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

WTXF, RF Channel 31
WTXF FOX 29 Philadelphia, Philadelphia, PA

June 22, 2018

Antenna Model:
ATW18HS9-ETO-31H

Specification Number
20171211-538 Rev C

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

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

Electrical Characteristics:

Channel:		31	
Frequency:		572 MHz to 578 MHz	
Service:		ATSC	
Azimuth Pattern Number:	Horizontal Polarization	ATW-O	
	Vertical Polarization	ATW-V1	
Elevation Pattern Number:	Horizontal Polarization	ATW18HS0H	
	Vertical Polarization	ATW15HS0V	
Azimuth Directivity:	Horizontal Polarization	1.00	(0.00 dB)
	Vertical Polarization	1.00	(0.00 dB)
Elevation Directivity:	Horizontal Polarization	18.00	(12.55 dBd)
	Vertical Polarization	15.00	(11.76 dBd)
Peak Power Gain:	Horizontal Polarization	13.80	(11.40 dBd)
	Vertical Polarization	3.50	(5.44 dBd)
Gain at Horizontal:	Horizontal Polarization	3.44	(5.36 dBd)
	Vertical Polarization	0.67	-(1.75 dBd)
Vertical/Horizontal Ratio:		0.2535	
Electrical Beam Tilt:		2.25 Degrees	
Input Power Required:		72.46 kW	(18.60 dBk)
RF Input:		8-3/16-inch EIA, 75 Ω, flanged male	
Input Power Rating (maximum):		94 kW Average Power, 8VSB	
Antenna VSWR (maximum):		1.10 Over 6 MHz Channel	

Preliminary Specification for TRASAR® Top Mounted

Coaxial Slotted Array Television Antenna

Antenna Mechanical Characteristics:

Mounting Configuration:		Top Mounted	
Height of Antenna (D):		39.8 feet	(12.1 meters)
"Height of Center of Radiation (B):		19.9 feet	(6.1 meters)
Overall Height (Includes four 3.5 ft lightning spurs) (A):		43.3 feet	(13.2 meters)
Deicing:		Fully enclosed pressurized radome	
Radome Diameter (C):		18.40 inches	(467.4 millimeters)
Radome Color:		Aviation Orange	
Climbing Device:		Fiberglass Ladder	
Calculated Weight[1]:	No Ice	5035.0 lb	2283.8 kg
	1/2" (13 mm) ice	5860.0 lb	2658.1 kg
Effective Projected Area (EPA-ft^2)[1 2]:			
	No Ice	59.8 ft²	(5.6 m²)
	1/2" (13 mm) ice	107.2 ft²	(10.0 m²)
Effective Moment Arm[1 2]:	No Ice	21.70 feet	(6.62 meters)
	1/2" (13 mm) ice	21.30 feet	(6.49 meters)

MOUNTING FLANGE BOLT CIRCLE[3]: 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, lightning spurs, and beacon only. Custom mounting brackets/adapters and/or antenna input section are NOT included.

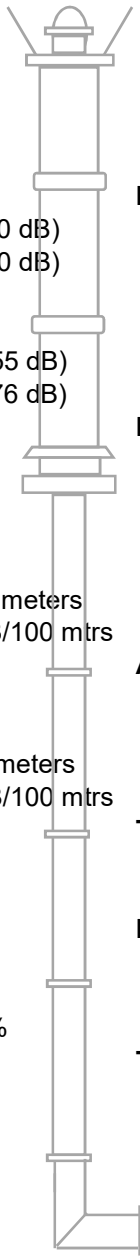
2) Preliminary antenna design based on a wind speed of 90 miles per hour (MPH) with no ice and 40 MPH with 1.0 -inches of design radial ice (2.8 -inches of factored ice at antenna, tiz) with a height above ground level (HAGL) of 1076 feet per ANSI/TIA-222-G. Structure Class II, Exposure Category C and Topographic Category I. Weight and wind area values include four lightning spurs and a standard beacon.

3) 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 bolt pattern unless electrical and/or mechanical requirements for the new antenna preclude the matching flange. Customer shall be responsible for supplying existing flange bolt pattern details when requesting a custom matching flange on the new antenna.

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

WTXF RF Channel: 31
WTXF FOX 29 Philadelphia
Philadelphia, PA
ATW18HS9-ETO-31H



Antenna Parameters

Azimuth Directivity:

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

Elevation Directivity:

Horizontal:	18.00	(12.55 dB)
Vertical:	15.00	(11.76 dB)

Transmission Line

Vertical Run:

Type:	8-3/16-inch EIA, 75 Ω	
Length:	1,100 feet	335.3 meters
Attenuation:	0.082 dB/100 feet	0.269 dB/100 mtrs

Horizontal Run:

Type:	8-3/16-inch EIA, 75 Ω	
Length:	100 feet	30.5 meters
Attenuation:	0.082 dB/100 feet	0.269 dB/100 mtrs

Transmission Line Efficiency: 79.72%

RF System/Other Efficiency: 94.19%

Effective Radiated Power:

Horizontal:	1000.00 kW	(30.00 dBk)
Vertical:	253.50 kW	(24.04 dBk)

Power Gain:

Horizontal:	13.80 numeric	(11.40 dBd)
Vertical:	3.50 numeric	(5.44 dBd)

Antenna Input Power:
72.46 kW (18.60 dBk)

