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S.O. 26680-3

Report of Test 6810-6-DA

for

VICTORIA RADIOWORKS, LTD.

KBAR-FM 100.9 MHz Victoria, TX

OBJECTIVE:

The objective of this test was to demonstrate the directional characteristics of a 6810-6-DA to meet the needs of KBAR-FM and to comply with the requirements of the FCC construction permit, file number BMPH-20060509ACM.

RESULTS:

The measured azimuth pattern for the 6810-6-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 BMPH-20060509ACM indicates that the Horizontal radiation component shall not exceed 15.0 kW at any azimuth and is restricted to the following values at the azimuths specified:

60 Degrees T: 2.90 kW

From Figure 1, the maximum radiation of the Horizontal component occurs at 315 Degrees T to 330 Degrees T. At the restricted azimuth of 60 Degrees T the Horizontal component is 7.33 dB down from the maximum of 15.0 kW, or 2.77 kW.

The R.M.S. of the Horizontal component is 0.719. The total Horizontal power gain is 6.380. The R.M.S. of the Vertical component is 0.715. The total Vertical power gain is 6.253. See Figure 4 for calculations. The R.M.S. of the FCC composite pattern is 0.887. The R.M.S. of the measured composite pattern is 0.754. Eighty-five percent (85%) of the original authorized FCC composite pattern is 0.754. Therefore this pattern complies with the FCC requirement of 73.316(c)(2)(ix)(A).

METHOD OF DIRECTIONALIZATION:

One bay of the 6810-6-DA was mounted on a tower of precise scale to the Allied 24SR tower at the KBAR-FM 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 BMPH-20060509ACM, a single level of the 6810-6-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 454.05 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 26680-3
August 1, 2008

Shively Labs

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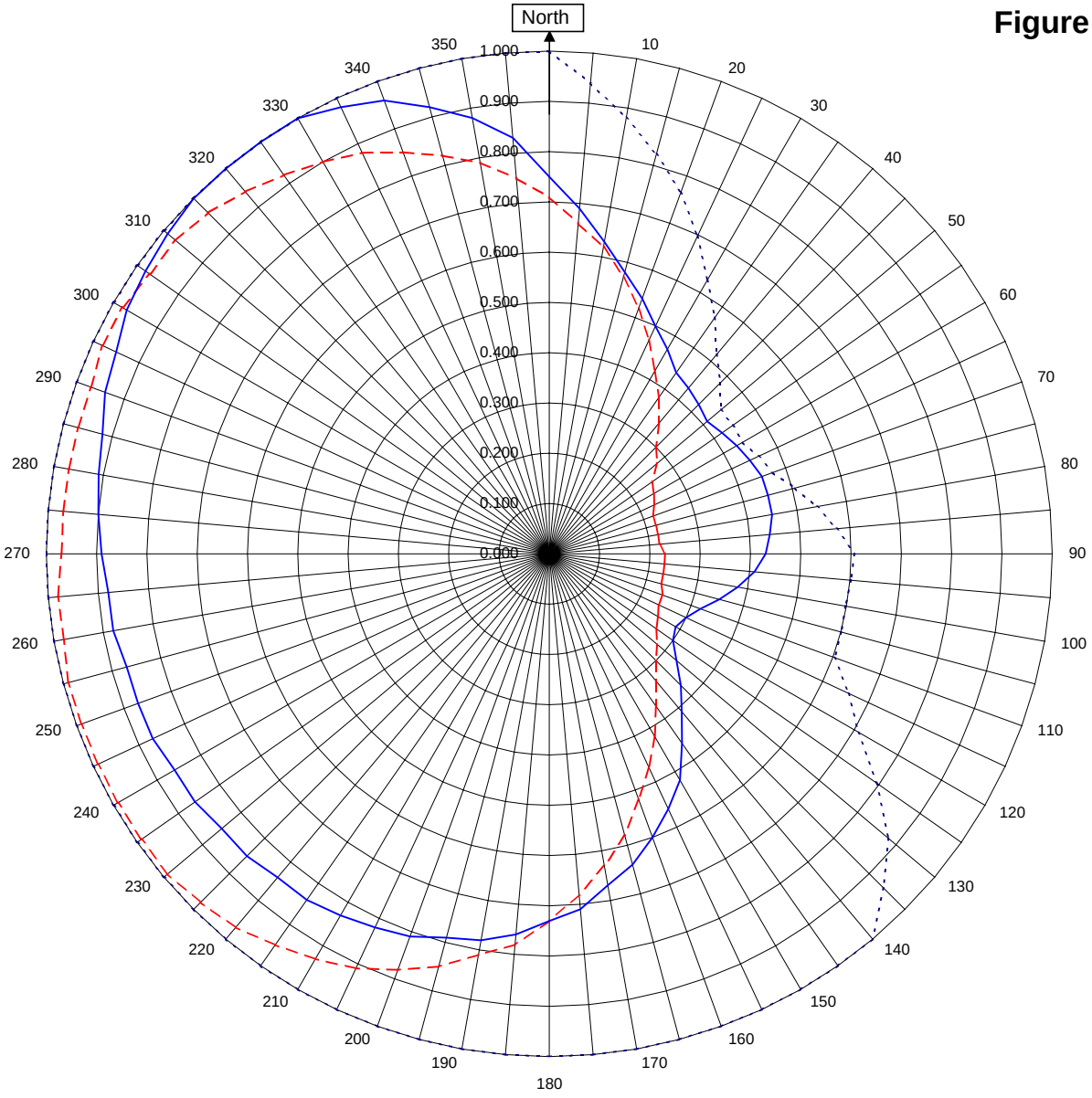
Figure 1



