 of the FCC Rules and Regulations.

Utilizing the formula in Section 73.625(b)(2) of the Rules for the effective heights, it is found that the depression angle,  $A_h$ , varies from 0.503 to 0.595 degrees. Since the relative vertical field is greater than 90% of the maximum at these depression angles, the maximum power was used in determining the distance to the DTV contour.

Table I includes the distances to the 48 and 40.506 dBu F(50,90) coverage contours, the average elevation 3.2 to 16.1 km, and the antenna height above average terrain for each of the ten

degree spaced radials. Exhibit E-3 provides the 48 and 40.506 dBu F(50,90) coverage contours and demonstrates that the community of license is covered by the F(50,90) 48 dBu contour.

Total Radiofrequency Field Levels at WDRB-DT Tower Site

The total contribution by the proposed WDRB-DT broadcast facilities and the addition of the proposed operation of WMYO-DT at 2 meters above ground level is less than two percent of the current FCC guidelines for uncontrolled/general population exposure.

The total percentage of radiofrequency field levels ("RFF") can be calculated by combining the percentage contribution of each station.

<u>Station</u>	<u>ERP</u> (kW)	<u>Frequenc</u> <u>y</u> (MHz)	<u>Ch</u>	<u>RCAGL</u> (m)	<u>Relative Field</u> 20°-90°	<u>S</u> ( $\mu\text{W}/\text{cm}^2$ )	<u>RFF</u> (%)
WMYO-DT Proposed	487H 146.10	482.488	16	296	0.067	0.845	<1.0
WDRB-DT Proposed	724H 217.2V	578-584	32	296	0.043	0.672	<1.0

For DTV operation, WDRB-DT proposes to use an ERI, Type ATW 25H3-ETO-32H or equivalent antenna. The elevation pattern for this antenna shows a maximum relative field of less than 0.043 towards the ground in the vicinity of the tower.

Using this relative field factor and the procedures prescribed in OET Bulletin 65, the maximum RFF resulting from the proposed operation is less than one  $\mu\text{W}/\text{cm}^2$ . This is less than one% of the 387  $\mu\text{W}/\text{cm}^2$  maximum human exposure to RFF recommended by the current FCC guidelines for the uncontrolled/general population.



Authorized personnel and rigging contractors will be alerted to the potential zone of high field level on the tower, and if necessary, the station will operate with reduced power or terminate the operation of the transmitter as appropriate when it is necessary for authorized personnel or contractors to perform work on the tower. Workers and the general public, therefore, will not be subjected to RFF levels in excess of the current FCC guidelines.

Environmental Assessment

An environmental assessment ("EA") is categorically excluded under Section 1.1306 of the FCC Rules and Regulations as the tower was constructed prior to the requirements specified in WT Docket No. 03-128 and the licensee indicates:

- (a)(1) The existing\* tower is not located in an officially designated wilderness area.
- (a)(2) The existing\* tower is not located in an officially designated wildlife preserve.
- (a)(3) The proposed facilities on an existing\* tower will not affect any listed threatened or endangered species or habitats.
- (a)(3)(ii) The proposed facilities on an existing\* tower will not jeopardize the continued existence of any proposed endangered or threatened species or likely to result in the destruction or adverse modification of proposed critical habitats.
- (a)(4) The proposed facilities located on a tower which was built prior to the adoption of WT Docket No. 03-128 and is grandfathered and has not affected any known districts, sites, buildings, structures, or objects significant in American history, architecture, archaeology, engineering, or culture.
- (a)(5) The existing\* tower is not located near any known Indian religious sites.
- (a)(6) The existing\* tower is not located in a flood plain.

- (a)(7) The installation of the DTV facilities on an existing\* guyed tower will not involve a significant change in surface features of the ground in the vicinity of the tower.
- (a)(8) It is not proposed to equip the tower with high intensity white lights unless required by the FAA.
- (b) Workers and the general public will not be subjected to RFF levels in excess of the current FCC guidelines contained in OET Bulletin No. 65, Edition 97-01, dated August 1997 and Supplement A.

\*WDRB-DT will obtain all required approvals as needed for any new tower construction.

ABOVE GROUND

ABOVE MEAN SEA LEVEL

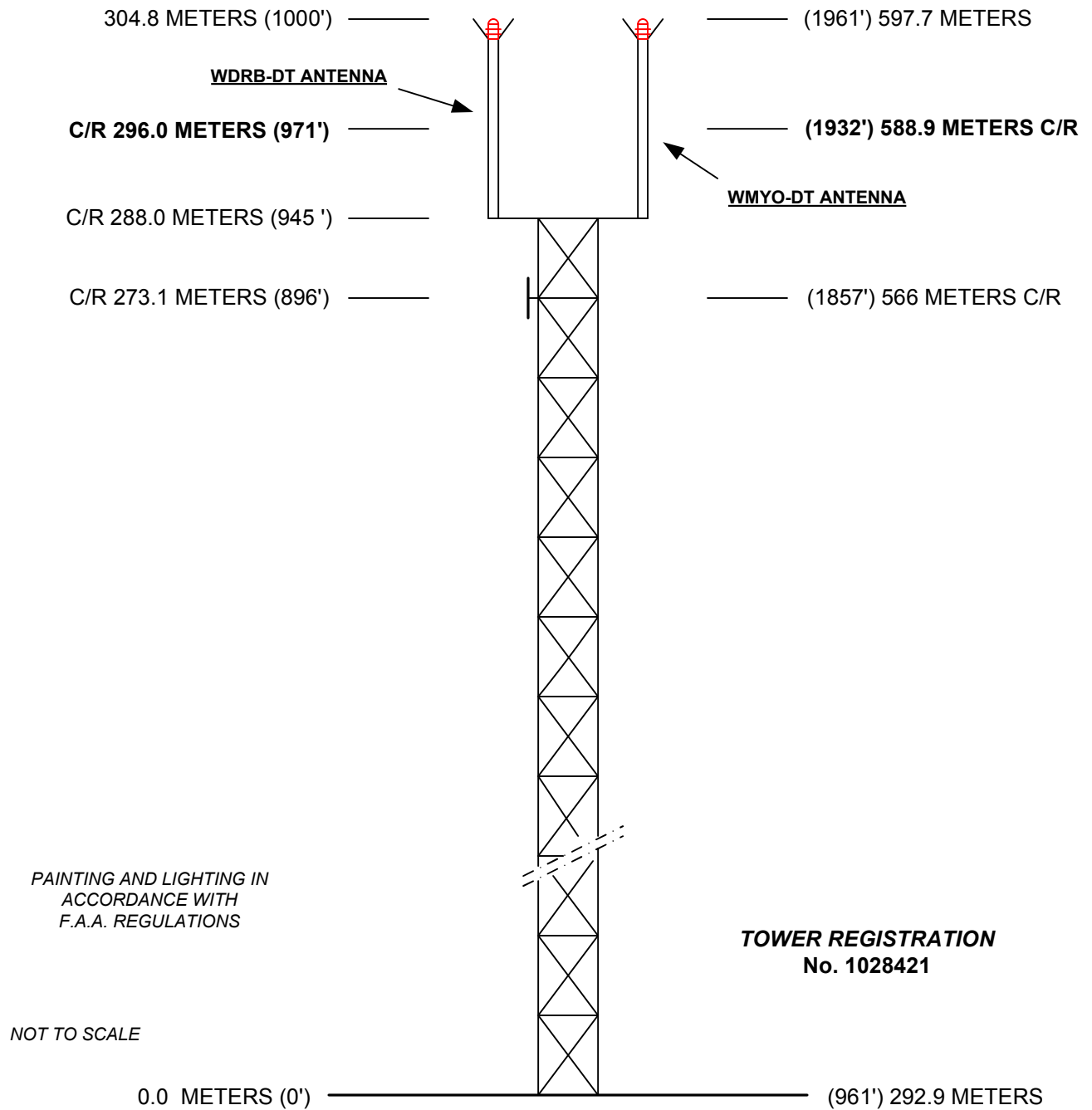


EXHIBIT E - 1  
TOWER SKETCH  
WDRB-DT, LOUISVILLE, KENTUCKY  
JUNE 2017

EXHIBIT E-2

ANTENNA MANUFACTURER DATA

# **Preliminary Specification for TRASAR® Top Mounted UHF Elliptically Polarized Coaxial Slotted Array Television Antenna**

