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S.O. 25553

Report of Test 6810-1R-DA

for

ENTERCOM BOSTON LICENSE, L.L.C.

WKAF (Aux) 97.7 MHz Brockton, MA

OBJECTIVE:

The objective of this test was to demonstrate the directional characteristics of a 6810-1R-DA to meet the needs of WKAF (Aux) and to comply with the requirements of the FCC construction permit, file number BXPH-20061030ADQ.

RESULTS:

The measured azimuth pattern for the 6810-1R-DA is shown in Figure 1. Figure 1A shows the Tabulation of the Horizontal Polarization. Figure 1B shows the Tabulation of the Vertical Polarization. Figure 1C shows the Tabulation of the FCC Composite Pattern. The calculated elevation pattern of the antenna is shown in Figure 3. Construction permit file number BXPH-20061030ADQ indicates that the Horizontal radiation component shall not exceed 2.7 kW at any azimuth and is restricted to the following values at the azimuths specified:

130 - 170 Degrees T: 0.061 kW

From Figure 1, the maximum radiation of the Horizontal component occurs at 284 Degrees T to 002 Degrees T. At the restricted azimuth of 130 - 170 Degrees T the Horizontal component is 18.416 dB down from the maximum of 2.7 kW, or 0.039 kW.

The R.M.S. of the Horizontal component is 0.653. The total Horizontal power gain is 1.101. The R.M.S. of the Vertical component is 0.640. The total Vertical power gain is 1.079. See Figure 4 for calculations. The R.M.S. of the FCC composite pattern is 0.703. The R.M.S. of the measured composite pattern is 0.656. Eighty-five percent (85%) of the original authorized FCC composite pattern is 0.598. Therefore this pattern complies with the FCC requirement of 73.316(c)(2)(ix)(A).

METHOD OF DIRECTIONALIZATION:

The 6810-1R-DA was mounted on a tower of precise scale to the Stainless G-5 SSV tower at the WKAF (Aux) site. The spacing of the antenna to the tower was varied to achieve the vertical pattern shown in Figure 1. A horizontal parasitic element was placed directly under the bay. The position of this horizontal parasitic element was changed until the horizontal pattern shown in Figure 1 was achieved. See Figure 2 for mechanical details.

METHOD OF MEASUREMENT:

As allowed by the construction permit, file number BXPH-20061030ADQ, a single level of the 6810-1R-DA was set up on the Howell Laboratories scale model antenna pattern measuring range. A scale of 4.5:1 was used.

SUPERVISION:

Mr. Surette was graduated from Lowell Technological Institute, Lowell, Massachusetts in 1973 with the degree of Bachelor of Science in Electrical Engineering. He has been directly involved with design and development of broadcast antennas, filter systems and RF transmission components since 1974, as an RF Engineer for six years with the original Shively Labs in Raymond, ME and for a short period of time with Dielectric Communications. He is currently an Associate Member of the AFCCE and a Senior Member of IEEE. He has authored a chapter on filters and combining systems for the latest edition of the CRC Electronics Handbook and for the 9th and 10th Editions of the NAB Handbook.

EQUIPMENT:

The scale model pattern range consists of a wooden rotating pedestal equipped with a position indicator. The scale model bay is placed on the top of this pedestal and is used in the transmission mode at approximately 20 feet above ground level. The receiving corner reflector is spaced 50 feet away from the rotating pedestal at the same level above ground as the transmitting model. The transmitting and receiving signals are carried to a control building by means of RG-9/U double shielded coax cable.

The control building is equipped with:

Hewlett Packard Model 8753 Network Analyzer
PC Based Controller
Hewlett Packard 7550A Graphics Plotter

The test equipment is calibrated to ANSI/NCSL Z540-1-1994.

TEST PROCEDURES:

The corner reflector is mounted so that the horizontal and vertical azimuth patterns are measured independently by rotating the corner reflector by 90 degrees. The network analyzer was set to 439.65 MHz. Calibrated pads are used to check the linearity of the measuring system. For example, 6 dB padding yields a scale reading of 50 from an unpadded reading of 100 in voltage. From the recorded patterns, the R.M.S. values are calculated and recorded as shown in Figure 1.