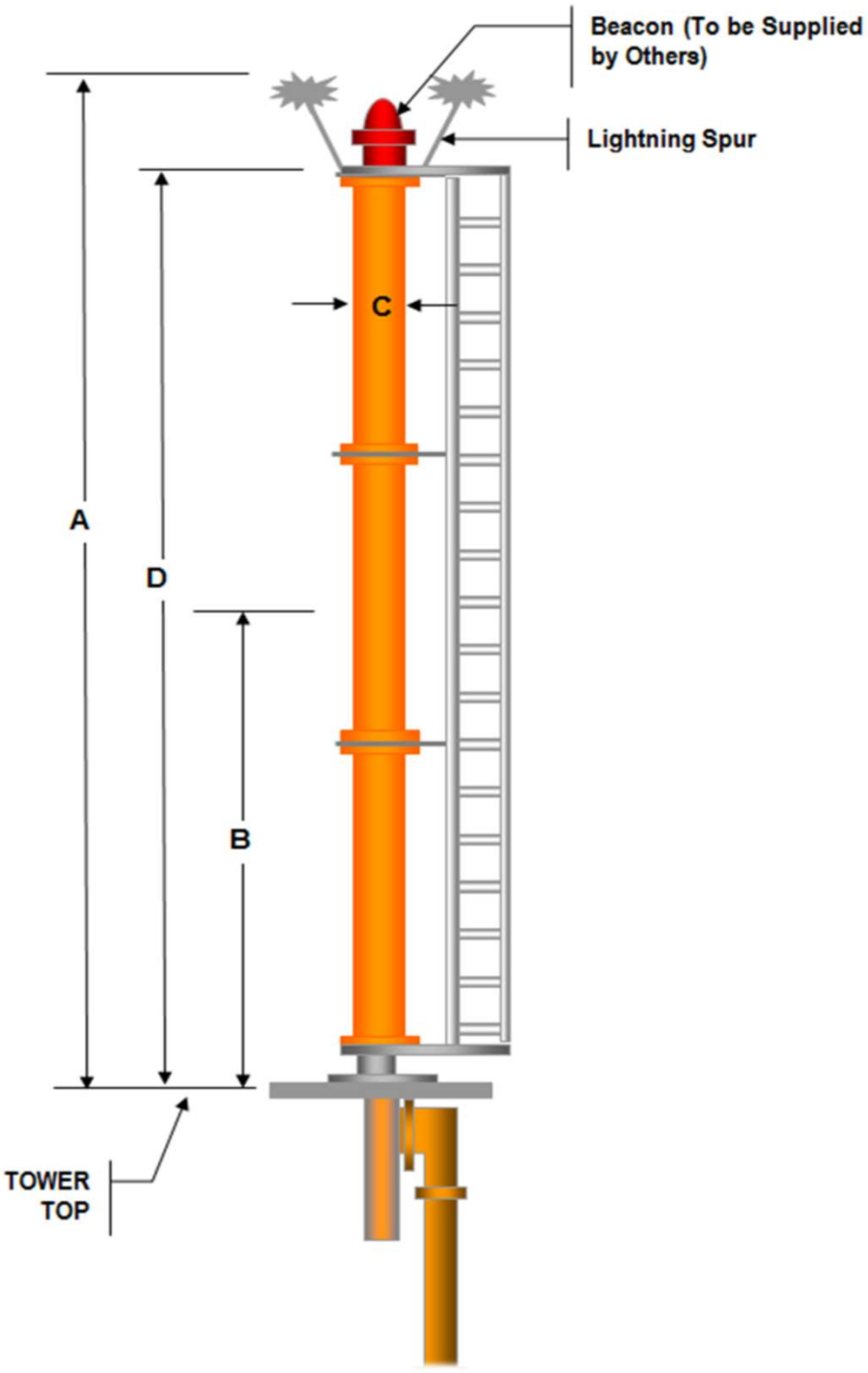
Transmission Line Losses:
-18.43 kW (0.984 dB)

RF System/Other Losses:
-5.61 kW (0.260 dB)

Total Losses:
-24.04 kW (1.244 dB)

Transmitter Power Output:
96.49 kW
(19.85 dBk)

Typical Mounting Configuration Shown. Actual Configuration May Vary.