**WDRB (DT), RF Channel 32  
Block Communications, Louisville, KY**

**June 7, 2017**

**Antenna Model:  
ATW25H3-ETO-32H**

**Specification Number  
20170523-587-2**

Electronics Research, Inc. 7777 Gardner Road Chandler IN 47610-9219 USA  
+1 812 925-6000 (tel) +1 812 925-4030 (fax)

Your Single Source for Broadcast Solutions™ Call Toll-free at 877 ERI-LINE Visit Online at [www.eriinc.com](http://www.eriinc.com)

**Preliminary Specification for  
TRASAR® Top Mounted  
UHF Elliptically Polarized  
Coaxial Slotted Array Television Antenna**

**Electrical Characteristics:**

<b>Channel:</b>	32		
<b>Frequency:</b>	578 MHz to 584 MHz		
<b>Service:</b>	ATSC		
<b>Azimuth Pattern Number:</b>	Horizontal Polarization	ATW-O-H	
	Vertical Polarization	ATW-O-V	
<b>Elevation Pattern Number:</b>	Horizontal Polarization	ATW25H3H	
	Vertical Polarization	ATW22H3V	
<b>Azimuth Directivity:</b>	Horizontal Polarization	1.00	(0.00 dB)
	Vertical Polarization	1.00	(0.00 dB)
<b>Elevation Directivity:</b>	Horizontal Polarization	25.00	(13.98 dBd)
	Vertical Polarization	22.00	(13.42 dBd)
<b>Peak Power Gain:</b>	Horizontal Polarization	18.64	(12.71 dBd)
	Vertical Polarization	5.59	(7.48 dBd)
<b>Gain at Horizontal:</b>	Horizontal Polarization	12.57	(10.99 dBd)
	Vertical Polarization	3.84	(5.85 dBd)
<b>Vertical/Horizontal Ratio:</b>	0.30		
<b>Electrical Beam Tilt:</b>	0.75 Degrees		
<b>Input Power Required:</b>	38.83 kW (15.89 dBk)		
<b>RF Input:</b>	7-3/16-inch, 75 ohm, flanged male		
<b>Input Power Rating (maximum):</b>	60 kW Average Power, 8VSB		
<b>Antenna VSWR (maximum):</b>	1.10 Over 6 MHz Channel		

**Preliminary Specification for  
TRASAR® Top Mounted  
UHF Elliptically Polarized  
Coaxial Slotted Array Television Antenna**

**Mechanical Characteristics:**

Mounting Configuration:			Top Mount
Height of Antenna (D):		48.5 feet	(14.8 meters)
Height of Center of Radiation (B):		24.3 feet	(7.4 meters)
Overall Height (Includes four 3.5 ft lightning spurs) (A):		52.0 feet	(15.9 meters)
Deicing:		Fully enclosed pressurized radome	
Radome Diameter (C):		18.4 inches	(467 millimeters)
Radome Color:		Aviation Orange	
Climbing Device:		Fiberglass Ladder	
Calculated Weight <sup>1</sup> :	No Ice	7,525 lbm	(3413.3 kg)
Windload Data <sup>3</sup> :	EPA	No Ice	64.2 sq.ft. (5.96 sq.m.)
		0.5inch (13 mm) ice	131.7 sq.ft. (12.23 sq.m.)
Effective Moment Arm <sup>3</sup> :	EPA	No Ice	26.9 feet (8.21 meters)
		0.5inch (13 mm) ice	26.3 feet (8.02 meters)

MOUNTING FLANGE BOLT CIRCLE<sup>2</sup>: Quantity (16), 1.38 inch holes for 1.25 inch bolts, equally spaced on a 21.50 inch bolt circle.

**This antenna is designed to be supported by a structure that can resist the antenna base reactions and which provides a support that is rigid in the three translational and three rotational degrees of freedom.**

1 Please note, the listed weights and effective wind areas are based on the PRELIMINARY design of the antenna. Final As-Built values for the antenna are typically within +/-10% of the Preliminary design values, and will be provided in the technical manual that accompanies the antenna. Specified loads include the antenna, beacon and lightning spurs only. Custom mounting brackets/adapters and/or antenna input section are NOT included.

2 The mounting flange specified is the standard ERI mounting flange used for this antenna configuration. In those instances where an existing top mounted antenna is being replaced the antenna supplied will be designed with a mounting flange to match that of the existing antenna unless electrical and /or mechanical requirements for the new antenna preclude the matching flange. Customer responsible for supplying verified flange requirements for the flange configuration being matched.

3 Based on a wind speed of 90 miles per hour MPH (145 kph) (fastest mile) no ice and 30 MPH (48kph) with 0.75-inches in base design ice (2.1-inches actual tiz) with a height above ground level (HAGL) of 945 feet (288 m) per ANSI/TIA-222-G. Structure Class II, Exposure Category C and Topographic Category I. EPA values include four lightning spurs & a standard beacon.

**NOTE: The purchaser or their representative shall be required to contact the tower owner, state and/or local building officials for specific design requirements and suitable parameters for a particular structure. Any variation from the parameters shown above must be communicated to ERI for comprehensive assessment.**

## Broadcast Antenna System

### Power Analysis

**WDRB (DT)**  
**Block Communications**  
**Louisville, KY**  
**ATW25H3-ETO-32H**

**RF Channel: 32**

#### Antenna Parameters

##### Azimuth Directivity:

Horizontal: 1.00 (0.00 dB)  
Vertical: 1.00 (0.00 dB)

##### Elevation Directivity:

Horizontal: 25.00 (13.98 dB)  
Vertical: 22.00 (13.42 dB)

#### Transmission Line

##### Vertical Run:

Type: 7-3/16-inch, 75 ohm, rigid line  
Length: 950 feet 289.6 meters  
Attenuation: 0.092 dB/100 feet 0.302 dB/100 mtrs

##### Horizontal Run:

Type: 7-3/16-inch, 75 ohm, rigid line  
Length: 200 feet 61.0 meters  
Attenuation: 0.092 dB/100 feet 0.302 dB/100 mtrs

##### Effective Radiated Power:

Horizontal: 724.00 kW (28.60 dBk)  
Vertical: 217.20 kW (23.37 dBk)

##### Power Gain:

Horizontal: 18.64 numeric (12.71 dBd)  
Vertical: 5.59 numeric (7.48 dBd)

##### Antenna Input Power:

38.83 kW (15.89 dBk)

##### Transmission Line Losses:

-10.71 kW (1.058 dB)