Respectfully submitted by:

Robert A. Surette
Director of Sales Engineering
S/O 25553
August 15, 2007

Shively Labs

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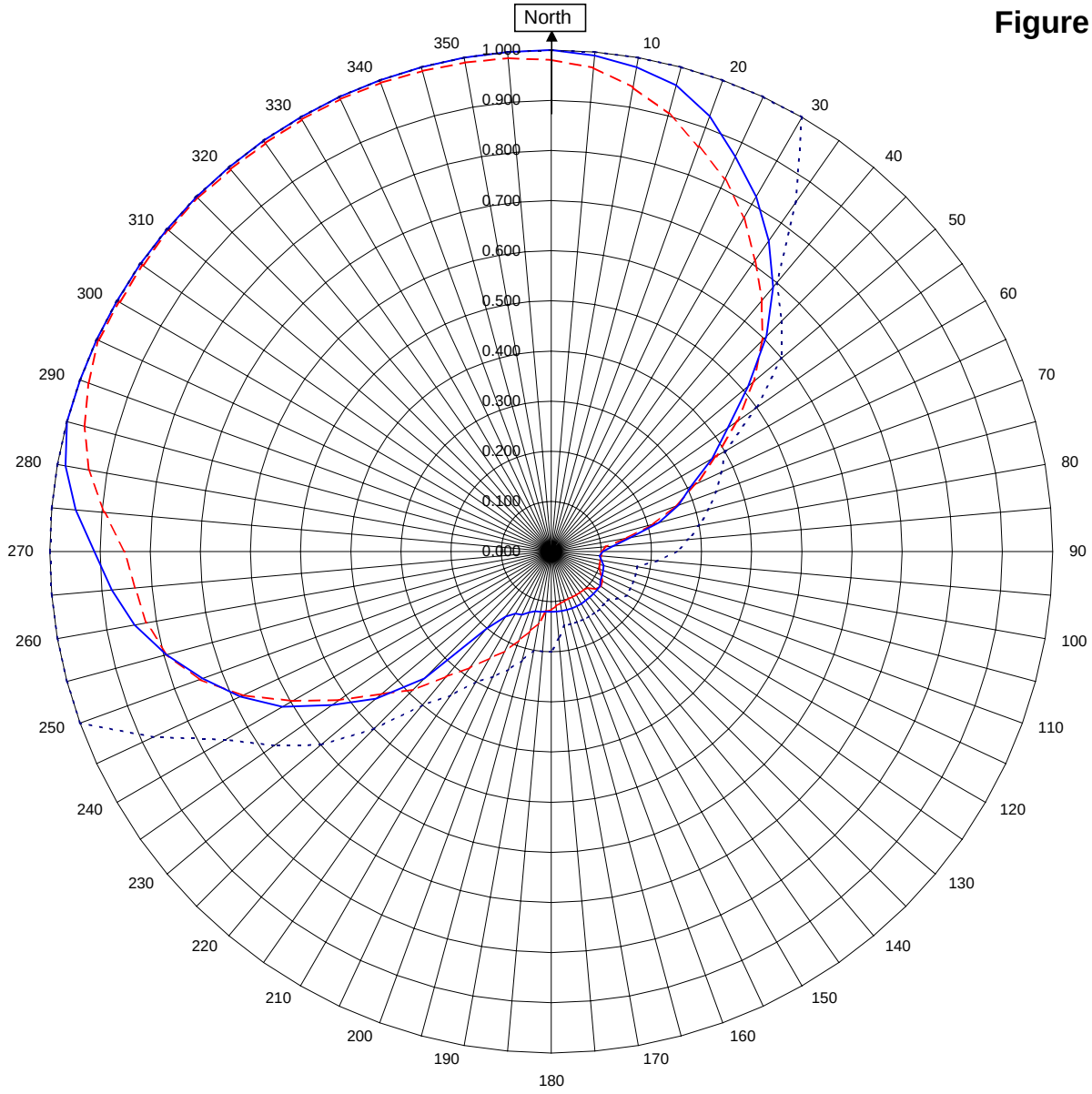
Figure 1



WKAF (Aux) Brockton, MA

25553

August 16, 2007

Horizontal RMS	0.653
Vertical RMS	0.640
H/V Composite RMS	0.656
FCC Composite RMS	0.703