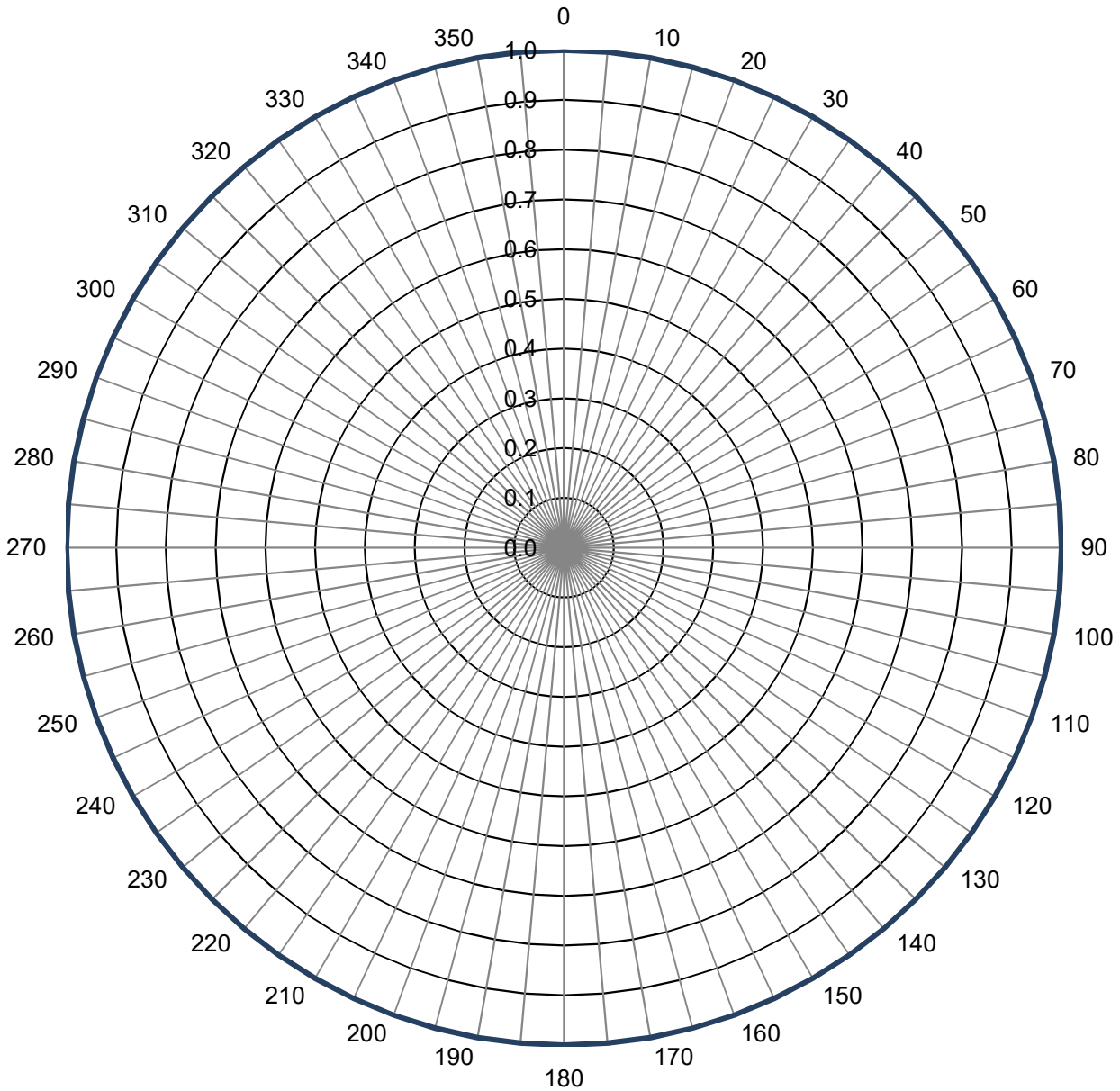


Azimuth Pattern

Type:	ATW-O		**Polarization:**	Horizontal
Directivity:	1.00 numeric	(0.00 dB)	**Frequency:**	31 (ATSC)
Peak(s) at:			**Location:**	Philadelphia, PA

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

Relative Field



Tabulated Data for Azimuth Pattern

Type: ATW-O

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

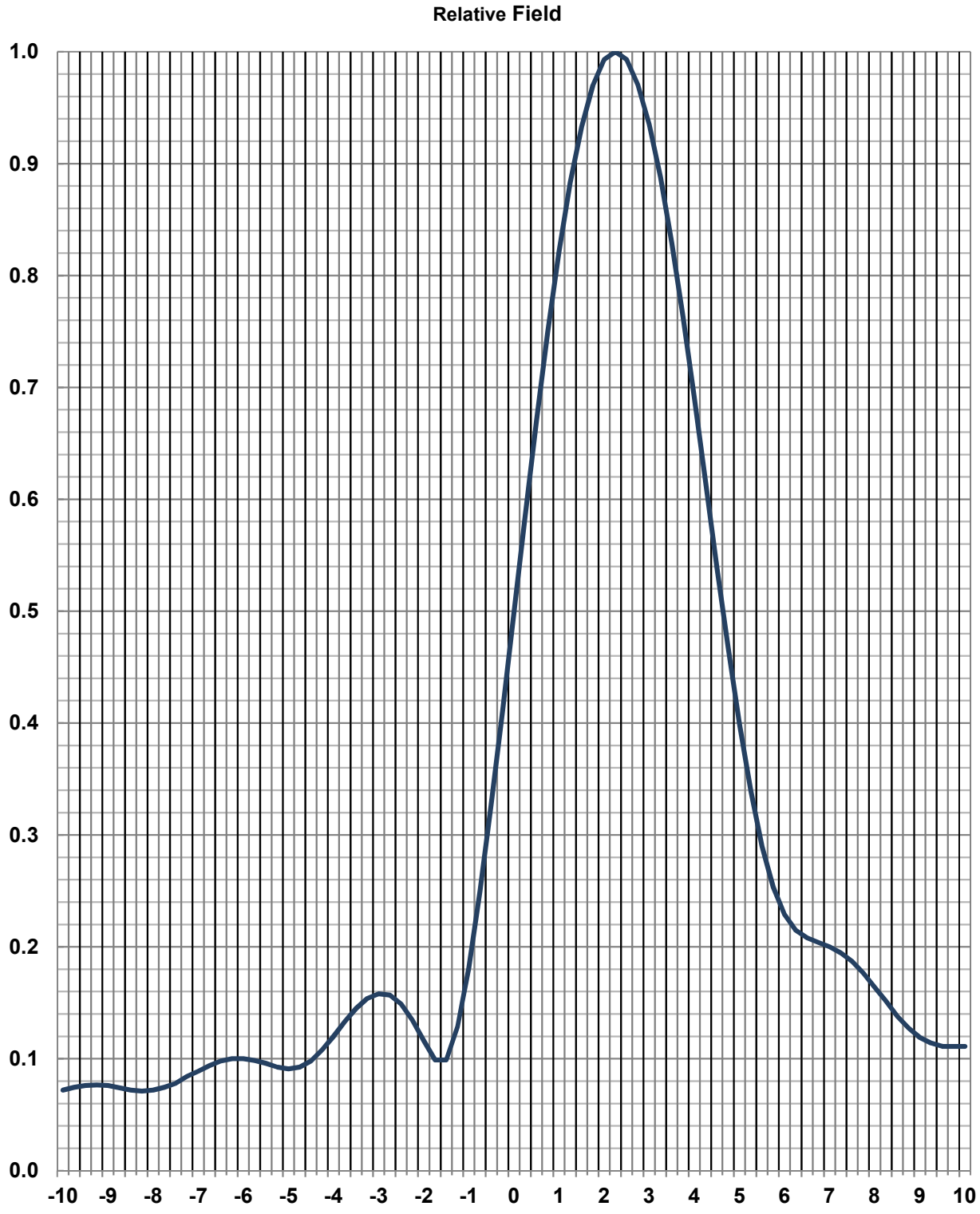
Angle	Field	dB
100	1.000	0.00
102	1.000	0.00
104	1.000	0.00
106	1.000	0.00
108	1.000	0.00
110	1.000	0.00
112	1.000	0.00
114	1.000	0.00
116	1.000	0.00
118	1.000	0.00
120	1.000	0.00
122	1.000	0.00
124	1.000	0.00
126	1.000	0.00
128	1.000	0.00
130	1.000	0.00
132	1.000	0.00
134	1.000	0.00
136	1.000	0.00
138	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:	ATW18HS0H		**Polarization:**	Horizontal
Directivity:			**Frequency:**	31 (ATSC)
Main Lobe:	18.00 numeric	(12.55 dB)	**Location:**	Philadelphia, PA
Horizontal:	4.48 numeric	(6.51 dB)	**Beam Tilt:**	2.25 degrees



