



ENGINEERING STATEMENT

In support of an Amendment to

License Application

BLCDT-20060705AAW

For Digital Channel 31

KFXK-DT Longview, TX

1000 kW ERP 361 m HAAT

PURPOSE

MARSAND, INC. has been retained by Warwick Communications, Inc. (KFXK), permittee of KFXK-DT, CH31 of Longview, TX, to prepare this engineering statement in support of an Amendment to License Application BLCDT-20060705AAW. The Federal Communications Commission (Commission) granted a Construction Permit (CP) to KFXK (BPCDT-19991027ACM) with an Effective Radiated Power (ERP) of 1,000 kW. An application was filed for a License to Cover that specified a different antenna model. This amendment addresses that change and shows that the change falls within the limits specified in the rules 47CFR73.1690.

DISCUSSION

The CP specified an Andrew ATW27H3-ESC1-31S. Before the equipment was purchased, the broadcast division of Andrew Corp. was purchased by Electronics Research Inc. (ERI). The antenna was purchased under the ERI model ATW27-H3-ESC1-31H. The azimuth pattern remained unchanged. Table 1 shows the comparison between the predicted radiation pattern on the CP vs. the pattern as installed. They are virtually identical. Appendix A contains the manufacturer's specifications which show a non-rotated, generic C1 pattern. The specific antenna pattern as installed reflects a 350 degree rotation of the generic C1 pattern and is as specified in the Tech Box of the CP and shown again in Table 1, below.

CONCLUSION

It is respectfully requested that the Commission grant this Amendment to License Application.



MARSAND, INC.

Matthew A. Sanderford, Jr., P.E.

EFFECTIVE RADIATED POWER PATTERN CALCULATIONS

Date: 8/9/2007	Site Elevation: 521.65 ft. 159.00 m
Call Letters: KFXK	Average Terrain: 446.19 ft. 136.00 m
City/State: Longview, TX	Antenna RC AG: 1108.92 ft. 338.00 m
Channel: 31DTV	Antenna RCAMSL: 1630.58 ft. 497.00 m
Frequency: 575 MHz Mid-Band	Antenna HAAT: 1184.38 ft. 361.00 m
Latitude: N 32° 15' 35"	Maximum ERP - 1000.00 kW 30.00 dBk
Longitude: W 94° 57' 02"	
Original CP Antenna Model: Andrew ATW27H3-ESC1-31S	
Ammended Antenna Model: ERI ATW27H3-ESC1-31H	

Radial Azimuth (degrees)	Original CP Antenna Model			Ammended Antenna Model			Difference (dBk)
	Azimuthal Relative Field	Radiation along Each Radial		Azimuthal Relative Field	Radiation along Each Radial		
		(dBk)	(kW)		(dBk)	(kW)	
*0	0.922	29.29	850.08	0.921	29.29	848.24	-0.01
10	0.809	28.16	654.48	0.811	28.18	657.72	0.02
20	0.695	26.84	483.03	0.695	26.84	483.03	0.00
30	0.605	25.64	366.03	0.604	25.62	364.82	-0.01
40	0.501	24.00	251.00	0.504	24.05	254.02	0.05
*45	0.429	22.65	184.04	0.438	22.82	191.41	0.17
50	0.357	21.05	127.45	0.363	21.20	131.77	0.14
60	0.232	17.31	53.82	0.235	17.42	55.23	0.11
70	0.192	15.67	36.86	0.190	15.58	36.10	-0.09
80	0.196	15.85	38.42	0.195	15.80	38.03	-0.04
*90	0.192	15.67	36.86	0.193	15.71	37.25	0.05
100	0.232	17.31	53.82	0.228	17.16	51.98	-0.15
110	0.357	21.05	127.45	0.348	20.83	121.10	-0.22
120	0.501	24.00	251.00	0.495	23.89	245.03	-0.10
130	0.605	25.64	366.03	0.602	25.59	362.40	-0.04
*135	0.650	26.26	422.50	0.646	26.20	416.67	-0.06
140	0.695	26.84	483.03	0.691	26.79	477.48	-0.05
150	0.809	28.16	654.48	0.803	28.09	644.81	-0.06
160	0.922	29.29	850.08	0.917	29.25	840.89	-0.05
170	0.979	29.82	958.44	0.979	29.82	958.44	0.00
*180	0.993	29.94	986.05	0.993	29.94	986.05	0.00
190	0.999	29.99	998.00	0.999	29.99	998.00	0.00
200	0.995	29.96	990.03	0.996	29.97	992.02	0.01
210	0.970	29.74	940.90	0.972	29.75	944.78	0.02
220	0.941	29.47	885.48	0.941	29.47	885.48	0.00
*225	0.941	29.47	884.54	0.935	29.41	873.29	-0.06
230	0.940	29.46	883.60	0.937	29.43	877.97	-0.03
240	0.967	29.71	935.09	0.963	29.67	927.37	-0.04
250	0.989	29.90	978.12	0.985	29.87	970.23	-0.04
260	0.995	29.96	990.03	0.992	29.93	984.06	-0.03
*270	0.989	29.90	978.12	0.987	29.89	974.17	-0.02
280	0.967	29.71	935.09	0.966	29.70	933.16	-0.01
290	0.940	29.46	883.60	0.938	29.44	879.84	-0.02
300	0.941	29.47	885.48	0.935	29.42	874.23	-0.06
310	0.970	29.74	940.90	0.963	29.67	927.37	-0.06
*315	0.983	29.85	965.31	0.978	29.81	956.48	-0.04
320	0.995	29.96	990.03	0.989	29.90	978.12	-0.05
330	0.999	29.99	998.00	0.994	29.95	988.04	-0.04
340	0.993	29.94	986.05	0.987	29.89	974.17	-0.05
350	0.979	29.82	958.44	0.974	29.77	948.68	-0.04
* Denote radials used in averaging							

Table 1



MARSAND, INC.

Matthew A. Sanderford, Jr., P.E.

DECLARATION

Matthew A. Sanderford, Jr., P.E., declares and states that he is a graduate Electrical Engineer with a Bachelor of Science Degree in Electrical Engineering from the University of Texas at El Paso, a Licensed Professional Engineer in the State of Texas, and his qualifications are known to the Federal Communications Commission, and that he is President of MARSAND, INC., a Registered Professional Engineering firm in the State of Texas, and that firm has been retained by Warwick Communications, Inc., to perform the engineering support as contained in this report.

All facts contained herein are true of his own knowledge except where stated to be on information or belief provided by Warwick Communications, Inc., and as to those facts, he believes them to be true.

I declare under penalty of perjury that the foregoing is true and correct.

Matthew A. Sanderford, Jr., P.E.

President - MARSAND, INC.