Frequency	97.7 / 439.65 mHz
Plot	Relative Field
Scale	4.5 : 1
	See Figure 2 for Mechanical Details

Antenna Model	6810-1R-DA
Pattern Type	Directional Azimuth

Figure 1a

Tabulation of Horizontal Azimuth Pattern
WKAF (Aux) Brockton, MA

Azimuth	Rel Field	Azimuth	Rel Field
0	1.000	180	0.120
10	0.981	190	0.122
20	0.924	200	0.129
30	0.817	210	0.143
40	0.688	220	0.200
45	0.607	225	0.358
50	0.512	230	0.456
60	0.371	240	0.619
70	0.270	250	0.740
80	0.160	260	0.844
90	0.103	270	0.911
100	0.102	280	0.984
110	0.110	290	1.000
120	0.113	300	1.000
130	0.119	310	1.000
135	0.119	315	1.000
140	0.119	320	1.000
150	0.120	330	1.000
160	0.120	340	1.000
170	0.120	350	1.000

Figure 1b

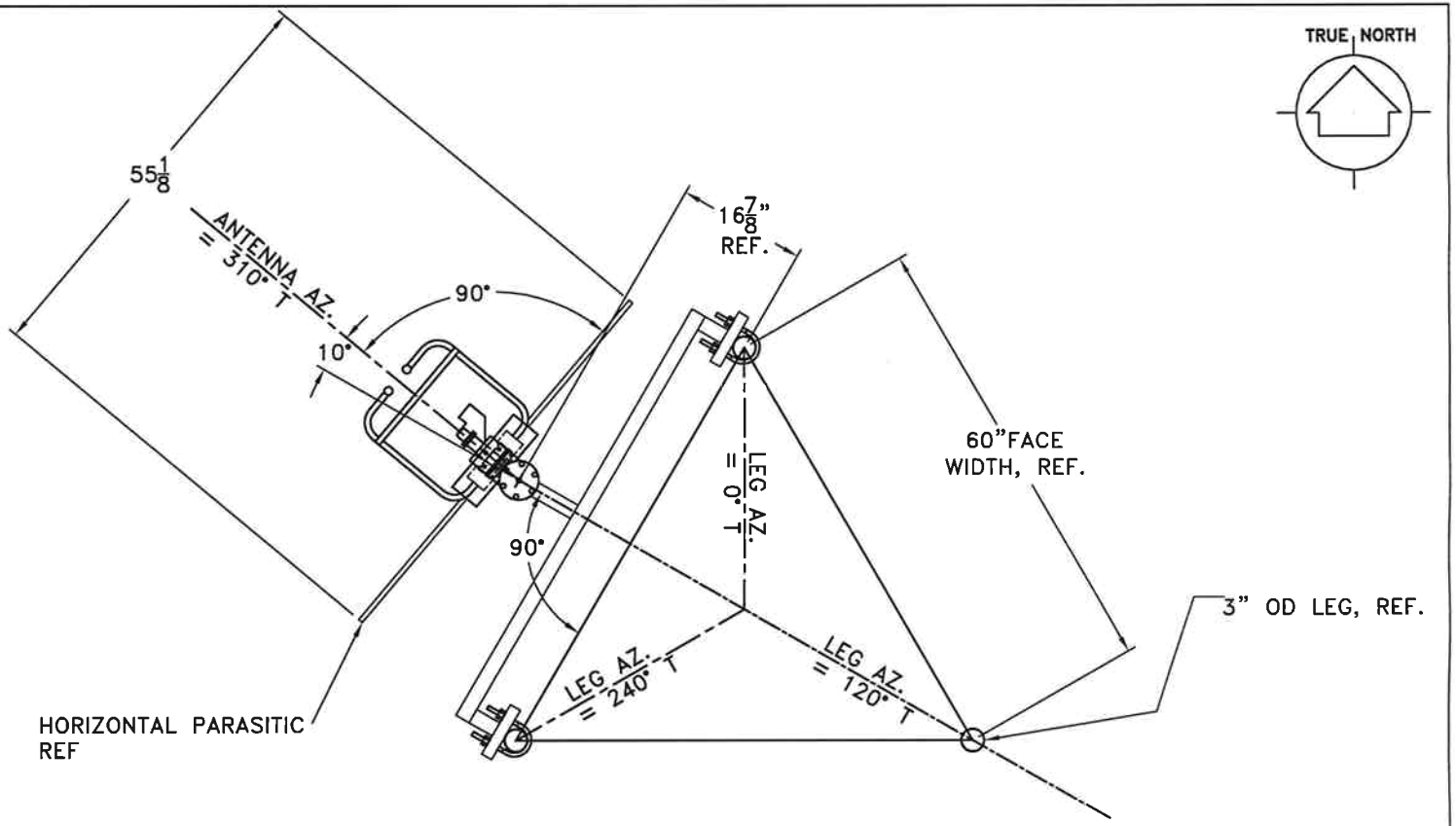
Tabulation of Vertical Azimuth Pattern
WKAF (Aux) Brockton, MA