**Total Losses:** 1.058 dB

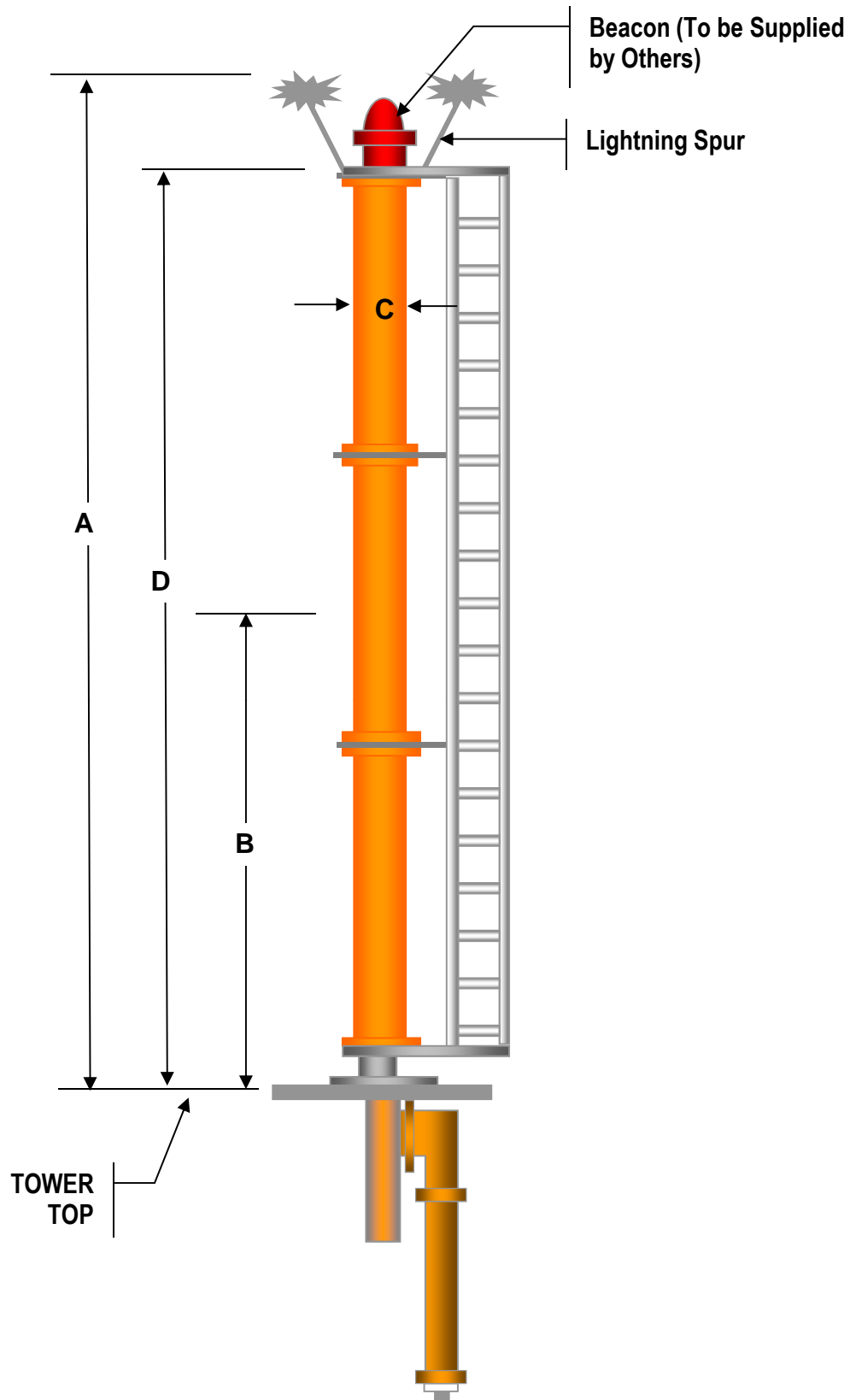
**Line Efficiency:** 78.38%

##### Transmitter Power Output:

49.54 kW  
(16.95 dBk)



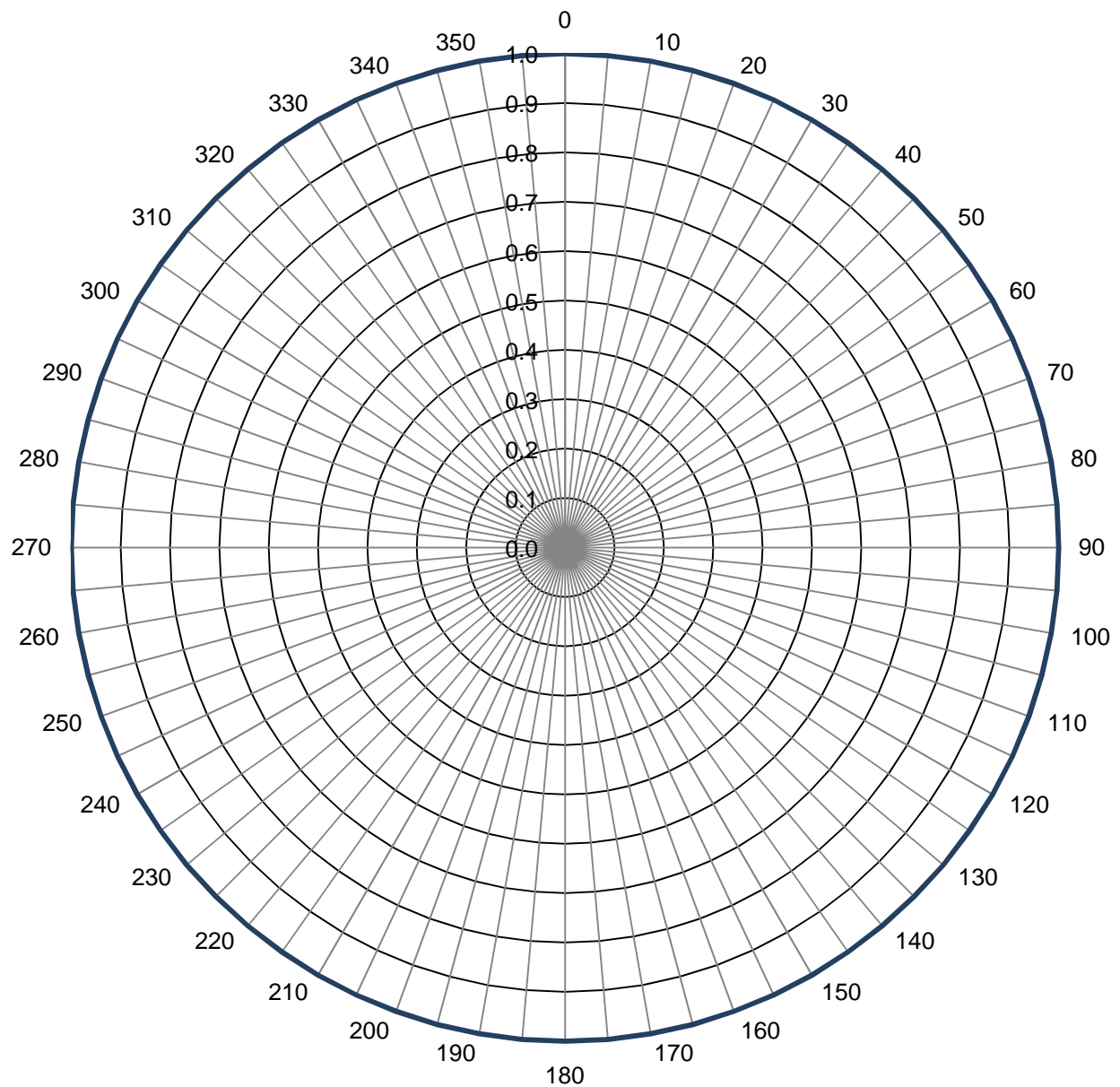
Typical Mounting Configuration Shown. Actual Configuration May Vary.



## Azimuth Pattern

Type:	ATW-O-H	Polarization:	Horizontal
Directivity:	1.00 numeric (0.00 dB)	Frequency:	32 (ATSC)
Peak(s) at:		Location:	Louisville, KY
		NOTE: Pattern shape and directivity may vary with channel and mounting configuration.	