Tabulated Data for Elevation Pattern

Type: ATW18HS0H

-10 to 10 degrees in 0.25 degree increments.
10 to 90 degrees in 0.50 degree increments.

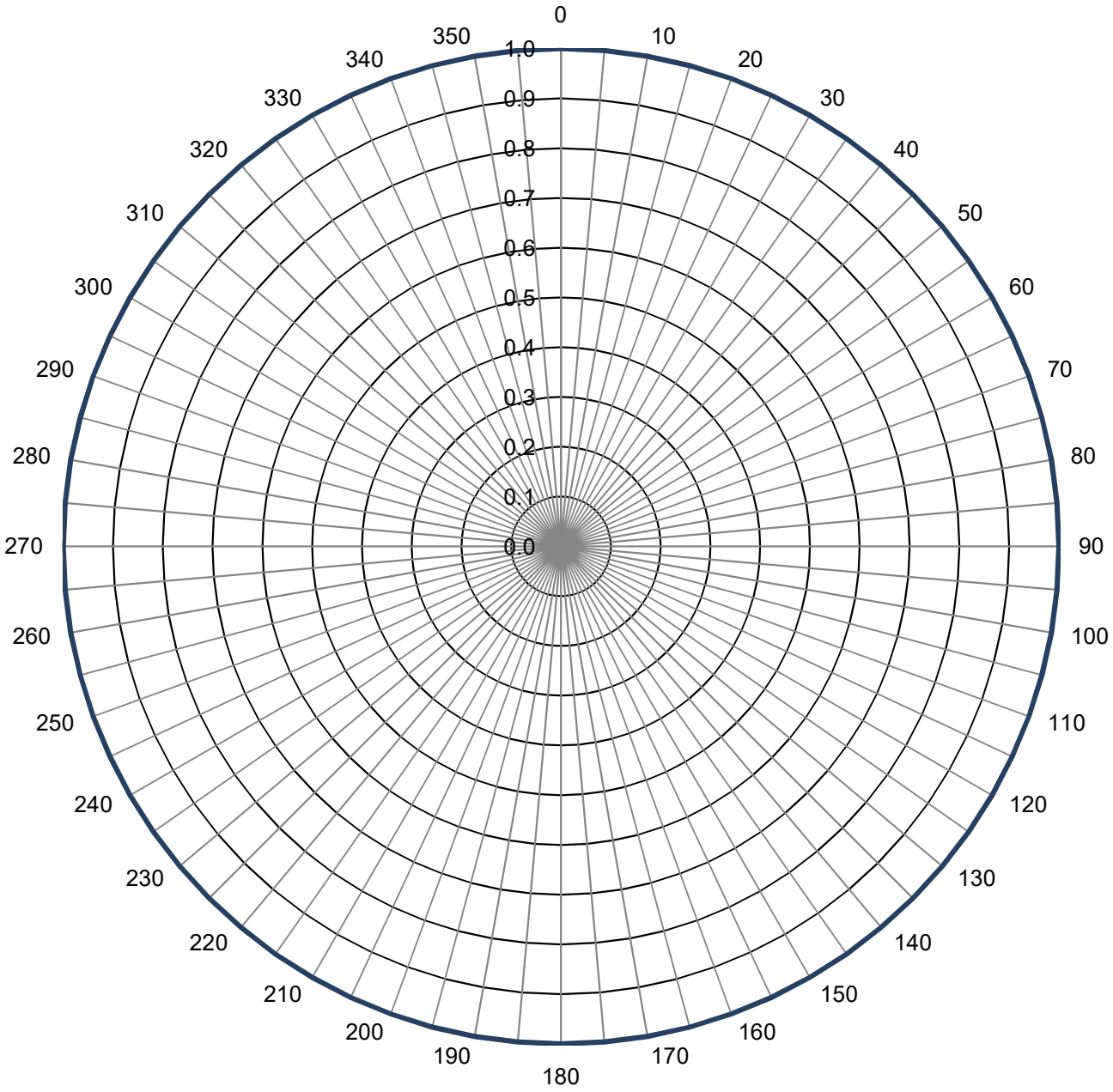
Angle	Field	dB	Angle	Field	dB	Angle	Field	dB	Angle	Field	dB	Angle	Field	dB
-10.00	0.072	-22.85	2.25	1.000	0.00	19.00	0.046	-26.74	43.50	0.036	-28.87	68.00	0.031	-30.17
-9.75	0.075	-22.56	2.50	0.993	-0.06	19.50	0.050	-26.02	44.00	0.036	-28.87	68.50	0.032	-29.90
-9.50	0.076	-22.38	2.75	0.971	-0.26	20.00	0.051	-25.85	44.50	0.035	-29.12	69.00	0.033	-29.63
-9.25	0.077	-22.33	3.00	0.935	-0.58	20.50	0.049	-26.20	45.00	0.033	-29.63	69.50	0.035	-29.12
-9.00	0.076	-22.38	3.25	0.888	-1.04	21.00	0.043	-27.33	45.50	0.031	-30.17	70.00	0.037	-28.64
-8.75	0.074	-22.62	3.50	0.829	-1.63	21.50	0.039	-28.18	46.00	0.031	-30.17	70.50	0.039	-28.18
-8.50	0.072	-22.85	3.75	0.763	-2.35	22.00	0.039	-28.18	46.50	0.032	-29.90	71.00	0.041	-27.74
-8.25	0.071	-22.97	4.00	0.691	-3.21	22.50	0.043	-27.33	47.00	0.034	-29.37	71.50	0.042	-27.54
-8.00	0.072	-22.85	4.25	0.616	-4.21	23.00	0.045	-26.94	47.50	0.036	-28.87	72.00	0.043	-27.33
-7.75	0.075	-22.56	4.50	0.540	-5.35	23.50	0.044	-27.13	48.00	0.036	-28.87	72.50	0.043	-27.33
-7.50	0.078	-22.16	4.75	0.467	-6.61	24.00	0.039	-28.18	48.50	0.036	-28.87	73.00	0.042	-27.54
-7.25	0.084	-21.51	5.00	0.399	-7.98	24.50	0.035	-29.12	49.00	0.034	-29.37	73.50	0.041	-27.74
-7.00	0.089	-21.01	5.25	0.340	-9.37	25.00	0.035	-29.12	49.50	0.032	-29.90	74.00	0.039	-28.18
-6.75	0.094	-20.54	5.50	0.290	-10.75	25.50	0.038	-28.40	50.00	0.031	-30.17	74.50	0.037	-28.64
-6.50	0.098	-20.18	5.75	0.254	-11.92	26.00	0.041	-27.74	50.50	0.031	-30.17	75.00	0.034	-29.37
-6.25	0.100	-20.00	6.00	0.229	-12.80	26.50	0.041	-27.74	51.00	0.032	-29.90	75.50	0.030	-30.46
-6.00	0.100	-20.00	6.25	0.215	-13.35	27.00	0.038	-28.40	51.50	0.034	-29.37	76.00	0.027	-31.37
-5.75	0.099	-20.13	6.50	0.208	-13.64	27.50	0.033	-29.63	52.00	0.036	-28.87	76.50	0.024	-32.40
-5.50	0.096	-20.35	6.75	0.204	-13.81	28.00	0.031	-30.17	52.50	0.037	-28.64	77.00	0.021	-33.56
-5.25	0.093	-20.68	7.00	0.200	-13.98	28.50	0.033	-29.63	53.00	0.037	-28.64	77.50	0.018	-34.89
-5.00	0.091	-20.82	7.25	0.195	-14.22	29.00	0.037	-28.64	53.50	0.036	-28.87	78.00	0.017	-35.39
-4.75	0.093	-20.68	7.50	0.187	-14.56	29.50	0.039	-28.18	54.00	0.034	-29.37	78.50	0.017	-35.39
-4.50	0.098	-20.18	7.75	0.177	-15.07	30.00	0.038	-28.40	54.50	0.033	-29.63	79.00	0.018	-34.89