Azimuth	Rel Field	Azimuth	Rel Field
0	0.980	180	0.117
10	0.940	190	0.145
20	0.859	200	0.189
30	0.769	210	0.246
40	0.654	220	0.325
45	0.595	225	0.390
50	0.528	230	0.442
60	0.379	240	0.596
70	0.262	250	0.746
80	0.151	260	0.820
90	0.100	270	0.851
100	0.100	280	0.936
110	0.102	290	0.982
120	0.118	300	0.995
130	0.117	310	0.997
135	0.103	315	0.996
140	0.100	320	0.995
150	0.100	330	0.995
160	0.100	340	0.994
170	0.105	350	0.990

Figure 1c

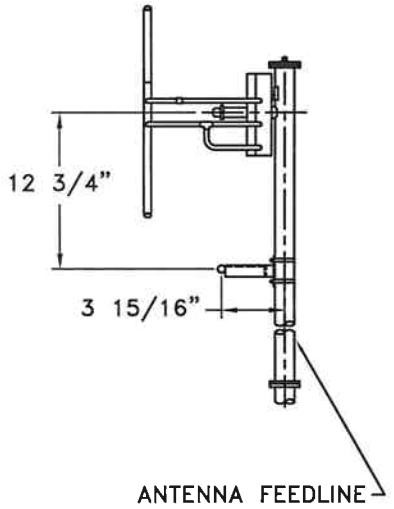
Tabulation of FCC Directional Composite
WKAF (Aux) Brockton, MA

Azimuth	Rel Field	Azimuth	Rel Field
0	1.000	180	0.200
10	1.000	190	0.200
20	1.000	200	0.250
30	1.000	210	0.300
40	0.700	220	0.400
50	0.600	230	0.600
60	0.400	240	0.750
70	0.350	250	1.000
80	0.300	260	1.000
90	0.250	270	1.000
100	0.175	280	1.000
110	0.175	290	1.000
120	0.175	300	1.000
130	0.150	310	1.000
140	0.150	320	1.000
150	0.150	330	1.000
160	0.150	340	1.000
170	0.150	350	1.000