Executed this 10th day of August, 2007

State of Texas

Appendix A

***FINAL SPECIFICATION FOR
TRASAR[®] ELLIPTICALLY POLARIZED
COAXIAL SLOTTED ARRAY ANTENNA***

*Prepared for
KFXX-DT Channel 31 Longview, TX
February 21, 2006*

**ANTENNA TYPE:
ATW27H3-ESC1-31H**

**SPECIFICATION NO :
LJS061699-486 RevD**

**FINAL SPECIFICATION FOR
TRASAR[®] ELLIPTICALLY POLARIZED
COAXIAL SLOTTED ARRAY ANTENNA**

ELECTRICAL CHARACTERISTICS:

CHANNEL :	DTV:	31
FREQUENCY RANGE :	DTV:	572 - 584 MHz
AZIMUTH PATTERN NUMBER :	H-Pol:	CH31HAZ-C1
	V-Pol:	CH31VAZ
ELEVATION PATTERN NUMBER :	H-Pol:	ATW27H3H
	V-Pol:	ATW24H3V
AZIMUTH DIRECTIVITY :	H-Pol:	1.54 (1.88 dBd)
	V-Pol:	2.54 (4.05 dBd)
ELEVATION DIRECTIVITY :	H-Pol:	27.00 (14.31 dBd)
	V-Pol:	24.00 (13.80 dBd)
PEAK POWER GAIN :	H-Pol:	35.52 (15.51 dBd)
	V-Pol:	8.88 (9.48 dBd)
GAIN AT HORIZONTAL :	H-Pol:	22.06 (13.44 dBd)
	V-Pol:	6.00 (7.78 dBd)
V/H RATIO:		0.25
ELECTRICAL BEAM TILT :		0.75 Degrees
INPUT POWER REQUIRED :		28.15 kW (14.49 dBk)
INPUT TYPE :		6 1/8-50 Ohm
ANTENNA VSWR (MAXIMUM) :	DTV:	1.10 Over Remainder of Channel

**FINAL SPECIFICATION FOR
TRASAR[®] ELLIPTICALLY POLARIZED
COAXIAL SLOTTED ARRAY ANTENNA**

MECHANICAL CHARACTERISTICS:

MOUNTING CONFIGURATION:	<i>Side Mount</i>
HEIGHT OF ANTENNA :	<i>52.75 feet</i>
HEIGHT OF CENTER OF RADIATION (B) :	<i>26.38 feet</i>
OVERALL HEIGHT (A) : <i>(Includes two 3-foot Lightning Rods)</i>	<i>56.00 feet</i>
DEICING :	<i>Pressurized Radome Enclosure</i>
RADOME DIAMETER (C):	<i>16.40 inches, OD</i>
RADOME COLOR :	<i>AVIATION ORANGE (Standard)</i>
CLIMBING DEVICE :	<i>Not Applicable</i>
CALCULATED WEIGHT :	<i>2100.00 lbs</i>
WINDLOAD DATA :	CaAc : <i>88.60 sq.ft.</i>

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 Calculated weight is based on the **PRELIMINARY** design of the antenna. The actual weight of the antenna will be within $\pm 10\%$ of the calculated weight. The actual weight will be given in the technical manual that accompanies the antenna. This figure is for the antenna only and does not include the antenna input section.*

2 Based on a wind speed of 70 miles per hour (MPH), and 61 MPH with ice, a height above average terrain (HAAT) of 1,184 feet, and a height above ground level (HAGL) of 1,109 feet per EIA/TIA-222-F.

NOTE: Localized conditions may require higher wind speed specifications than TIA/EIA specifications. Check with local authorities to verify wind speed requirements.

Broadcast Antenna System
Power Analysis

KFXK-DT
Longview, TX
ATW27H3-ESC1-31H

Channel 31

ANTENNA PARAMETERS :

Azimuth Directivity :

Hor. Pol : 1.54 (0.00 dBd)

Ver. Pol : 2.54 (4.05 dBd)

ERP :

Hor. Pol : 1,000.00 kW (30.00 dBk)

Ver. Pol : 250.00 kW (23.98 dBk)

Elevation Directivity :

Hor. Pol : 27.00 (14.31 dBd)

Ver. Pol : 24.00 (13.80 dBd)

POWER GAIN :

Hor. Pol : 35.52 (15.51 dBd)

Ver. Pol : 8.88 (9.48 dBd)

V/H RATIO: 0.25

TRANSMISSION LINE :

VERTICAL RUN :

Type: MACX650

Length, ft. : 1000

Attenuation , dB/100 ft: 0.119

ANTENNA INPUT :

kW : 28.15

dBk : 14.49

HORIZONTAL RUN :

Type: MACX650

Length, ft. : 100

Attenuation , dB/100 ft: 0.119

LINE LOSS :

kW : 9.90

dB : 1.31

OTHER LINE LOSSES:

Type: N/A

Length, ft. : 0

Attenuation , dB/100 ft: 0

Line Efficiency : 73.98%

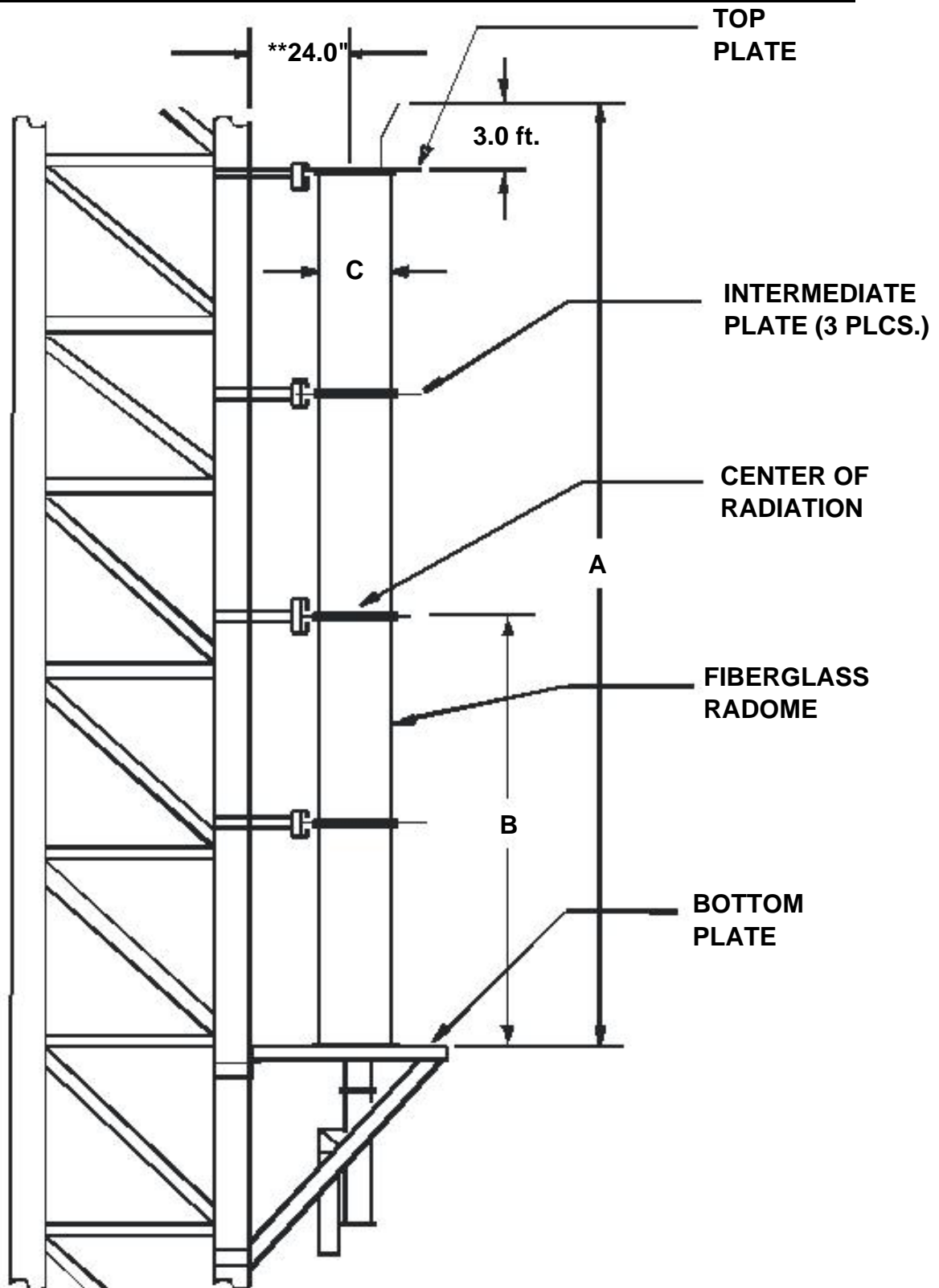
**TRANSMITTER
POWER :**

kW : 38.05

dBk : 15.80

TYPICAL MOUNTING CONFIGURATION SHOWN. ACTUAL CONFIGURATION MAY VARY.

SIDE MOUNT ANTENNA DIMENSIONS AND TOWER ATTACHMENT DETAILS



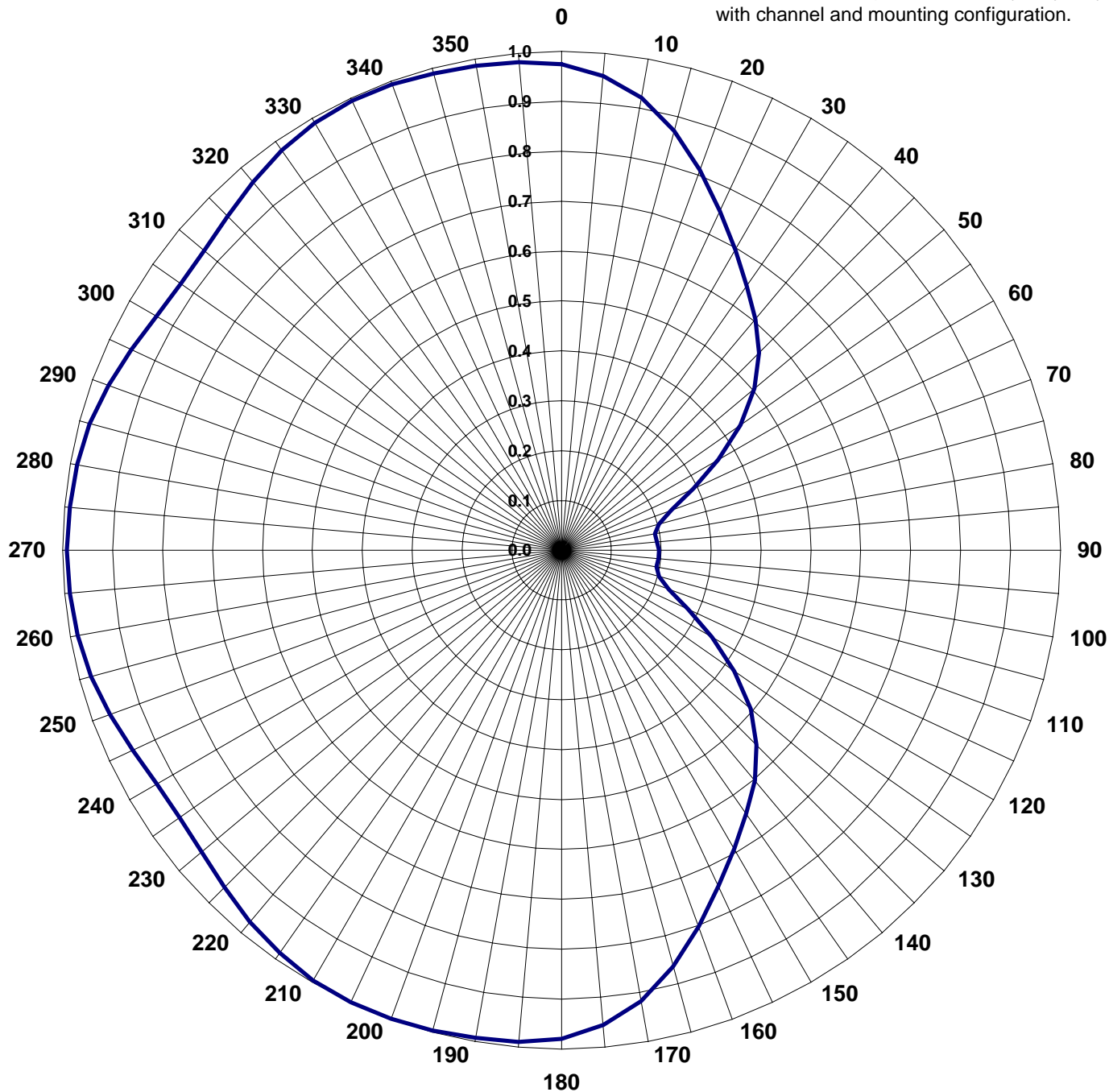
**TOWER AND MOUNT
NOT PROVIDED**

**** RECOMMENDED MINIMUM SPACING**

AZIMUTH PATTERN

TYPE:	CH31HAZ-C1	
	Numeric	dB
Directivity:	1.77	2.48
Peak(s) at:		
Polarization:	Horizontal	
Frequency:	31 (Digital)	
Location:	Longview, TX	