Relative Field

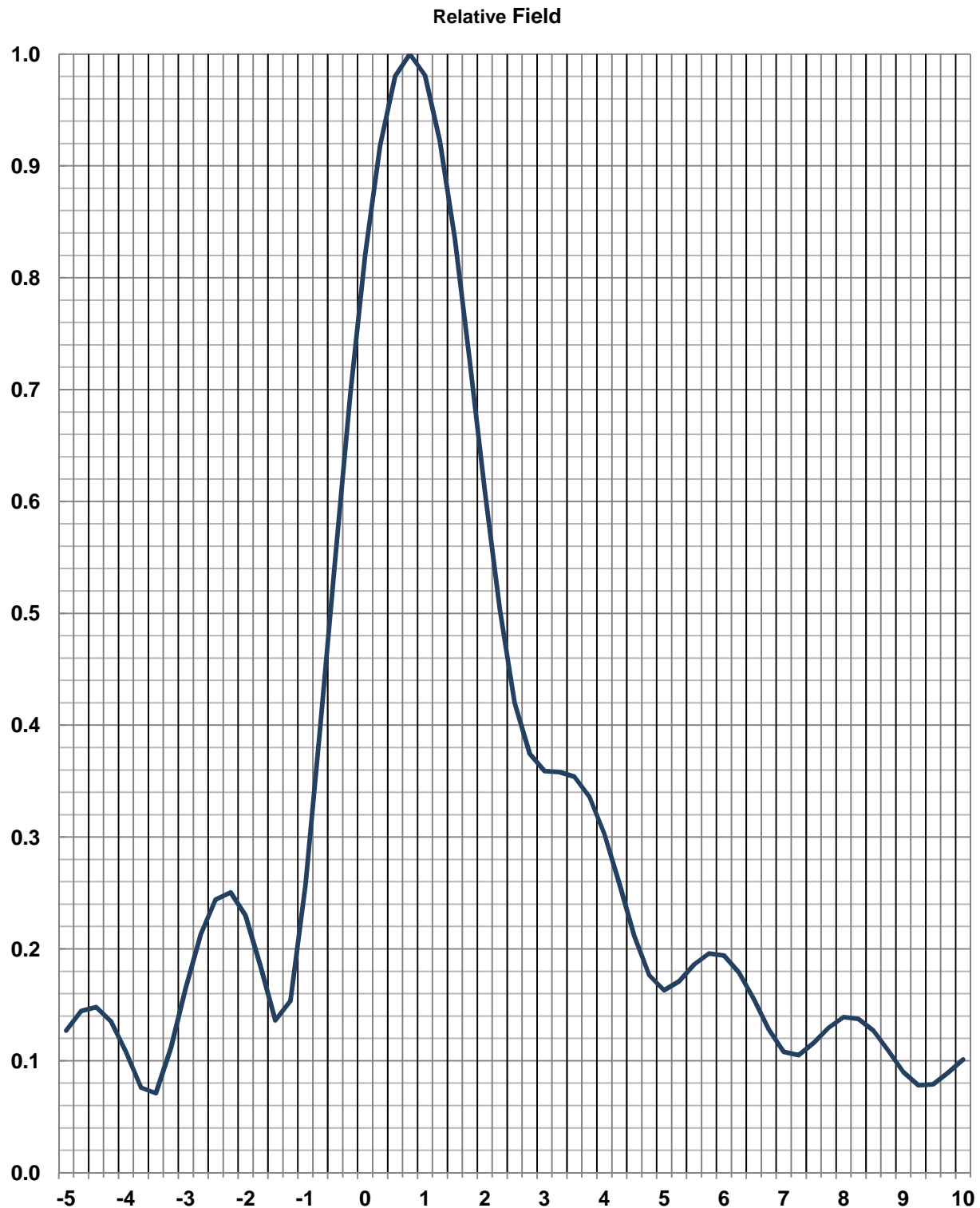


**Tabulated Data for Azimuth Pattern**Type: ATW-O-H

Angle	Field	dB	Angle	Field	dB	Angle	Field	dB	Angle	Field	dB
0	1.000	0.00	100	1.000	0.00	200	1.000	0.00	300	1.000	0.00
2	1.000	0.00	102	1.000	0.00	202	1.000	0.00	302	1.000	0.00
4	1.000	0.00	104	1.000	0.00	204	1.000	0.00	304	1.000	0.00
6	1.000	0.00	106	1.000	0.00	206	1.000	0.00	306	1.000	0.00
8	1.000	0.00	108	1.000	0.00	208	1.000	0.00	308	1.000	0.00
10	1.000	0.00	110	1.000	0.00	210	1.000	0.00	310	1.000	0.00
12	1.000	0.00	112	1.000	0.00	212	1.000	0.00	312	1.000	0.00
14	1.000	0.00	114	1.000	0.00	214	1.000	0.00	314	1.000	0.00
16	1.000	0.00	116	1.000	0.00	216	1.000	0.00	316	1.000	0.00
18	1.000	0.00	118	1.000	0.00	218	1.000	0.00	318	1.000	0.00
20	1.000	0.00	120	1.000	0.00	220	1.000	0.00	320	1.000	0.00
22	1.000	0.00	122	1.000	0.00	222	1.000	0.00	322	1.000	0.00
24	1.000	0.00	124	1.000	0.00	224	1.000	0.00	324	1.000	0.00
26	1.000	0.00	126	1.000	0.00	226	1.000	0.00	326	1.000	0.00
28	1.000	0.00	128	1.000	0.00	228	1.000	0.00	328	1.000	0.00
30	1.000	0.00	130	1.000	0.00	230	1.000	0.00	330	1.000	0.00
32	1.000	0.00	132	1.000	0.00	232	1.000	0.00	332	1.000	0.00
34	1.000	0.00	134	1.000	0.00	234	1.000	0.00	334	1.000	0.00
36	1.000	0.00	136	1.000	0.00	236	1.000	0.00	336	1.000	0.00
38	1.000	0.00	138	1.000	0.00	238	1.000	0.00	338	1.000	0.00
40	1.000	0.00	140	1.000	0.00	240	1.000	0.00	340	1.000	0.00
42	1.000	0.00	142	1.000	0.00	242	1.000	0.00	342	1.000	0.00
44	1.000	0.00	144	1.000	0.00	244	1.000	0.00	344	1.000	0.00
46	1.000	0.00	146	1.000	0.00	246	1.000	0.00	346	1.000	0.00
48	1.000	0.00	148	1.000	0.00	248	1.000	0.00	348	1.000	0.00
50	1.000	0.00	150	1.000	0.00	250	1.000	0.00	350	1.000	0.00
52	1.000	0.00	152	1.000	0.00	252	1.000	0.00	352	1.000	0.00
54	1.000	0.00	154	1.000	0.00	254	1.000	0.00	354	1.000	0.00
56	1.000	0.00	156	1.000	0.00	256	1.000	0.00	356	1.000	0.00
58	1.000	0.00	158	1.000	0.00	258	1.000	0.00	358	1.000	0.00
60	1.000	0.00	160	1.000	0.00	260	1.000	0.00	360	1.000	0.00
62	1.000	0.00	162	1.000	0.00	262	1.000	0.00			
64	1.000	0.00	164	1.000	0.00	264	1.000	0.00			
66	1.000	0.00	166	1.000	0.00	266	1.000	0.00			
68	1.000	0.00	168	1.000	0.00	268	1.000	0.00			
70	1.000	0.00	170	1.000	0.00	270	1.000	0.00			
72	1.000	0.00	172	1.000	0.00	272	1.000	0.00			
74	1.000	0.00	174	1.000	0.00	274	1.000	0.00			
76	1.000	0.00	176	1.000	0.00	276	1.000	0.00			
78	1.000	0.00	178	1.000	0.00	278	1.000	0.00			
80	1.000	0.00	180	1.000	0.00	280	1.000	0.00			
82	1.000	0.00	182	1.000	0.00	282	1.000	0.00			
84	1.000	0.00	184	1.000	0.00	284	1.000	0.00			
86	1.000	0.00	186	1.000	0.00	286	1.000	0.00			
88	1.000	0.00	188	1.000	0.00	288	1.000	0.00			
90	1.000	0.00	190	1.000	0.00	290	1.000	0.00			
92	1.000	0.00	192	1.000	0.00	292	1.000	0.00			
94	1.000	0.00	194	1.000	0.00	294	1.000	0.00			
96	1.000	0.00	196	1.000	0.00	296	1.000	0.00			
98	1.000	0.00	198	1.000	0.00	298	1.000	0.00			

### Elevation Pattern

Type:	ATW25H3H		Polarization:	Horizontal
Directivity:			Frequency:	32 (ATSC)
Main Lobe:	25.00 numeric	(13.98 dB)	Location:	Louisville, KY
Horizontal:	16.85 numeric	(12.27 dB)	Beam Tilt:	0.75 degrees



**Tabulated Data for Elevation Pattern**Type: ATW25H3H

-5 to 10 degrees in 0.25 degree increments.

10 to 90 degrees in 0.50 degree increments.