TOP VIEW

TOWER MAKE: STAINLESS G-5, SSV

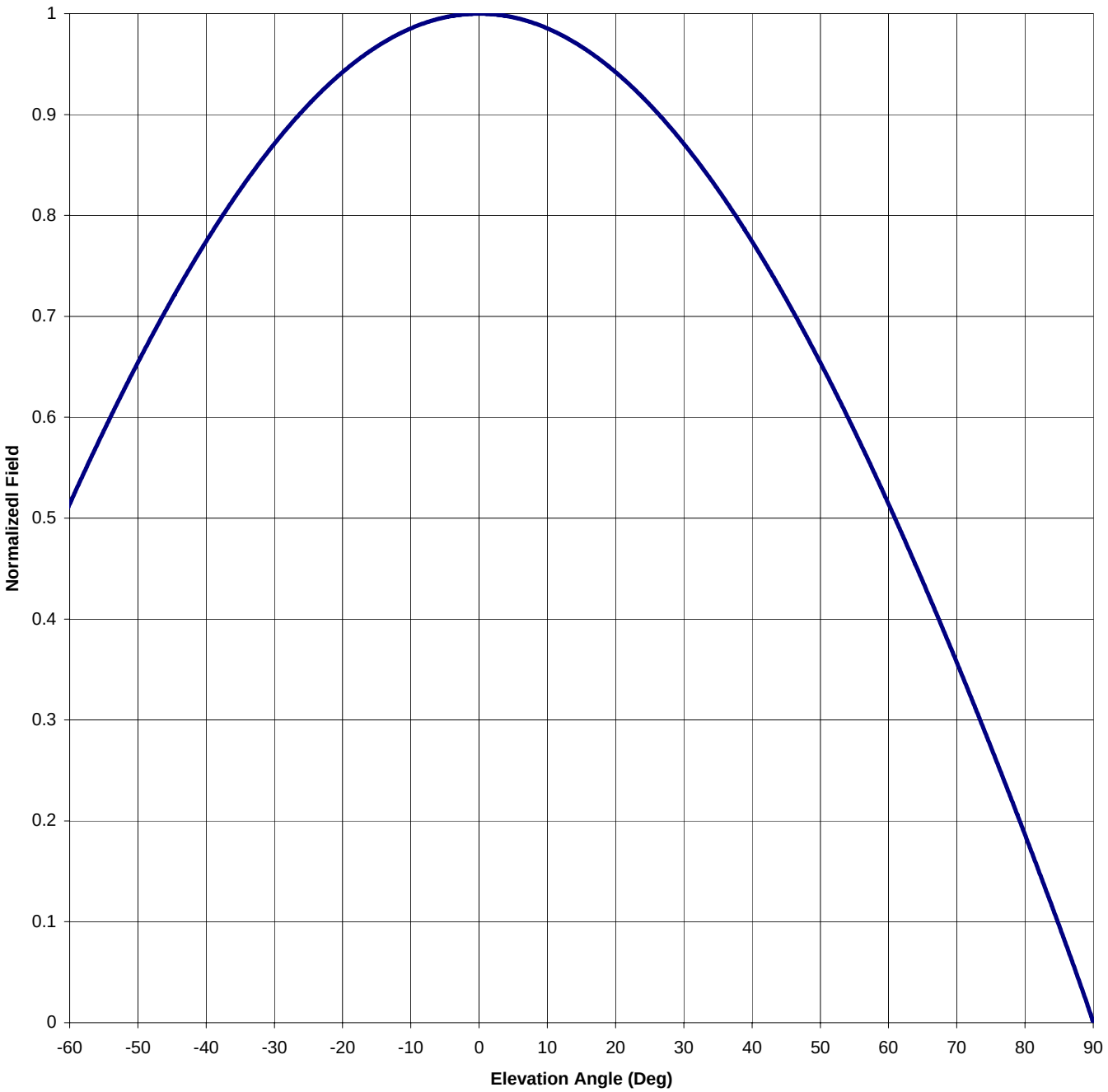


SIDE VIEW

ANTENNA HEADING: 310° TRUE NORTH

SHIVELY LABS A DIVISION OF HOWELL LABORATORIES INC.,BRIDGTON, MAINE			
SHOP ORDER: 25553	FREQUENCY: 97.7 MHz.	SCALE: N.T.S.	DRAWN BY: ASP APPROVED BY:
MODEL: 6810-1R-DIRECTIONAL ANTENNA			
DATE: 8/13/07	FIGURE 2		

Antenna Mfg.:	**Shively Labs**			**Date:**	**8/16/2007**
Antenna Type:	**6810-1R-DA**				
Station:	**WKAF (Aux)**	**Beam Tilt**	**0**		
Frequency:	**97.7**	**Gain (Max)**	**1.101**	**0.418**	**dB**
Channel #:	**249**	**Gain (Horizon)**	**1.101**	**0.418**	**dB**
Figure:	**3**				



Antenna Mfg.: Shively Labs
Antenna Type: 6810-1R-DA
Station: WKAF (Aux)
Frequency: 97.7
Channel #: 249
Figure: 3

Date: 8/16/2007

Beam Tilt	**0**	
Gain (Max)	**1.101**	**0.418 dB**
Gain (Horizon)	**1.101**	**0.418 dB**