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



TABULATED DATA FOR AZIMUTH PATTERN

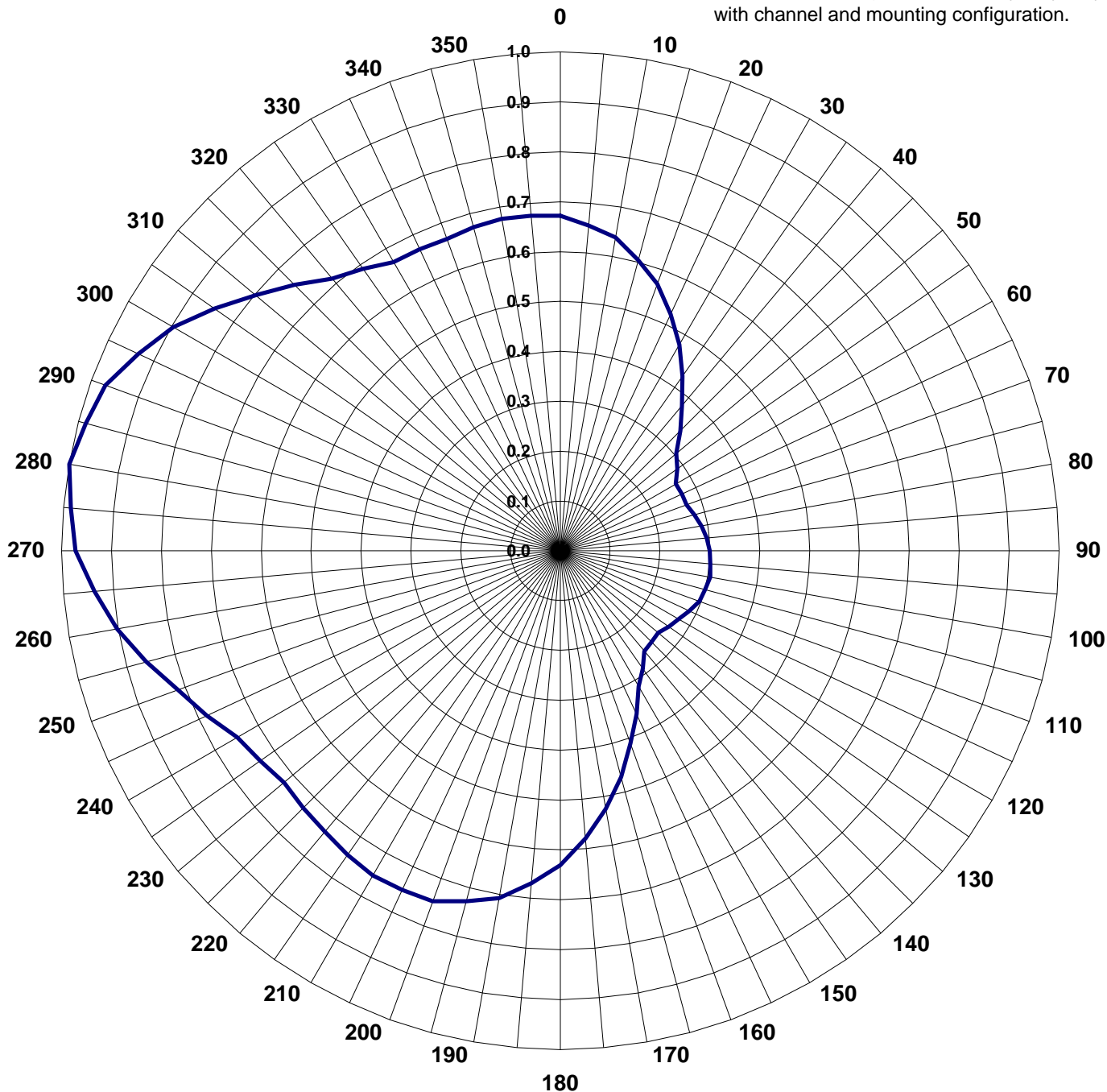
TYPE: CH31HAZ-C1

ANGLE	FIELD	dB	ANGLE	FIELD	dB	ANGLE	FIELD	dB	ANGLE	FIELD	dB
0	0.974	-0.23	92	0.195	-14.20	184	0.988	-0.10	276	0.990	-0.09
2	0.968	-0.28	94	0.195	-14.20	186	0.991	-0.08	278	0.989	-0.10
4	0.960	-0.35	96	0.194	-14.24	188	0.992	-0.07	280	0.987	-0.11
6	0.950	-0.45	98	0.193	-14.29	190	0.993	-0.06	282	0.984	-0.14
8	0.937	-0.57	100	0.193	-14.29	192	0.995	-0.04	284	0.981	-0.17
10	0.921	-0.71	102	0.195	-14.20	194	0.996	-0.03	286	0.976	-0.21
12	0.903	-0.89	104	0.198	-14.07	196	0.997	-0.03	288	0.971	-0.26
14	0.882	-1.09	106	0.205	-13.76	198	0.998	-0.02	290	0.966	-0.30
16	0.860	-1.31	108	0.215	-13.35	200	0.999	-0.01	292	0.960	-0.35
18	0.836	-1.56	110	0.228	-12.84	202	1.000	0.00	294	0.954	-0.41
20	0.811	-1.82	112	0.246	-12.18	204	1.000	0.00	296	0.948	-0.46
22	0.787	-2.08	114	0.267	-11.47	206	1.000	0.00	298	0.943	-0.51
24	0.762	-2.36	116	0.291	-10.72	208	0.998	-0.02	300	0.938	-0.56
26	0.738	-2.64	118	0.318	-9.95	210	0.996	-0.03	302	0.935	-0.58
28	0.716	-2.90	120	0.348	-9.17	212	0.993	-0.06	304	0.933	-0.60
30	0.695	-3.16	122	0.378	-8.45	214	0.989	-0.10	306	0.932	-0.61
32	0.675	-3.41	124	0.408	-7.79	216	0.984	-0.14	308	0.933	-0.60
34	0.656	-3.66	126	0.438	-7.17	218	0.978	-0.19	310	0.935	-0.58
36	0.638	-3.90	128	0.467	-6.61	220	0.972	-0.25	312	0.939	-0.55
38	0.621	-4.14	130	0.495	-6.11	222	0.965	-0.31	314	0.944	-0.50
40	0.604	-4.38	132	0.520	-5.68	224	0.959	-0.36	316	0.950	-0.45
42	0.587	-4.63	134	0.543	-5.30	226	0.952	-0.43	318	0.956	-0.39
44	0.568	-4.91	136	0.564	-4.97	228	0.946	-0.48	320	0.963	-0.33
46	0.549	-5.21	138	0.584	-4.67	230	0.941	-0.53	322	0.969	-0.27
48	0.527	-5.56	140	0.602	-4.41	232	0.938	-0.56	324	0.975	-0.22
50	0.504	-5.95	142	0.620	-4.15	234	0.935	-0.58	326	0.981	-0.17
52	0.479	-6.39	144	0.637	-3.92	236	0.934	-0.59	328	0.985	-0.13
54	0.452	-6.90	146	0.654	-3.69	238	0.935	-0.58	330	0.989	-0.10
56	0.423	-7.47	148	0.672	-3.45	240	0.937	-0.57	332	0.992	-0.07
58	0.393	-8.11	150	0.691	-3.21	242	0.941	-0.53	334	0.994	-0.05
60	0.363	-8.80	152	0.711	-2.96	244	0.945	-0.49	336	0.994	-0.05
62	0.333	-9.55	154	0.732	-2.71	246	0.951	-0.44	338	0.994	-0.05
64	0.305	-10.31	156	0.755	-2.44	248	0.957	-0.38	340	0.994	-0.05
66	0.279	-11.09	158	0.778	-2.18	250	0.963	-0.33	342	0.993	-0.06
68	0.255	-11.87	160	0.803	-1.91	252	0.968	-0.28	344	0.991	-0.08
70	0.235	-12.58	162	0.827	-1.65	254	0.974	-0.23	346	0.990	-0.09
72	0.219	-13.19	164	0.852	-1.39	256	0.978	-0.19	348	0.988	-0.10
74	0.206	-13.72	166	0.875	-1.16	258	0.982	-0.16	350	0.987	-0.11
76	0.198	-14.07	168	0.897	-0.94	260	0.985	-0.13	352	0.985	-0.13
78	0.192	-14.33	170	0.917	-0.75	262	0.988	-0.10	354	0.983	-0.15
80	0.190	-14.42	172	0.935	-0.58	264	0.990	-0.09	356	0.981	-0.17
82	0.190	-14.42	174	0.950	-0.45	266	0.991	-0.08	358	0.978	-0.19
84	0.191	-14.38	176	0.962	-0.34	268	0.991	-0.08	360	0.974	-0.23
86	0.192	-14.33	178	0.972	-0.25	270	0.992	-0.07			
88	0.194	-14.24	180	0.979	-0.18	272	0.992	-0.07			
90	0.195	-14.20	182	0.985	-0.13	274	0.991	-0.08			