Angle	Field	dB	Angle	Field	dB	Angle	Field	dB	Angle	Field	dB	Angle	Field	dB
-5.00	0.127	-17.92	7.25	0.105	-19.58	29.00	0.040	-27.96	53.50	0.012	-38.42	78.00	0.040	-27.96
-4.75	0.145	-16.80	7.50	0.116	-18.71	29.50	0.031	-30.17	54.00	0.020	-33.98	78.50	0.037	-28.64
-4.50	0.148	-16.59	7.75	0.130	-17.75	30.00	0.021	-33.56	54.50	0.029	-30.75	79.00	0.034	-29.37
-4.25	0.135	-17.39	8.00	0.139	-17.14	30.50	0.027	-31.37	55.00	0.035	-29.12	79.50	0.030	-30.46
-4.00	0.108	-19.33	8.25	0.138	-17.23	31.00	0.037	-28.64	55.50	0.036	-28.87	80.00	0.027	-31.37
-3.75	0.076	-22.38	8.50	0.127	-17.92	31.50	0.038	-28.40	56.00	0.032	-29.90	80.50	0.023	-32.77
-3.50	0.071	-22.97	8.75	0.109	-19.25	32.00	0.030	-30.46	56.50	0.023	-32.77	81.00	0.018	-34.89
-3.25	0.112	-19.05	9.00	0.090	-20.92	32.50	0.020	-33.98	57.00	0.013	-37.72	81.50	0.015	-36.48
-3.00	0.165	-15.65	9.25	0.078	-22.16	33.00	0.024	-32.40	57.50	0.012	-38.42	82.00	0.011	-39.17
-2.75	0.213	-13.43	9.50	0.079	-22.05	33.50	0.034	-29.37	58.00	0.021	-33.56	82.50	0.008	-41.94
-2.50	0.244	-12.25	9.75	0.090	-20.96	34.00	0.037	-28.64	58.50	0.030	-30.46	83.00	0.005	-46.02
-2.25	0.251	-12.02	10.00	0.101	-19.91	34.50	0.030	-30.46	59.00	0.036	-28.87	83.50	0.003	-50.46
-2.00	0.230	-12.77	10.50	0.106	-19.49	35.00	0.020	-33.98	59.50	0.037	-28.64	84.00	0.002	-53.98
-1.75	0.185	-14.68	11.00	0.083	-21.62	35.50	0.021	-33.56	60.00	0.033	-29.63	84.50	0.003	-50.46
-1.50	0.136	-17.33	11.50	0.060	-24.44	36.00	0.031	-30.17	60.50	0.026	-31.70	85.00	0.004	-47.96
-1.25	0.154	-16.28	12.00	0.073	-22.73	36.50	0.036	-28.87	61.00	0.016	-35.92	85.50	0.005	-46.02
-1.00	0.257	-11.80	12.50	0.088	-21.11	37.00	0.032	-29.90	61.50	0.008	-41.94	86.00	0.005	-46.02
-0.75	0.399	-7.98	13.00	0.078	-22.16	37.50	0.022	-33.15	62.00	0.014	-37.08	86.50	0.006	-44.44
-0.50	0.550	-5.19	13.50	0.055	-25.19	38.00	0.017	-35.39	62.50	0.024	-32.40	87.00	0.005	-46.02
-0.25	0.695	-3.17	14.00	0.052	-25.68	38.50	0.026	-31.70	63.00	0.032	-29.90	87.50	0.005	-46.02
0.00	0.821	-1.71	14.50	0.069	-23.22	39.00	0.034	-29.37	63.50	0.037	-28.64	88.00	0.004	-47.96
0.25	0.918	-0.74	15.00	0.072	-22.85	39.50	0.034	-29.37	64.00	0.038	-28.40	88.50	0.003	-50.46
0.50	0.980	-0.18	15.50	0.056	-25.04	40.00	0.027	-31.37	64.50	0.036	-28.87	89.00	0.002	-53.98
0.75	1.000	0.00	16.00	0.041	-27.74	40.50	0.017	-35.39	65.00	0.030	-30.46	89.50	0.001	-60.00
1.00	0.981	-0.17	16.50	0.052	-25.68	41.00	0.019	-34.42	65.50	0.022	-33.15	90.00	0.000	---
1.25	0.923	-0.70	17.00	0.062	-24.15	41.50	0.029	-30.75	66.00	0.012	-38.42			
1.50	0.835	-1.57	17.50	0.056	-25.04	42.00	0.035	-29.12	66.50	0.005	-46.02			
1.75	0.726	-2.78	18.00	0.038	-28.40	42.50	0.033	-29.63	67.00	0.012	-38.42			
2.00	0.610	-4.29	18.50	0.037	-28.64	43.00	0.024	-32.40	67.50	0.022	-33.15			
2.25	0.504	-5.96	19.00	0.052	-25.68	43.50	0.015	-36.48	68.00	0.030	-30.46			
2.50	0.420	-7.54	19.50	0.055	-25.19	44.00	0.019	-34.42	68.50	0.036	-28.87			
2.75	0.375	-8.53	20.00	0.043	-27.33	44.50	0.029	-30.75	69.00	0.039	-28.18			
3.00	0.359	-8.90	20.50	0.030	-30.46	45.00	0.035	-29.12	69.50	0.040	-27.96			
3.25	0.358	-8.92	21.00	0.038	-28.40	45.50	0.033	-29.63	70.00	0.039	-28.18			
3.50	0.354	-9.02	21.50	0.049	-26.20	46.00	0.025	-32.04	70.50	0.035	-29.12			
3.75	0.336	-9.47	22.00	0.047	-26.56	46.50	0.015	-36.48	71.00	0.029	-30.75			
4.00	0.303	-10.37	22.50	0.033	-29.63	47.00	0.018	-34.89	71.50	0.022	-33.15			
4.25	0.259	-11.75	23.00	0.027	-31.37	47.50	0.027	-31.37	72.00	0.013	-37.72			
4.50	0.212	-13.47	23.50	0.039	-28.18	48.00	0.034	-29.37	72.50	0.004	-47.96			
4.75	0.177	-15.07	24.00	0.046	-26.74	48.50	0.035	-29.12	73.00	0.005	-46.02			
5.00	0.163	-15.76	24.50	0.039	-28.18	49.00	0.029	-30.75	73.50	0.013	-37.72			
5.25	0.171	-15.34	25.00	0.027	-31.37	49.50	0.019	-34.42	74.00	0.021	-33.56			
5.50	0.186	-14.61	25.50	0.028	-31.06	50.00	0.014	-37.08	74.50	0.028	-31.06			
5.75	0.196	-14.15	26.00	0.039	-28.18	50.50	0.021	-33.56	75.00	0.033	-29.63			
6.00	0.194	-14.24	26.50	0.043	-27.33	51.00	0.031	-30.17	75.50	0.037	-28.64			
6.25	0.179	-14.94	27.00	0.035	-29.12	51.50	0.036	-28.87	76.00	0.040	-27.96			
6.50	0.155	-16.19	27.50	0.023	-32.77	52.00	0.035	-29.12	76.50	0.042	-27.54			
6.75	0.128	-17.86	28.00	0.028	-31.06	52.50	0.028	-31.06	77.00	0.042	-27.54			
7.00	0.108	-19.33	28.50	0.038	-28.40	53.00	0.018	-34.89	77.50	0.041	-27.74			

**Azimuth Pattern**

Type: ATW-O-V

Directivity: 1.00 numeric (0.00 dB)

Peak(s) at:

Polarization:

Vertical

Frequency:

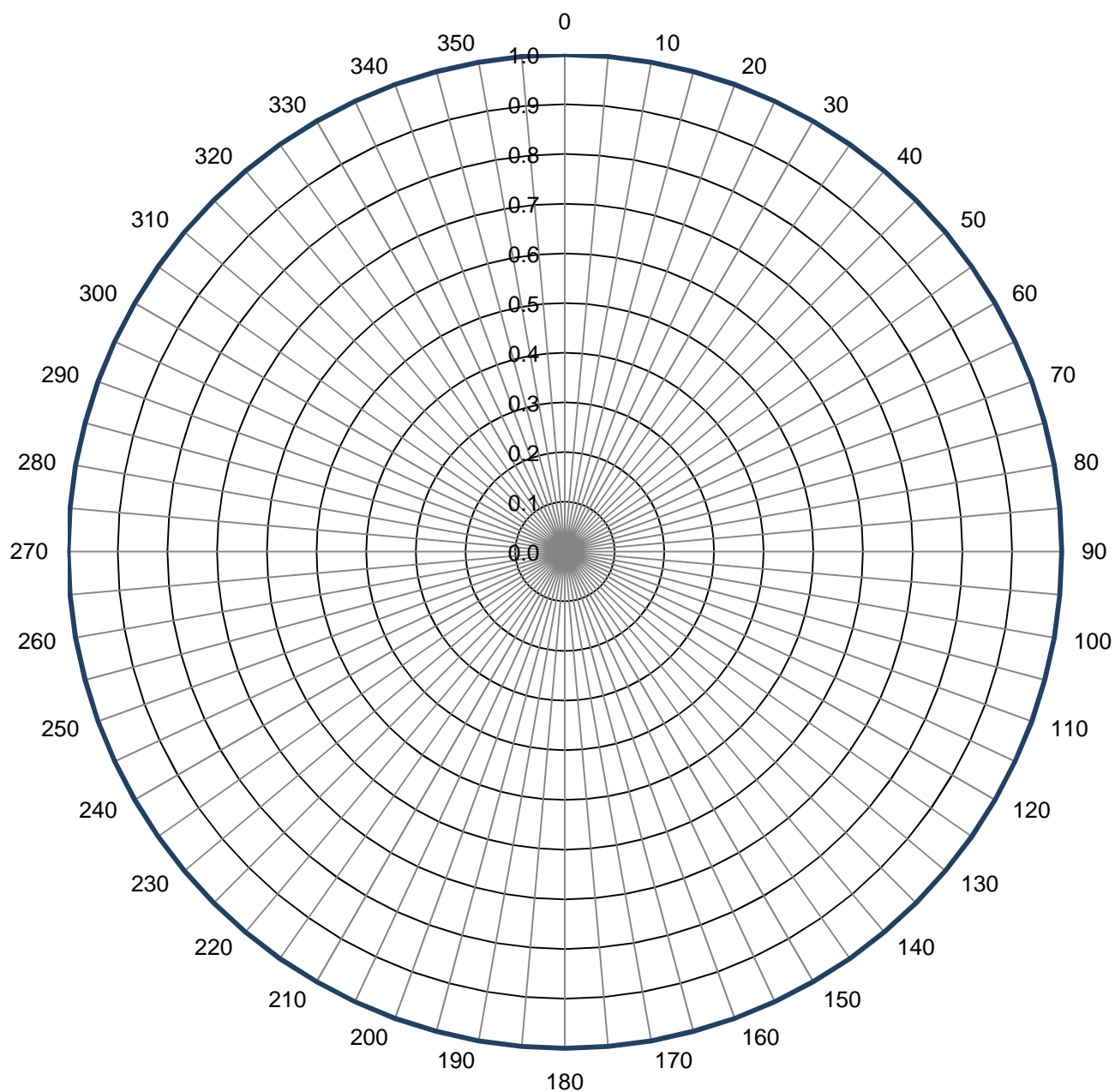
32 (ATSC)

Location:

Louisville, KY

NOTE: Pattern shape and directivity may vary with channel and mounting configuration.

Relative Field



**Tabulated Data for Azimuth Pattern**Type: ATW-O-V

Angle	Field	dB
0	1.000	0.00
2	1.000	0.00
4	1.000	0.00
6	1.000	0.00
8	1.000	0.00
10	1.000	0.00
12	1.000	0.00
14	1.000	0.00
16	1.000	0.00
18	1.000	0.00
20	1.000	0.00
22	1.000	0.00
24	1.000	0.00
26	1.000	0.00
28	1.000	0.00
30	1.000	0.00
32	1.000	0.00
34	1.000	0.00
36	1.000	0.00
38	1.000	0.00
40	1.000	0.00
42	1.000	0.00
44	1.000	0.00
46	1.000	0.00
48	1.000	0.00
50	1.000	0.00
52	1.000	0.00
54	1.000	0.00
56	1.000	0.00
58	1.000	0.00
60	1.000	0.00
62	1.000	0.00
64	1.000	0.00
66	1.000	0.00
68	1.000	0.00
70	1.000	0.00
72	1.000	0.00
74	1.000	0.00
76	1.000	0.00
78	1.000	0.00
80	1.000	0.00
82	1.000	0.00
84	1.000	0.00
86	1.000	0.00
88	1.000	0.00
90	1.000	0.00
92	1.000	0.00
94	1.000	0.00
96	1.000	0.00
98	1.000	0.00

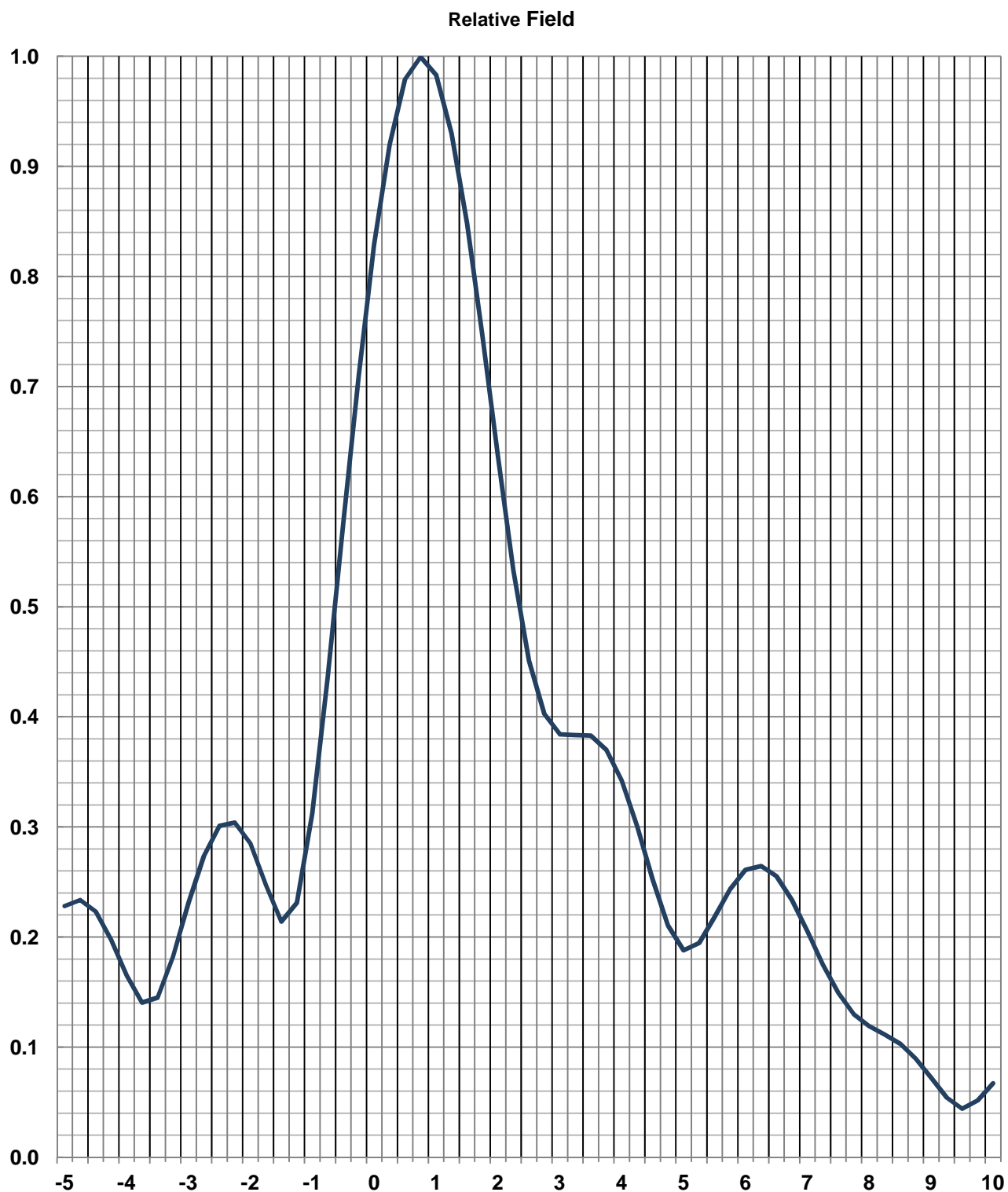
Angle	Field	dB
100	1.000	0.00
102	1.000	0.00
104	1.000	0.00
106	1.000	0.00
108	1.000	0.00
110	1.000	0.00
112	1.000	0.00
114	1.000	0.00
116	1.000	0.00
118	1.000	0.00
120	1.000	0.00
122	1.000	0.00
124	1.000	0.00
126	1.000	0.00
128	1.000	0.00
130	1.000	0.00
132	1.000	0.00
134	1.000	0.00
136	1.000	0.00
138	1.000	0.00
140	1.000	0.00
142	1.000	0.00
144	1.000	0.00
146	1.000	0.00
148	1.000	0.00
150	1.000	0.00
152	1.000	0.00
154	1.000	0.00
156	1.000	0.00
158	1.000	0.00
160	1.000	0.00
162	1.000	0.00
164	1.000	0.00
166	1.000	0.00
168	1.000	0.00
170	1.000	0.00
172	1.000	0.00
174	1.000	0.00
176	1.000	0.00
178	1.000	0.00
180	1.000	0.00
182	1.000	0.00
184	1.000	0.00
186	1.000	0.00
188	1.000	0.00
190	1.000	0.00
192	1.000	0.00
194	1.000	0.00
196	1.000	0.00
198	1.000	0.00