-4.25	0.108	-19.33	8.00	0.164	-15.70	30.50	0.034	-29.37	55.00	0.032	-29.90	79.50	0.019	-34.42
-4.00	0.120	-18.42	8.25	0.152	-16.39	31.00	0.031	-30.17	55.50	0.033	-29.63	80.00	0.022	-33.15
-3.75	0.134	-17.49	8.50	0.138	-17.20	31.50	0.031	-30.17	56.00	0.034	-29.37	80.50	0.024	-32.40
-3.50	0.145	-16.77	8.75	0.128	-17.89	32.00	0.034	-29.37	56.50	0.035	-29.12	81.00	0.026	-31.70
-3.25	0.154	-16.25	9.00	0.119	-18.49	32.50	0.037	-28.64	57.00	0.037	-28.64	81.50	0.028	-31.06
-3.00	0.158	-16.03	9.25	0.114	-18.86	33.00	0.037	-28.64	57.50	0.038	-28.40	82.00	0.030	-30.46
-2.75	0.157	-16.08	9.50	0.111	-19.09	33.50	0.036	-28.87	58.00	0.038	-28.40	82.50	0.032	-29.90
-2.50	0.149	-16.54	9.75	0.111	-19.09	34.00	0.032	-29.90	58.50	0.038	-28.40	83.00	0.033	-29.63
-2.25	0.135	-17.43	10.00	0.111	-19.09	34.50	0.030	-30.46	59.00	0.037	-28.64	83.50	0.033	-29.63
-2.00	0.116	-18.71	10.50	0.109	-19.25	35.00	0.030	-30.46	59.50	0.036	-28.87	84.00	0.033	-29.63
-1.75	0.099	-20.09	11.00	0.103	-19.74	35.50	0.033	-29.63	60.00	0.034	-29.37	84.50	0.033	-29.63
-1.50	0.099	-20.09	11.50	0.092	-20.72	36.00	0.036	-28.87	60.50	0.034	-29.37	85.00	0.033	-29.63
-1.25	0.129	-17.82	12.00	0.081	-21.83	36.50	0.036	-28.87	61.00	0.033	-29.63	85.50	0.032	-29.90
-1.00	0.181	-14.85	12.50	0.075	-22.50	37.00	0.035	-29.12	61.50	0.034	-29.37	86.00	0.030	-30.46
-0.75	0.250	-12.04	13.00	0.076	-22.38	37.50	0.032	-29.90	62.00	0.035	-29.12	86.50	0.029	-30.75
-0.50	0.328	-9.68	13.50	0.077	-22.27	38.00	0.030	-30.46	62.50	0.037	-28.64	87.00	0.027	-31.37
-0.25	0.412	-7.70	14.00	0.075	-22.50	38.50	0.030	-30.46	63.00	0.038	-28.40	87.50	0.024	-32.40
0.00	0.499	-6.04	14.50	0.069	-23.22	39.00	0.032	-29.90	63.50	0.039	-28.18	88.00	0.022	-33.15
0.25	0.586	-4.65	15.00	0.061	-24.29	39.50	0.035	-29.12	64.00	0.040	-27.96	88.50	0.019	-34.42
0.50	0.670	-3.48	15.50	0.056	-25.04	40.00	0.036	-28.87	64.50	0.040	-27.96	89.00	0.016	-35.92
0.75	0.750	-2.50	16.00	0.057	-24.88	40.50	0.035	-29.12	65.00	0.039	-28.18	89.50	0.013	-37.72
1.00	0.821	-1.71	16.50	0.060	-24.44	41.00	0.033	-29.63	65.50	0.038	-28.40	90.00	0.010	-40.00
1.25	0.883	-1.08	17.00	0.060	-24.44	41.50	0.030	-30.46	66.00	0.036	-28.87			
1.50	0.933	-0.60	17.50	0.056	-25.04	42.00	0.030	-30.46	66.50	0.034	-29.37			
1.75	0.970	-0.26	18.00	0.049	-26.20	42.50	0.031	-30.17	67.00	0.033	-29.63			
2.00	0.993	-0.06	18.50	0.045	-26.94	43.00	0.034	-29.37	67.50	0.032	-29.90			