AZIMUTH PATTERN

TYPE:	CH31VAZ	
	Numeric	dB
Directivity:	1.77	2.48
Peak(s) at:		
Polarization:	Horizontal	
Frequency:	31 (Digital)	
Location:	Longview, TX	

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



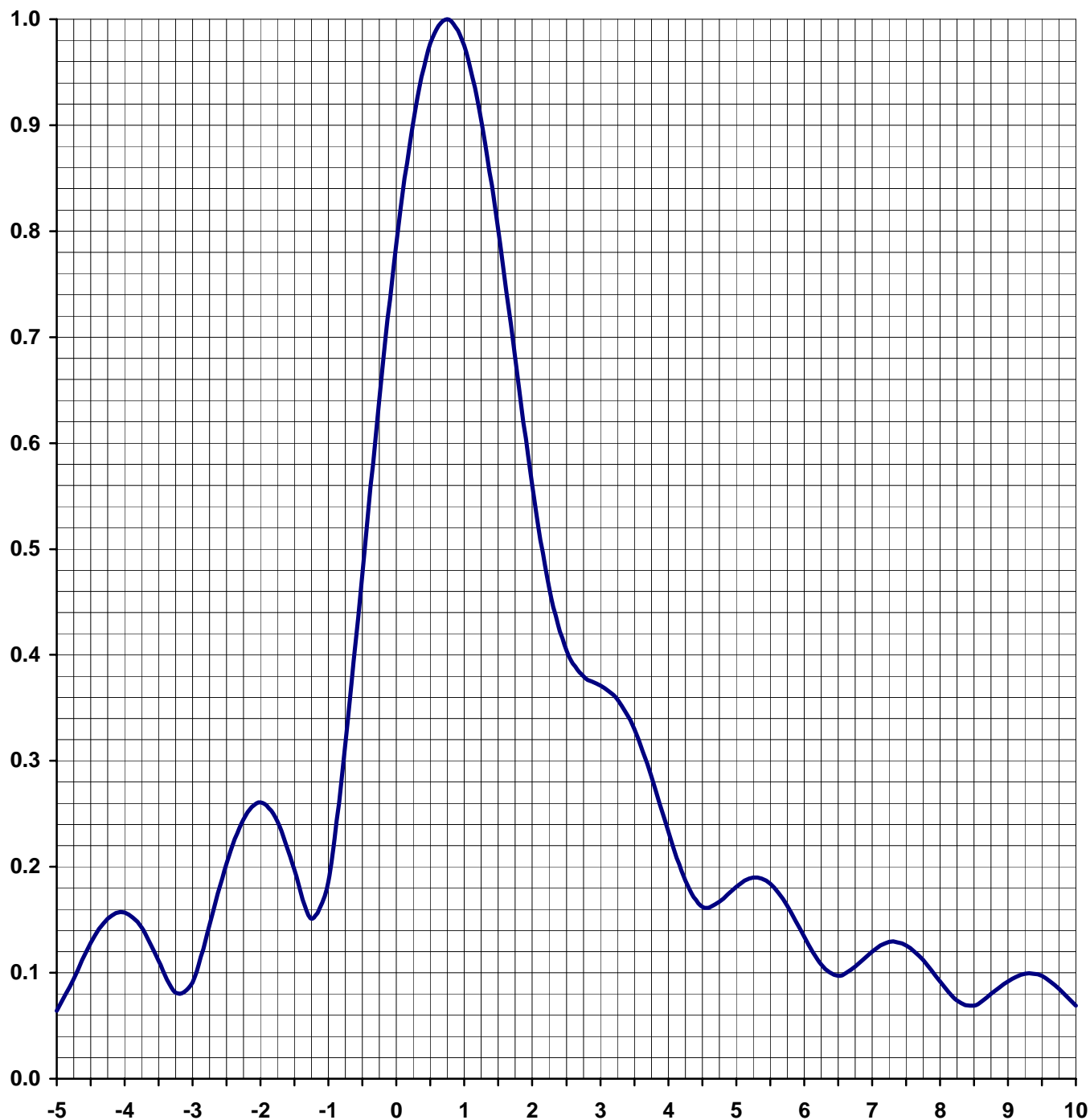
TABULATED DATA FOR AZIMUTH PATTERN

TYPE: CH31VAZ

ANGLE	FIELD	dB	ANGLE	FIELD	dB	ANGLE	FIELD	dB	ANGLE	FIELD	dB
0	0.672	-3.45	92	0.301	-10.43	184	0.661	-3.60	276	0.989	-0.10
2	0.665	-3.54	94	0.302	-10.40	186	0.676	-3.40	278	0.994	-0.05
4	0.658	-3.64	96	0.303	-10.37	188	0.692	-3.20	280	1.000	0.00
6	0.651	-3.73	98	0.304	-10.34	190	0.707	-3.01	282	0.994	-0.05
8	0.644	-3.82	100	0.305	-10.31	192	0.715	-2.91	284	0.988	-0.10
10	0.637	-3.92	102	0.303	-10.37	194	0.723	-2.82	286	0.983	-0.15
12	0.623	-4.11	104	0.302	-10.40	196	0.732	-2.71	288	0.977	-0.20
14	0.610	-4.29	106	0.300	-10.46	198	0.740	-2.62	290	0.971	-0.26
16	0.596	-4.50	108	0.299	-10.49	200	0.748	-2.52	292	0.956	-0.39
18	0.583	-4.69	110	0.297	-10.54	202	0.749	-2.51	294	0.941	-0.53
20	0.569	-4.90	112	0.292	-10.69	204	0.750	-2.50	296	0.926	-0.67
22	0.551	-5.18	114	0.288	-10.81	206	0.750	-2.50	298	0.911	-0.81
24	0.532	-5.48	116	0.283	-10.96	208	0.751	-2.49	300	0.896	-0.95
26	0.514	-5.78	118	0.279	-11.09	210	0.752	-2.48	302	0.876	-1.15
28	0.495	-6.11	120	0.274	-11.24	212	0.749	-2.51	304	0.856	-1.35
30	0.477	-6.43	122	0.270	-11.37	214	0.745	-2.56	306	0.837	-1.55
32	0.457	-6.80	124	0.267	-11.47	216	0.742	-2.59	308	0.817	-1.76
34	0.438	-7.17	126	0.263	-11.60	218	0.738	-2.64	310	0.797	-1.97
36	0.418	-7.58	128	0.260	-11.70	220	0.735	-2.67	312	0.780	-2.16
38	0.399	-7.98	130	0.256	-11.84	222	0.733	-2.70	314	0.763	-2.35
40	0.379	-8.43	132	0.257	-11.80	224	0.730	-2.73	316	0.746	-2.55
42	0.364	-8.78	134	0.258	-11.77	226	0.728	-2.76	318	0.729	-2.75
44	0.349	-9.14	136	0.260	-11.70	228	0.725	-2.79	320	0.712	-2.95
46	0.334	-9.53	138	0.261	-11.67	230	0.723	-2.82	322	0.703	-3.06
48	0.319	-9.92	140	0.262	-11.63	232	0.728	-2.76	324	0.694	-3.17
50	0.304	-10.34	142	0.272	-11.31	234	0.733	-2.70	326	0.686	-3.27
52	0.297	-10.54	144	0.283	-10.96	236	0.738	-2.64	328	0.677	-3.39
54	0.290	-10.75	146	0.293	-10.66	238	0.743	-2.58	330	0.668	-3.50
56	0.282	-11.00	148	0.304	-10.34	240	0.748	-2.52	332	0.667	-3.52
58	0.275	-11.21	150	0.314	-10.06	242	0.762	-2.36	334	0.667	-3.52
60	0.268	-11.44	152	0.333	-9.55	244	0.775	-2.21	336	0.666	-3.53
62	0.268	-11.44	154	0.353	-9.04	246	0.789	-2.06	338	0.666	-3.53
64	0.269	-11.40	156	0.372	-8.59	248	0.802	-1.92	340	0.665	-3.54
66	0.269	-11.40	158	0.392	-8.13	250	0.816	-1.77	342	0.667	-3.52
68	0.270	-11.37	160	0.411	-7.72	252	0.833	-1.59	344	0.669	-3.49
70	0.270	-11.37	162	0.434	-7.25	254	0.850	-1.41	346	0.672	-3.45
72	0.273	-11.28	164	0.457	-6.80	256	0.868	-1.23	348	0.674	-3.43
74	0.277	-11.15	166	0.480	-6.38	258	0.885	-1.06	350	0.676	-3.40
76	0.280	-11.06	168	0.503	-5.97	260	0.902	-0.90	352	0.675	-3.41
78	0.284	-10.93	170	0.526	-5.58	262	0.916	-0.76	354	0.674	-3.43
80	0.287	-10.84	172	0.547	-5.24	264	0.930	-0.63	356	0.674	-3.43
82	0.290	-10.75	174	0.568	-4.91	266	0.944	-0.50	358	0.673	-3.44
84	0.292	-10.69	176	0.588	-4.61	268	0.958	-0.37	360	0.672	-3.45
86	0.295	-10.60	178	0.609	-4.31	270	0.972	-0.25			
88	0.297	-10.54	180	0.630	-4.01	272	0.978	-0.19			
90	0.300	-10.46	182	0.645	-3.81	274	0.983	-0.15			