Angle	Field	dB
200	1.000	0.00
202	1.000	0.00
204	1.000	0.00
206	1.000	0.00
208	1.000	0.00
210	1.000	0.00
212	1.000	0.00
214	1.000	0.00
216	1.000	0.00
218	1.000	0.00
220	1.000	0.00
222	1.000	0.00
224	1.000	0.00
226	1.000	0.00
228	1.000	0.00
230	1.000	0.00
232	1.000	0.00
234	1.000	0.00
236	1.000	0.00
238	1.000	0.00
240	1.000	0.00
242	1.000	0.00
244	1.000	0.00
246	1.000	0.00
248	1.000	0.00
250	1.000	0.00
252	1.000	0.00
254	1.000	0.00
256	1.000	0.00
258	1.000	0.00
260	1.000	0.00
262	1.000	0.00
264	1.000	0.00
266	1.000	0.00
268	1.000	0.00
270	1.000	0.00
272	1.000	0.00
274	1.000	0.00
276	1.000	0.00
278	1.000	0.00
280	1.000	0.00
282	1.000	0.00
284	1.000	0.00
286	1.000	0.00
288	1.000	0.00
290	1.000	0.00
292	1.000	0.00
294	1.000	0.00
296	1.000	0.00
298	1.000	0.00

Angle	Field	dB
300	1.000	0.00
302	1.000	0.00
304	1.000	0.00
306	1.000	0.00
308	1.000	0.00
310	1.000	0.00
312	1.000	0.00
314	1.000	0.00
316	1.000	0.00
318	1.000	0.00
320	1.000	0.00
322	1.000	0.00
324	1.000	0.00
326	1.000	0.00
328	1.000	0.00
330	1.000	0.00
332	1.000	0.00
334	1.000	0.00
336	1.000	0.00
338	1.000	0.00
340	1.000	0.00
342	1.000	0.00
344	1.000	0.00
346	1.000	0.00
348	1.000	0.00
350	1.000	0.00
352	1.000	0.00
354	1.000	0.00
356	1.000	0.00
358	1.000	0.00
360	1.000	0.00

## Elevation Pattern

Type:	ATW22H3V		Polarization:	Vertical
Directivity:			Frequency:	32 (ATSC)
Main Lobe:	22.00 numeric	(13.42 dB)	Location:	Louisville, KY
Horizontal:	15.12 numeric	(11.80 dB)	Beam Tilt:	0.75 degrees





**Tabulated Data for Elevation Pattern**Type: ATW22H3V

-5 to 10 degrees in 0.25 degree increments.

10 to 90 degrees in 0.50 degree increments.