Angle of Depression (Deg)	Relative Field	Angle of Depression (Deg)	Relative Field	Angle of Depression (Deg)	Relative Field	Angle of Depression (Deg)	Relative Field
-90	0.000	-44	0.729	0	1.000	46	0.705
-89	0.021	-43	0.741	1	1.000	47	0.693
-88	0.040	-42	0.752	2	0.999	48	0.680
-87	0.059	-41	0.763	3	0.999	49	0.667
-86	0.078	-40	0.774	4	0.998	50	0.654
-85	0.096	-39	0.785	5	0.996	51	0.641
-84	0.114	-38	0.796	6	0.995	52	0.628
-83	0.133	-37	0.806	7	0.993	53	0.614
-82	0.151	-36	0.816	8	0.991	54	0.600
-81	0.168	-35	0.826	9	0.988	55	0.586
-80	0.186	-34	0.835	10	0.985	56	0.572
-79	0.204	-33	0.845	11	0.982	57	0.558
-78	0.221	-32	0.854	12	0.979	58	0.544
-77	0.239	-31	0.862	13	0.975	59	0.529
-76	0.256	-30	0.871	14	0.971	60	0.514
-75	0.273	-29	0.879	15	0.967	61	0.499
-74	0.290	-28	0.887	16	0.963	62	0.484
-73	0.307	-27	0.895	17	0.958	63	0.469
-72	0.324	-26	0.903	18	0.953	64	0.453
-71	0.341	-25	0.910	19	0.948	65	0.437
-70	0.357	-24	0.917	20	0.942	66	0.422
-69	0.373	-23	0.924	21	0.936	67	0.406
-68	0.390	-22	0.930	22	0.930	68	0.390
-67	0.406	-21	0.936	23	0.924	69	0.373
-66	0.422	-20	0.942	24	0.917	70	0.357
-65	0.437	-19	0.948	25	0.910	71	0.341
-64	0.453	-18	0.953	26	0.903	72	0.324
-63	0.469	-17	0.958	27	0.895	73	0.307
-62	0.484	-16	0.963	28	0.887	74	0.290
-61	0.499	-15	0.967	29	0.879	75	0.273
-60	0.514	-14	0.971	30	0.871	76	0.256
-59	0.529	-13	0.975	31	0.862	77	0.239
-58	0.544	-12	0.979	32	0.854	78	0.221
-57	0.558	-11	0.982	33	0.845	79	0.204
-56	0.572	-10	0.985	34	0.835	80	0.186
-55	0.586	-9	0.988	35	0.826	81	0.168
-54	0.600	-8	0.991	36	0.816	82	0.151
-53	0.614	-7	0.993	37	0.806	83	0.133
-52	0.628	-6	0.995	38	0.796	84	0.114
-51	0.641	-5	0.996	39	0.785	85	0.096
-50	0.654	-4	0.998	40	0.774	86	0.078
-49	0.667	-3	0.999	41	0.763	87	0.059
-48	0.680	-2	0.999	42	0.752	88	0.040
-47	0.693	-1	1.000	43	0.741	89	0.021
-46	0.705	0	1.000	44	0.729	90	0.000
-45	0.717			45	0.717		

S.O. 25553 Figure 4

VALIDATION OF TOTAL POWER GAIN CALCULATION

WKAF (Aux) 97.7 MHz BROCKTON, MA

MODEL 6810-1R-DA

Elevation Gain of Antenna 0.46

Horizontal RMS value divided by the Vertical RMS value equals the Horiz. - Vert. Ratio

H RMS 0.653 V RMS 0.64 H/V Ratio 1.020

Elevation Gain of Horizontal Component 0.469

Elevation Gain of Vertical Component 0.451

Horizontal Azimuth Gain equals 1/(RMS)SQ. 2.345

Vertical Azimuth Gain equals 1/(RMS/Max Vert)SQ. 2.393
Max. Vertical 0.99

***Total Horizontal Power Gain is the Elevation Gain Times the Azimuth Gain**

Total Horizontal Power Gain = **1.101**

***Total Vertical Power Gain is the Elevation Gain Times the Azimuth Gain**

Total Vertical Power Gain = **1.079**

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ERP divided by Horizontal Power Gain equals Antenna Input Power

2.7 KW ERP Equals 2.453 KW Antenna Input Power

Antenna Input Power times Vertical Power Gain equals Vertical ERP

2.453 KW Times 1.079 KW Equals 2.646 KW ERP

Maximum Value of the Vertical Component squared times the Maximum ERP equals the Vertical ERP

0.99 Equals 2.646 KW Vertical ERP

NOTE: Calculating the ERP of the Vertical Component by two methods validates the total power gain calculations