ELEVATION PATTERN

TYPE:	ATW27H3H	
Directivity:	Numeric	dBd
Main Lobe:	27.00	14.31
Horizontal:	16.77	12.24
Beam Tilt:	0.75	
Polarization:	Horizontal	
Frequency:	31 (Digital)	
Location:	Longview, TX	

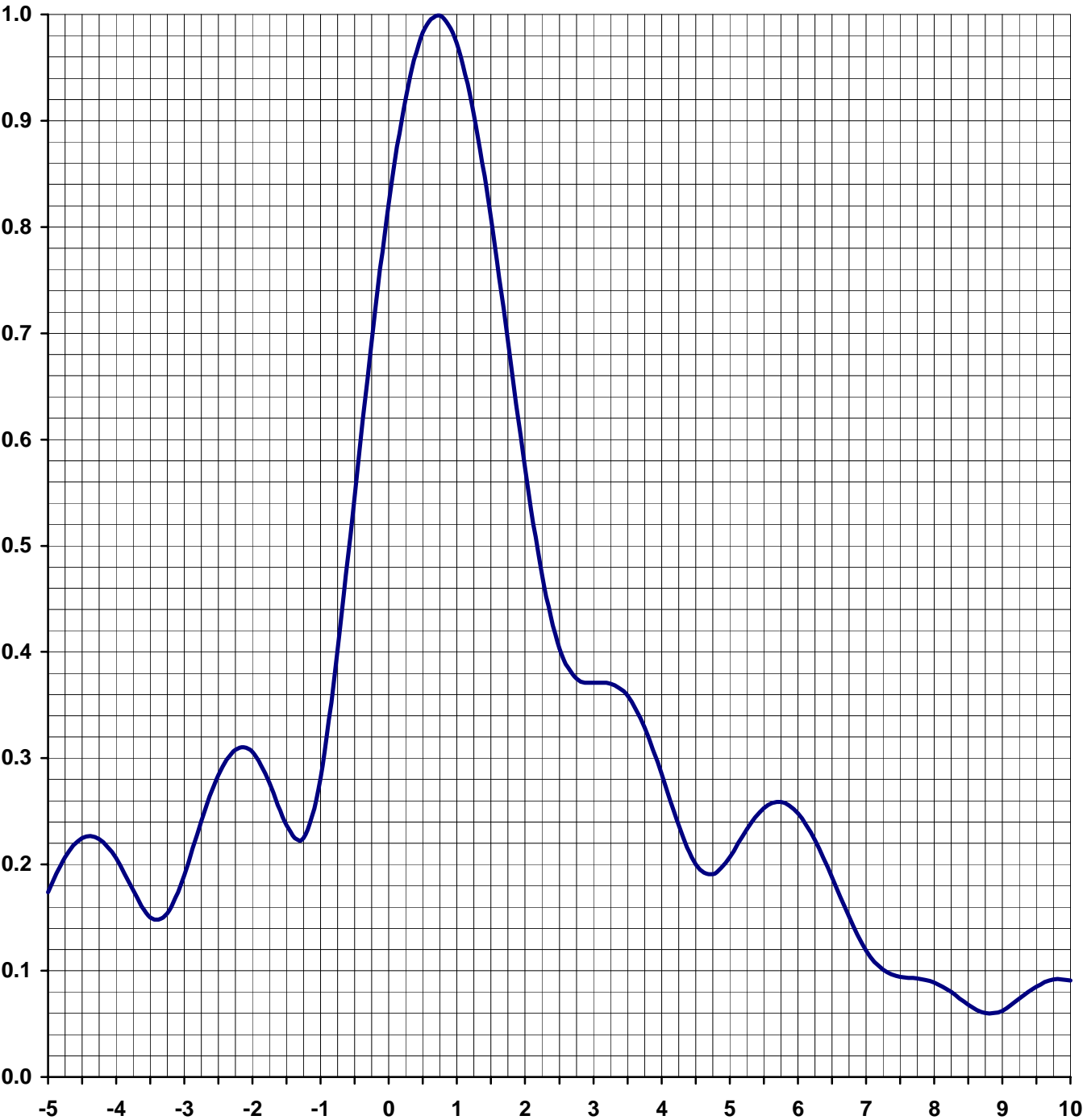


TABULATED DATA FOR ELEVATION PATTERN**TYPE: ATW27H3H****-5 to 10 degrees in 0.25 increments****10 to 90 degrees in 0.50 increments**