Angle	Field	dB	Angle	Field	dB	Angle	Field	dB	Angle	Field	dB	Angle	Field	dB
-5.00	0.228	-12.84	7.25	0.175	-15.14	29.00	0.073	-22.73	53.50	0.049	-26.20	78.00	0.049	-26.20
-4.75	0.234	-12.63	7.50	0.149	-16.54	29.50	0.060	-24.44	54.00	0.060	-24.44	78.50	0.046	-26.74
-4.50	0.223	-13.03	7.75	0.130	-17.72	30.00	0.050	-26.02	54.50	0.066	-23.61	79.00	0.043	-27.33
-4.25	0.198	-14.09	8.00	0.119	-18.49	30.50	0.039	-28.18	55.00	0.066	-23.61	79.50	0.039	-28.18
-4.00	0.165	-15.65	8.25	0.112	-19.05	31.00	0.025	-32.04	55.50	0.061	-24.29	80.00	0.035	-29.12
-3.75	0.141	-17.05	8.50	0.103	-19.74	31.50	0.014	-37.08	56.00	0.054	-25.35	80.50	0.031	-30.17
-3.50	0.145	-16.77	8.75	0.090	-20.96	32.00	0.015	-36.48	56.50	0.047	-26.56	81.00	0.027	-31.37
-3.25	0.182	-14.80	9.00	0.072	-22.85	32.50	0.016	-35.92	57.00	0.043	-27.33	81.50	0.023	-32.77
-3.00	0.231	-12.73	9.25	0.054	-25.35	33.00	0.007	-43.10	57.50	0.044	-27.13	82.00	0.019	-34.42
-2.75	0.274	-11.26	9.50	0.044	-27.13	33.50	0.012	-38.42	58.00	0.047	-26.56	82.50	0.016	-35.92
-2.50	0.301	-10.43	9.75	0.052	-25.76	34.00	0.037	-28.64	58.50	0.049	-26.20	83.00	0.012	-38.42
-2.25	0.304	-10.34	10.00	0.067	-23.48	34.50	0.062	-24.15	59.00	0.048	-26.38	83.50	0.010	-40.00
-2.00	0.285	-10.90	10.50	0.090	-20.92	35.00	0.081	-21.83	59.50	0.045	-26.94	84.00	0.008	-41.94
-1.75	0.247	-12.15	11.00	0.082	-21.72	35.50	0.090	-20.92	60.00	0.039	-28.18	84.50	0.006	-44.44
-1.50	0.214	-13.39	11.50	0.057	-24.88	36.00	0.088	-21.11	60.50	0.032	-29.90	85.00	0.006	-44.44
-1.25	0.231	-12.73	12.00	0.074	-22.62	36.50	0.078	-22.16	61.00	0.026	-31.70	85.50	0.005	-46.02
-1.00	0.312	-10.12	12.50	0.120	-18.42	37.00	0.065	-23.74	61.50	0.025	-32.04	86.00	0.005	-46.02
-0.75	0.437	-7.19	13.00	0.150	-16.48	37.50	0.055	-25.19	62.00	0.028	-31.06	86.50	0.005	-46.02
-0.50	0.575	-4.81	13.50	0.150	-16.48	38.00	0.048	-26.38	62.50	0.032	-29.90	87.00	0.004	-47.96
-0.25	0.710	-2.97	14.00	0.127	-17.92	38.50	0.042	-27.54	63.00	0.034	-29.37	87.50	0.004	-47.96
0.00	0.829	-1.63	14.50	0.096	-20.35	39.00	0.033	-29.63	63.50	0.032	-29.90	88.00	0.003	-50.46
0.25	0.920	-0.72	15.00	0.073	-22.73	39.50	0.023	-32.77	64.00	0.028	-31.06	88.50	0.003	-50.46
0.50	0.979	-0.18	15.50	0.056	-25.04	40.00	0.018	-34.89	64.50	0.021	-33.56	89.00	0.002	-53.98
0.75	1.000	0.00	16.00	0.033	-29.63	40.50	0.019	-34.42	65.00	0.011	-39.17	89.50	0.001	-60.00
1.00	0.983	-0.15	16.50	0.013	-37.72	41.00	0.018	-34.89	65.50	0.002	-53.98	90.00	0.000	---
1.25	0.930	-0.63	17.00	0.031	-30.17	41.50	0.012	-38.42	66.00	0.014	-37.08			
1.50	0.848	-1.43	17.50	0.042	-27.54	42.00	0.011	-39.17	66.50	0.026	-31.70			
1.75	0.746	-2.55	18.00	0.033	-29.63	42.50	0.029	-30.75	67.00	0.037	-28.64			
2.00	0.636	-3.93	18.50	0.024	-32.40	43.00	0.049	-26.20	67.50	0.047	-26.56			
2.25	0.533	-5.47	19.00	0.055	-25.19	43.50	0.066	-23.61	68.00	0.054	-25.35			
2.50	0.451	-6.92	19.50	0.093	-20.63	44.00	0.076	-22.38	68.50	0.058	-24.73			
2.75	0.403	-7.90	20.00	0.118	-18.56	44.50	0.079	-22.05	69.00	0.060	-24.44			
3.00	0.384	-8.31	20.50	0.122	-18.27	45.00	0.074	-22.62	69.50	0.059	-24.58			
3.25	0.384	-8.32	21.00	0.109	-19.25	45.50	0.064	-23.88	70.00	0.055	-25.19			
3.50	0.383	-8.34	21.50	0.088	-21.11	46.00	0.055	-25.19	70.50	0.050	-26.02			
3.75	0.370	-8.64	22.00	0.068	-23.35	46.50	0.049	-26.20	71.00	0.043	-27.33			
4.00	0.342	-9.32	22.50	0.053	-25.51	47.00	0.047	-26.56	71.50	0.036	-28.87			
4.25	0.301	-10.44	23.00	0.037	-28.64	47.50	0.045	-26.94	72.00	0.029	-30.75			
4.50	0.252	-11.97	23.50	0.019	-34.42	48.00	0.041	-27.74	72.50	0.025	-32.04			
4.75	0.210	-13.56	24.00	0.011	-39.17	48.50	0.034	-29.37	73.00	0.025	-32.04			
5.00	0.188	-14.52	24.50	0.020	-33.98	49.00	0.027	-31.37	73.50	0.029	-30.75			
5.25	0.195	-14.22	25.00	0.018	-34.89	49.50	0.024	-32.40	74.00	0.034	-29.37			
5.50	0.218	-13.23	25.50	0.005	-46.02	50.00	0.025	-32.04	74.50	0.039	-28.18			
5.75	0.244	-12.27	26.00	0.029	-30.75	50.50	0.026	-31.70	75.00	0.044	-27.13			
6.00	0.261	-11.67	26.50	0.062	-24.15	51.00	0.023	-32.77	75.50	0.048	-26.38			
6.25	0.265	-11.55	27.00	0.088	-21.11	51.50	0.015	-36.48	76.00	0.050	-26.02			
6.50	0.255	-11.87	27.50	0.102	-19.83	52.00	0.008	-41.94	76.50	0.052	-25.68			
6.75	0.234	-12.63	28.00	0.102	-19.83	52.50	0.019	-34.42	77.00	0.052	-25.68			
7.00	0.205	-13.76	28.50	0.089	-21.01	53.00	0.035	-29.12	77.50	0.051	-25.85			

TABLE I  
COMPUTED COVERAGE DATA  
FOR THE PROPOSED DTV OPERATION OF  
WDRB-DT, LOUISVILLE, KENTUCKY  
CHANNEL 32 724 KW (H) 217.2 (V) ERP 390.4 METERS HAAT  
JULY 2017

<u>Radial</u> <u>Bearing</u> (N ° E, T)	<u>Average*</u> <u>Elevation</u>	<u>Effective</u> <u>Height</u> meters	<u>Depression</u> <u>Angle</u> degrees	<u>Effective</u> <u>Radiated</u> <u>Power</u> kW	<u>Distance to Contour F(50/90)</u>	
	<u>3.2 to 16.1 km</u> meters				<u>48 dBu</u> <u>City Grade</u> km	<u>40.506 dBu</u> <u>Noise-Limited</u> km
0	220.2	368.7	0.532	724	87.8	101.5
10	208.0	380.9	0.541	724	88.7	102.5
20	195.9	393.0	0.549	724	89.5	103.5
30	183.8	405.1	0.558	724	90.3	104.5
40	171.6	417.3	0.566	724	90.9	105.6
50	163.4	425.5	0.571	724	91.3	106.3
60	159.2	429.7	0.574	724	91.6	106.7
70	154.9	434.0	0.577	724	91.8	107.1
80	150.7	438.2	0.580	724	92.0	107.5
90	146.4	442.5	0.583	724	92.3	107.8
100	144.7	444.2	0.584	724	92.4	108.0
110	142.9	446.0	0.585	724	92.5	108.1
120	141.2	447.7	0.586	724	92.6	108.3
130	139.4	449.5	0.587	724	92.7	108.4
140	140.2	448.7	0.587	724	92.6	108.4
150	143.5	445.4	0.585	724	92.4	108.1
160	146.9	442.0	0.582	724	92.3	107.8
170	150.2	438.7	0.580	724	92.1	107.5
180	153.6	435.3	0.578	724	91.9	107.2
190	175.7	413.2	0.563	724	90.7	105.2
200	197.9	391.0	0.548	724	89.4	103.3
210	220.0	368.9	0.532	724	87.8	101.5
220	242.2	346.7	0.516	724	85.7	99.6
230	251.9	337.0	0.509	724	84.7	98.8
240	249.1	339.8	0.511	724	85.0	99.0
250	246.3	342.6	0.513	724	85.3	99.3
260	243.5	345.4	0.515	724	85.6	99.5
270	240.8	348.1	0.517	724	85.9	99.8

TABLE I  
COMPUTED COVERAGE DATA  
FOR THE PROPOSED DTV OPERATION OF  
WDRB-DT, LOUISVILLE, KENTUCKY  
CHANNEL 32 724 KW (H) 217.2 (V) ERP 390.4 METERS HAAT  
JULY 2017

<u>Radial</u> <u>Bearing</u> (N ° E, T)	<u>Average*</u> <u>Elevation</u> <u>3.2 to 16.1 km</u> meters	<u>Effective</u> <u>Height</u> meters	<u>Depression</u> <u>Angle</u> degrees	<u>Effective</u> <u>Radiated</u> <u>Power</u> kW	<u>Distance to Contour F(50/90)</u>	
					<u>48 dBu</u> <u>City Grade</u> km	<u>40.506 dBu</u> <u>Noise-Limited</u> km
280	244.9	344.0	0.514	724	85.5	99.4
290	249.0	340.0	0.511	724	85.0	99.1
300	253.0	335.9	0.508	724	84.6	98.7
310	257.1	331.8	0.505	724	84.1	98.3
320	254.8	334.1	0.506	724	84.4	98.5
330	246.2	342.7	0.513	724	85.3	99.3
340	237.5	351.4	0.519	724	86.2	100.0
350	228.8	360.1	0.526	724	87.0	100.8

\*Based on data from FCC one-second data base.

DTV Channel 32 (578-584 MHz)  
Center of Radiation 588.9 meters AMSL  
Effective Radiated Power 724 kW (H) 217.2 (V)  
Antenna Height Above Average Terrain 390.4 meters

North Latitude: 38° 21' 00"  
West Longitude: 85° 50' 57"

(NAD-27)