Azimuth Pattern

Type:	ATW-V1		**Polarization:**	Vertical
Directivity:	1.00 numeric	(0.00 dB)	**Frequency:**	31 (ATSC)
Peak(s) at:			**Location:**	Philadelphia, PA

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

Relative Field



Tabulated Data for Azimuth Pattern

Type: ATW-V1

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

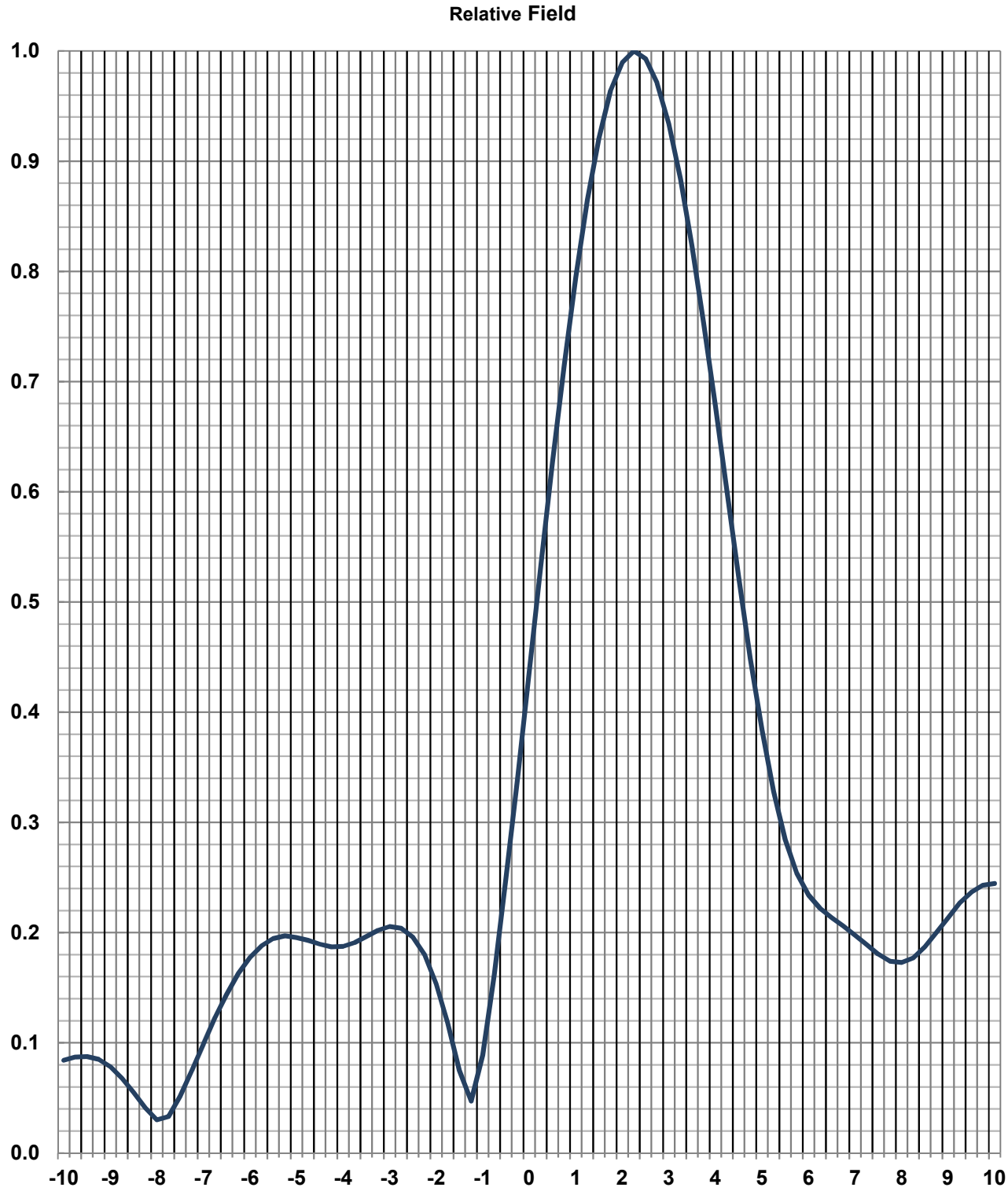
Angle	Field	dB
100	1.000	0.00
102	1.000	0.00
104	1.000	0.00
106	1.000	0.00
108	1.000	0.00
110	1.000	0.00
112	1.000	0.00
114	1.000	0.00
116	1.000	0.00
118	1.000	0.00
120	1.000	0.00
122	1.000	0.00
124	1.000	0.00
126	1.000	0.00
128	1.000	0.00
130	1.000	0.00
132	1.000	0.00
134	1.000	0.00
136	1.000	0.00
138	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:	ATW15HS0V		**Polarization:**	Vertical
Directivity:			**Frequency:**	31 (ATSC)
Main Lobe:	15.00 numeric	(11.76 dB)	**Location:**	Philadelphia, PA
Horizontal:	2.86 numeric	(4.57 dB)	**Beam Tilt:**	2.25 degrees