ANGLE	FIELD	dB	ANGLE	FIELD	dB	ANGLE	FIELD	dB	ANGLE	FIELD	dB	ANGLE	FIELD	dB
-5.00	0.064	-23.88	6.75	0.106	-19.49	27.00	0.023	-32.77	50.50	0.034	-29.37	74.00	0.006	-44.44
-4.75	0.094	-20.54	7.00	0.120	-18.42	27.50	0.034	-29.37	51.00	0.031	-30.17	74.50	0.012	-38.42
-4.50	0.128	-17.86	7.25	0.129	-17.79	28.00	0.037	-28.64	51.50	0.023	-32.77	75.00	0.019	-34.42
-4.25	0.151	-16.42	7.50	0.126	-17.99	28.50	0.027	-31.37	52.00	0.014	-37.08	75.50	0.027	-31.37
-4.00	0.157	-16.08	7.75	0.112	-19.02	29.00	0.019	-34.42	52.50	0.018	-34.89	76.00	0.033	-29.63
-3.75	0.143	-16.89	8.00	0.092	-20.72	29.50	0.028	-31.06	53.00	0.028	-31.06	76.50	0.037	-28.64
-3.50	0.111	-19.09	8.25	0.074	-22.62	30.00	0.036	-28.87	53.50	0.034	-29.37	77.00	0.041	-27.74
-3.25	0.081	-21.83	8.50	0.069	-23.22	30.50	0.031	-30.17	54.00	0.034	-29.37	77.50	0.042	-27.54
-3.00	0.091	-20.82	8.75	0.080	-21.94	31.00	0.020	-33.98	54.50	0.028	-31.06	78.00	0.043	-27.33
-2.75	0.145	-16.77	9.00	0.092	-20.72	31.50	0.022	-33.15	55.00	0.018	-34.89	78.50	0.042	-27.54
-2.50	0.203	-13.85	9.25	0.099	-20.09	32.00	0.032	-29.90	55.50	0.014	-37.08	79.00	0.041	-27.74
-2.25	0.245	-12.22	9.50	0.097	-20.26	32.50	0.034	-29.37	56.00	0.022	-33.15	79.50	0.038	-28.40
-2.00	0.261	-11.67	9.75	0.085	-21.41	33.00	0.025	-32.04	56.50	0.031	-30.17	80.00	0.035	-29.12
-1.75	0.243	-12.29	10.00	0.069	-23.22	33.50	0.017	-35.39	57.00	0.036	-28.87	80.50	0.032	-29.90
-1.50	0.197	-14.11	10.50	0.054	-25.35	34.00	0.025	-32.04	57.50	0.035	-29.12	81.00	0.028	-31.06
-1.25	0.151	-16.42	11.00	0.075	-22.50	34.50	0.033	-29.63	58.00	0.029	-30.75	81.50	0.024	-32.40
-1.00	0.186	-14.61	11.50	0.078	-22.16	35.00	0.031	-30.17	58.50	0.019	-34.42	82.00	0.020	-33.98
-0.75	0.316	-10.01	12.00	0.056	-25.04	35.50	0.021	-33.56	59.00	0.013	-37.72	82.50	0.016	-35.92
-0.50	0.476	-6.45	12.50	0.046	-26.74	36.00	0.017	-35.39	59.50	0.019	-34.42	83.00	0.013	-37.72
-0.25	0.641	-3.86	13.00	0.064	-23.88	36.50	0.027	-31.37	60.00	0.028	-31.06	83.50	0.009	-40.92
0.00	0.788	-2.07	13.50	0.066	-23.61	37.00	0.033	-29.63	60.50	0.036	-28.87	84.00	0.007	-43.10
0.25	0.903	-0.89	14.00	0.046	-26.74	37.50	0.029	-30.75	61.00	0.038	-28.40	84.50	0.004	-47.96
0.50	0.977	-0.20	14.50	0.039	-28.18	38.00	0.019	-34.42	61.50	0.036	-28.87	85.00	0.002	-53.98
0.75	1.000	0.00	15.00	0.056	-25.04	38.50	0.018	-34.89	62.00	0.029	-30.75	85.50	0.001	-60.00
1.00	0.975	-0.22	15.50	0.058	-24.73	39.00	0.028	-31.06	62.50	0.019	-34.42	86.00	0.001	-60.00
1.25	0.905	-0.87	16.00	0.041	-27.74	39.50	0.033	-29.63	63.00	0.012	-38.42	86.50	0.001	-60.00
1.50	0.802	-1.92	16.50	0.034	-29.37	40.00	0.029	-30.75	63.50	0.017	-35.39	87.00	0.002	-53.98
1.75	0.681	-3.34	17.00	0.049	-26.20	40.50	0.019	-34.42	64.00	0.026	-31.70	87.50	0.002	-53.98
2.00	0.561	-5.02	17.50	0.052	-25.68	41.00	0.017	-35.39	64.50	0.035	-29.12	88.00	0.002	-53.98
2.25	0.464	-6.67	18.00	0.038	-28.40	41.50	0.027	-31.37	65.00	0.040	-27.96	88.50	0.002	-53.98
2.50	0.404	-7.87	18.50	0.029	-30.75	42.00	0.033	-29.63	65.50	0.041	-27.74	89.00	0.001	-60.00
2.75	0.380	-8.40	19.00	0.043	-27.33	42.50	0.030	-30.46	66.00	0.038	-28.40	89.50	0.001	-60.00
3.00	0.371	-8.61	19.50	0.048	-26.38	43.00	0.020	-33.98	66.50	0.031	-30.17	90.00	0.000	0.00
3.25	0.358	-8.92	20.00	0.036	-28.87	43.50	0.015	-36.48	67.00	0.022	-33.15			
3.50	0.330	-9.63	20.50	0.026	-31.70	44.00	0.023	-32.77	67.50	0.013	-37.72			
3.75	0.285	-10.90	21.00	0.038	-28.40	44.50	0.032	-29.90	68.00	0.011	-39.17			
4.00	0.233	-12.65	21.50	0.044	-27.13	45.00	0.032	-29.90	68.50	0.019	-34.42			
4.25	0.187	-14.56	22.00	0.034	-29.37	45.50	0.025	-32.04	69.00	0.029	-30.75			
4.50	0.162	-15.81	22.50	0.024	-32.40	46.00	0.015	-36.48	69.50	0.036	-28.87			
4.75	0.167	-15.55	23.00	0.033	-29.63	46.50	0.018	-34.89	70.00	0.042	-27.54			
5.00	0.181	-14.85	23.50	0.041	-27.74	47.00	0.028	-31.06	70.50	0.044	-27.13			
5.25	0.190	-14.42	24.00	0.035	-29.12	47.50	0.033	-29.63	71.00	0.044	-27.13			
5.50	0.184	-14.70	24.50	0.023	-32.77	48.00	0.031	-30.17	71.50	0.040	-27.96			
5.75	0.163	-15.76	25.00	0.029	-30.75	48.50	0.022	-33.15	72.00	0.035	-29.12			
6.00	0.134	-17.46	25.50	0.039	-28.18	49.00	0.014	-37.08	72.50	0.028	-31.06			
6.25	0.108	-19.33	26.00	0.036	-28.87	49.50	0.020	-33.98	73.00	0.019	-34.42			
6.50	0.097	-20.26	26.50	0.024	-32.40	50.00	0.029	-30.75	73.50	0.011	-39.17			

ELEVATION PATTERN

TYPE:	ATW24H3V	
Directivity:	Numeric	dBd
Main Lobe:	26.00	14.15
Horizontal:	14.82	11.71
Beam Tilt:	0.75	
Polarization:	Horizontal	
Frequency:	31 (Digital)	
Location:	Longview, TX	



TABULATED DATA FOR ELEVATION PATTERN

TYPE: ATW24H3V

-5 to 10 degrees in 0.25 increments

10 to 90 degrees in 0.50 increments

ANGLE	FIELD	dB	ANGLE	FIELD	dB	ANGLE	FIELD	dB	ANGLE	FIELD	dB	ANGLE	FIELD	dB
-5.00	0.174	-15.19	6.75	0.151	-16.42	27.00	0.018	-34.89	50.50	0.026	-31.70	74.00	0.028	-31.06
-4.75	0.207	-13.68	7.00	0.119	-18.49	27.50	0.023	-32.77	51.00	0.023	-32.77	74.50	0.032	-29.90
-4.50	0.225	-12.96	7.25	0.101	-19.91	28.00	0.028	-31.06	51.50	0.028	-31.06	75.00	0.037	-28.64
-4.25	0.224	-13.00	7.50	0.094	-20.54	28.50	0.019	-34.42	52.00	0.033	-29.63	75.50	0.042	-27.54
-4.00	0.206	-13.72	7.75	0.093	-20.63	29.00	0.003	-50.46	52.50	0.034	-29.37	76.00	0.046	-26.74
-3.75	0.176	-15.09	8.00	0.089	-21.01	29.50	0.022	-33.15	53.00	0.028	-31.06	76.50	0.048	-26.38
-3.50	0.150	-16.48	8.25	0.080	-21.94	30.00	0.040	-27.96	53.50	0.017	-35.39	77.00	0.050	-26.02
-3.25	0.154	-16.25	8.50	0.068	-23.35	30.50	0.054	-25.35	54.00	0.008	-41.94	77.50	0.050	-26.02
-3.00	0.190	-14.42	8.75	0.060	-24.44	31.00	0.066	-23.61	54.50	0.020	-33.98	78.00	0.049	-26.20
-2.75	0.241	-12.36	9.00	0.062	-24.15	31.50	0.077	-22.27	55.00	0.035	-29.12	78.50	0.048	-26.38
-2.50	0.284	-10.93	9.25	0.074	-22.62	32.00	0.084	-21.51	55.50	0.046	-26.74	79.00	0.045	-26.94
-2.25	0.308	-10.23	9.50	0.085	-21.41	32.50	0.081	-21.83	56.00	0.053	-25.51	79.50	0.042	-27.54
-2.00	0.306	-10.29	9.75	0.092	-20.72	33.00	0.066	-23.61	56.50	0.055	-25.19	80.00	0.038	-28.40
-1.75	0.277	-11.15	10.00	0.091	-20.82	33.50	0.042	-27.54	57.00	0.052	-25.68	80.50	0.034	-29.37
-1.50	0.237	-12.51	10.50	0.075	-22.50	34.00	0.020	-33.98	57.50	0.048	-26.38	81.00	0.030	-30.46
-1.25	0.225	-12.96	11.00	0.084	-21.51	34.50	0.019	-34.42	58.00	0.046	-26.74	81.50	0.026	-31.70
-1.00	0.281	-11.03	11.50	0.125	-18.06	35.00	0.028	-31.06	58.50	0.046	-26.74	82.00	0.022	-33.15
-0.75	0.402	-7.92	12.00	0.151	-16.42	35.50	0.027	-31.37	59.00	0.048	-26.38	82.50	0.019	-34.42
-0.50	0.546	-5.26	12.50	0.141	-17.02	36.00	0.016	-35.92	59.50	0.049	-26.20	83.00	0.016	-35.92
-0.25	0.692	-3.20	13.00	0.101	-19.91	36.50	0.012	-38.42	60.00	0.049	-26.20	83.50	0.013	-37.72
0.00	0.822	-1.70	13.50	0.054	-25.35	37.00	0.029	-30.75	60.50	0.045	-26.94	84.00	0.011	-39.17
0.25	0.921	-0.71	14.00	0.034	-29.37	37.50	0.045	-26.94	61.00	0.039	-28.18	84.50	0.009	-40.92
0.50	0.983	-0.15	14.50	0.037	-28.64	38.00	0.056	-25.04	61.50	0.032	-29.90	85.00	0.008	-41.94
0.75	0.999	-0.01	15.00	0.029	-30.75	38.50	0.063	-24.01	62.00	0.026	-31.70	85.50	0.007	-43.10
1.00	0.973	-0.24	15.50	0.027	-31.37	39.00	0.067	-23.48	62.50	0.026	-31.70	86.00	0.006	-44.44
1.25	0.906	-0.86	16.00	0.040	-27.96	39.50	0.070	-23.10	63.00	0.030	-30.46	86.50	0.006	-44.44
1.50	0.809	-1.84	16.50	0.048	-26.38	40.00	0.069	-23.22	63.50	0.035	-29.12	87.00	0.005	-46.02
1.75	0.693	-3.19	17.00	0.055	-25.19	40.50	0.061	-24.29	64.00	0.038	-28.40	87.50	0.004	-47.96
2.00	0.574	-4.82	17.50	0.079	-22.05	41.00	0.046	-26.74	64.50	0.037	-28.64	88.00	0.004	-47.96
2.25	0.473	-6.50	18.00	0.106	-19.49	41.50	0.028	-31.06	65.00	0.033	-29.63	88.50	0.003	-50.46
2.50	0.403	-7.89	18.50	0.119	-18.49	42.00	0.020	-33.98	65.50	0.026	-31.70	89.00	0.002	-53.98
2.75	0.375	-8.52	19.00	0.108	-19.33	42.50	0.027	-31.37	66.00	0.016	-35.92	89.50	0.001	-60.00
3.00	0.371	-8.61	19.50	0.076	-22.38	43.00	0.033	-29.63	66.50	0.004	-47.96	90.00	0.000	---
3.25	0.370	-8.64	20.00	0.038	-28.40	43.50	0.031	-30.17	67.00	0.009	-40.92			
3.50	0.359	-8.90	20.50	0.019	-34.42	44.00	0.021	-33.56	67.50	0.022	-33.15			
3.75	0.329	-9.66	21.00	0.026	-31.70	44.50	0.012	-38.42	68.00	0.033	-29.63			
4.00	0.285	-10.90	21.50	0.022	-33.15	45.00	0.024	-32.40	68.50	0.043	-27.33			
4.25	0.237	-12.51	22.00	0.011	-39.17	45.50	0.039	-28.18	69.00	0.050	-26.02			
4.50	0.200	-13.98	22.50	0.021	-33.56	46.00	0.050	-26.02	69.50	0.054	-25.35			
4.75	0.191	-14.38	23.00	0.037	-28.64	46.50	0.056	-25.04	70.00	0.055	-25.19			
5.00	0.207	-13.68	23.50	0.051	-25.85	47.00	0.057	-24.88	70.50	0.054	-25.35			
5.25	0.233	-12.65	24.00	0.069	-23.22	47.50	0.057	-24.88	71.00	0.050	-26.02			
5.50	0.253	-11.94	24.50	0.088	-21.11	48.00	0.058	-24.73	71.50	0.045	-26.94			
5.75	0.259	-11.73	25.00	0.100	-20.00	48.50	0.058	-24.73	72.00	0.039	-28.18			
6.00	0.248	-12.11	25.50	0.096	-20.35	49.00	0.055	-25.19	72.50	0.032	-29.90			
6.25	0.223	-13.03	26.00	0.075	-22.50	49.50	0.048	-26.38	73.00	0.028	-31.06			
6.50	0.188	-14.52	26.50	0.044	-27.13	50.00	0.037	-28.64	73.50	0.026	-31.70			