Tabulated Data for Elevation Pattern

Type: ATW15HS0V

-10 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
-10.00	0.084	-21.51	2.25	1.000	0.00	19.00	0.168	-15.49	43.50	0.026	-31.87	68.00	0.064	-23.88
-9.75	0.087	-21.21	2.50	0.993	-0.06	19.50	0.164	-15.70	44.00	0.030	-30.46	68.50	0.063	-24.08
-9.50	0.088	-21.16	2.75	0.971	-0.26	20.00	0.149	-16.54	44.50	0.033	-29.63	69.00	0.061	-24.36
-9.25	0.085	-21.41	3.00	0.934	-0.59	20.50	0.125	-18.06	45.00	0.033	-29.63	69.50	0.059	-24.66
-9.00	0.079	-22.10	3.25	0.884	-1.07	21.00	0.095	-20.45	45.50	0.030	-30.46	70.00	0.057	-24.96
-8.75	0.068	-23.35	3.50	0.823	-1.70	21.50	0.063	-24.08	46.00	0.026	-31.87	70.50	0.055	-25.19
-8.50	0.055	-25.19	3.75	0.753	-2.46	22.00	0.033	-29.76	46.50	0.022	-33.15	71.00	0.054	-25.35
-8.25	0.041	-27.74	4.00	0.678	-3.38	22.50	0.008	-42.50	47.00	0.026	-31.70	71.50	0.053	-25.51
-8.00	0.030	-30.46	4.25	0.600	-4.44	23.00	0.010	-40.00	47.50	0.037	-28.75	72.00	0.053	-25.51
-7.75	0.033	-29.63	4.50	0.523	-5.63	23.50	0.018	-35.14	48.00	0.050	-26.11	72.50	0.053	-25.51
-7.50	0.052	-25.76	4.75	0.449	-6.96	24.00	0.016	-36.19	48.50	0.063	-24.01	73.00	0.052	-25.68
-7.25	0.075	-22.50	5.00	0.384	-8.31	24.50	0.007	-43.10	49.00	0.075	-22.50	73.50	0.052	-25.68
-7.00	0.099	-20.09	5.25	0.328	-9.68	25.00	0.015	-36.48	49.50	0.085	-21.41	74.00	0.051	-25.85
-6.75	0.123	-18.20	5.50	0.285	-10.92	25.50	0.037	-28.64	50.00	0.093	-20.68	74.50	0.050	-26.02
-6.50	0.144	-16.83	5.75	0.254	-11.90	26.00	0.063	-24.08	50.50	0.097	-20.26	75.00	0.049	-26.29
-6.25	0.163	-15.76	6.00	0.234	-12.62	26.50	0.087	-21.21	51.00	0.098	-20.18	75.50	0.047	-26.65
-6.00	0.178	-15.02	6.25	0.222	-13.07	27.00	0.109	-19.25	51.50	0.097	-20.26	76.00	0.045	-27.03
-5.75	0.188	-14.52	6.50	0.214	-13.41	27.50	0.127	-17.96	52.00	0.094	-20.58	76.50	0.042	-27.64
-5.50	0.195	-14.22	6.75	0.206	-13.72	28.00	0.138	-17.20	52.50	0.088	-21.16	77.00	0.039	-28.29
-5.25	0.197	-14.11	7.00	0.198	-14.09	28.50	0.142	-16.95	53.00	0.080	-21.94	77.50	0.035	-29.12
-5.00	0.196	-14.18	7.25	0.189	-14.47	29.00	0.138	-17.20	53.50	0.072	-22.85	78.00	0.032	-30.03
-4.75	0.193	-14.29	7.50	0.181	-14.87	29.50	0.127	-17.96	54.00	0.062	-24.15	78.50	0.028	-31.21
-4.50	0.190	-14.45	7.75	0.174	-15.19	30.00	0.109	-19.25	54.50	0.053	-25.51	79.00	0.024	-32.40
-4.25	0.187	-14.56	8.00	0.173	-15.24	30.50	0.087	-21.21	55.00	0.045	-26.94	79.50	0.021	-33.76
-4.00	0.188	-14.54	8.25	0.177	-15.04	31.00	0.063	-24.08	55.50	0.039	-28.29	80.00	0.017	-35.65
-3.75	0.191	-14.38	8.50	0.187	-14.56	31.50	0.039	-28.18	56.00	0.036	-29.00	80.50	0.013	-37.72
-3.50	0.197	-14.13	8.75	0.200	-13.98	32.00	0.019	-34.42	56.50	0.036	-29.00	81.00	0.010	-40.00
-3.25	0.202	-13.89	9.00	0.214	-13.41	32.50	0.011	-39.17	57.00	0.038	-28.52	81.50	0.007	-43.10
-3.00	0.206	-13.74	9.25	0.227	-12.88	33.00	0.018	-35.14	57.50	0.041	-27.85	82.00	0.005	-46.02
-2.75	0.204	-13.81	9.50	0.237	-12.52	33.50	0.022	-33.15	58.00	0.043	-27.43	82.50	0.005	-46.02
-2.50	0.196	-14.15	9.75	0.243	-12.29	34.00	0.021	-33.56	58.50	0.043	-27.33	83.00	0.005	-46.02
-2.25	0.180	-14.89	10.00	0.245	-12.23	34.50	0.018	-34.89	59.00	0.043	-27.43	83.50	0.007	-43.74
-2.00	0.154	-16.28	10.50	0.232	-12.71	35.00	0.022	-33.35	59.50	0.040	-28.07	84.00	0.008	-41.94
-1.75	0.118	-18.56	11.00	0.200	-13.98	35.50	0.035	-29.24	60.00	0.035	-29.12	84.50	0.009	-40.92
-1.50	0.075	-22.50	11.50	0.156	-16.17	36.00	0.052	-25.68	60.50	0.029	-30.75	85.00	0.010	-40.45
-1.25	0.047	-26.56	12.00	0.105	-19.62	36.50	0.071	-22.97	61.00	0.022	-33.35	85.50	0.010	-40.00
-1.00	0.089	-21.01	12.50	0.056	-25.11	37.00	0.089	-21.06	61.50	0.015	-36.77	86.00	0.010	-40.00
-0.75	0.162	-15.81	13.00	0.020	-33.98	37.50	0.104	-19.70	62.00	0.011	-39.17	86.50	0.010	-40.00
-0.50	0.249	-12.08	13.50	0.026	-31.70	38.00	0.115	-18.82	62.50	0.016	-36.19	87.00	0.010	-40.00
-0.25	0.341	-9.34	14.00	0.041	-27.74	38.50	0.121	-18.38	63.00	0.024	-32.40	87.50	0.009	-40.92
0.00	0.437	-7.19	14.50	0.045	-26.94	39.00	0.122	-18.31	63.50	0.033	-29.76	88.00	0.009	-40.92
0.25	0.533	-5.47	15.00	0.038	-28.40	39.50	0.118	-18.60	64.00	0.041	-27.74	88.50	0.008	-41.94
0.50	0.627	-4.06	15.50	0.027	-31.37	40.00	0.109	-19.25	64.50	0.049	-26.29	89.00	0.007	-43.74
0.75	0.715	-2.91	16.00	0.031	-30.17	40.50	0.096	-20.40	65.00	0.055	-25.27	89.50	0.005	-46.02
1.00	0.795	-1.99	16.50	0.056	-25.04	41.00	0.080	-21.94	65.50	0.060	-24.51	90.00	0.004	-47.96
1.25	0.865	-1.26	17.00	0.087	-21.21	41.50	0.063	-24.08	66.00	0.063	-24.01			
1.50	0.921	-0.71	17.50	0.118	-18.60	42.00	0.046	-26.84	66.50	0.065	-23.74			
1.75	0.964	-0.32	18.00	0.143	-16.89	42.50	0.031	-30.17	67.00	0.066	-23.61			
2.00	0.990	-0.09	18.50	0.161	-15.86	43.00	0.024	-32.40	67.50	0.065	-23.74			