KBAR-FM Victoria, TX

26680-3

August 1, 2008

Horizontal RMS	0.719
Vertical RMS	0.715
H/V Composite RMS	0.754
FCC Composite RMS	0.887

Frequency	100.9 / 454.05 mHz
Plot	Relative Field
Scale	4.5 : 1
	See Figure 2 for Mechanical Details

Antenna Model	6810-6-DA Pattern 25-A
Pattern Type	Directional Azimuth

Figure 1a

Tabulation of Horizontal Azimuth Pattern
KBAR-FM Victoria, TX

Azimuth	Rel Field	Azimuth	Rel Field
0	0.750	180	0.730
10	0.630	190	0.780
20	0.540	200	0.810
30	0.470	210	0.830
40	0.430	220	0.840
45	0.420	225	0.850
50	0.410	230	0.850
60	0.430	240	0.860
70	0.450	250	0.870
80	0.450	260	0.880
90	0.430	270	0.890
100	0.380	280	0.910
110	0.320	290	0.940
120	0.290	300	0.970
130	0.330	310	0.990
135	0.370	315	1.000
140	0.410	320	1.000
150	0.520	330	1.000
160	0.600	340	0.960
170	0.670	350	0.880

Figure 1b

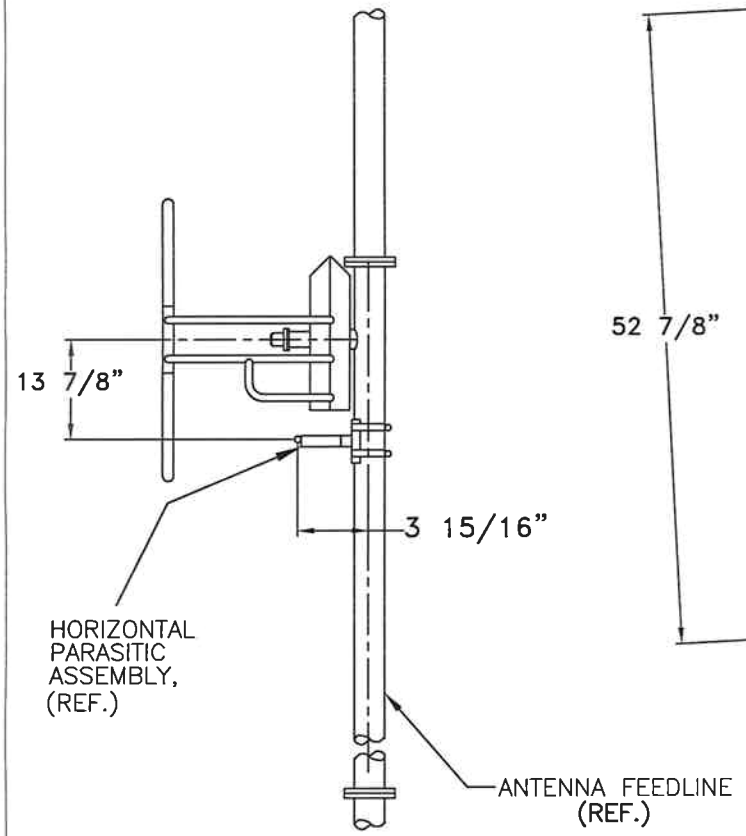
Tabulation of Vertical Azimuth Pattern
KBAR-FM Victoria, TX

Azimuth	Rel Field	Azimuth	Rel Field
0	0.710	180	0.730
10	0.620	190	0.810
20	0.520	200	0.880
30	0.420	210	0.930
40	0.340	220	0.970
45	0.300	225	0.980
50	0.280	230	0.990
60	0.240	240	0.990
70	0.220	250	0.990
80	0.220	260	0.980
90	0.230	270	0.970
100	0.230	280	0.970
110	0.240	290	0.970
120	0.250	300	0.980
130	0.280	310	0.970
135	0.300	315	0.960
140	0.330	320	0.940
150	0.420	330	0.900
160	0.520	340	0.850
170	0.630	350	0.790

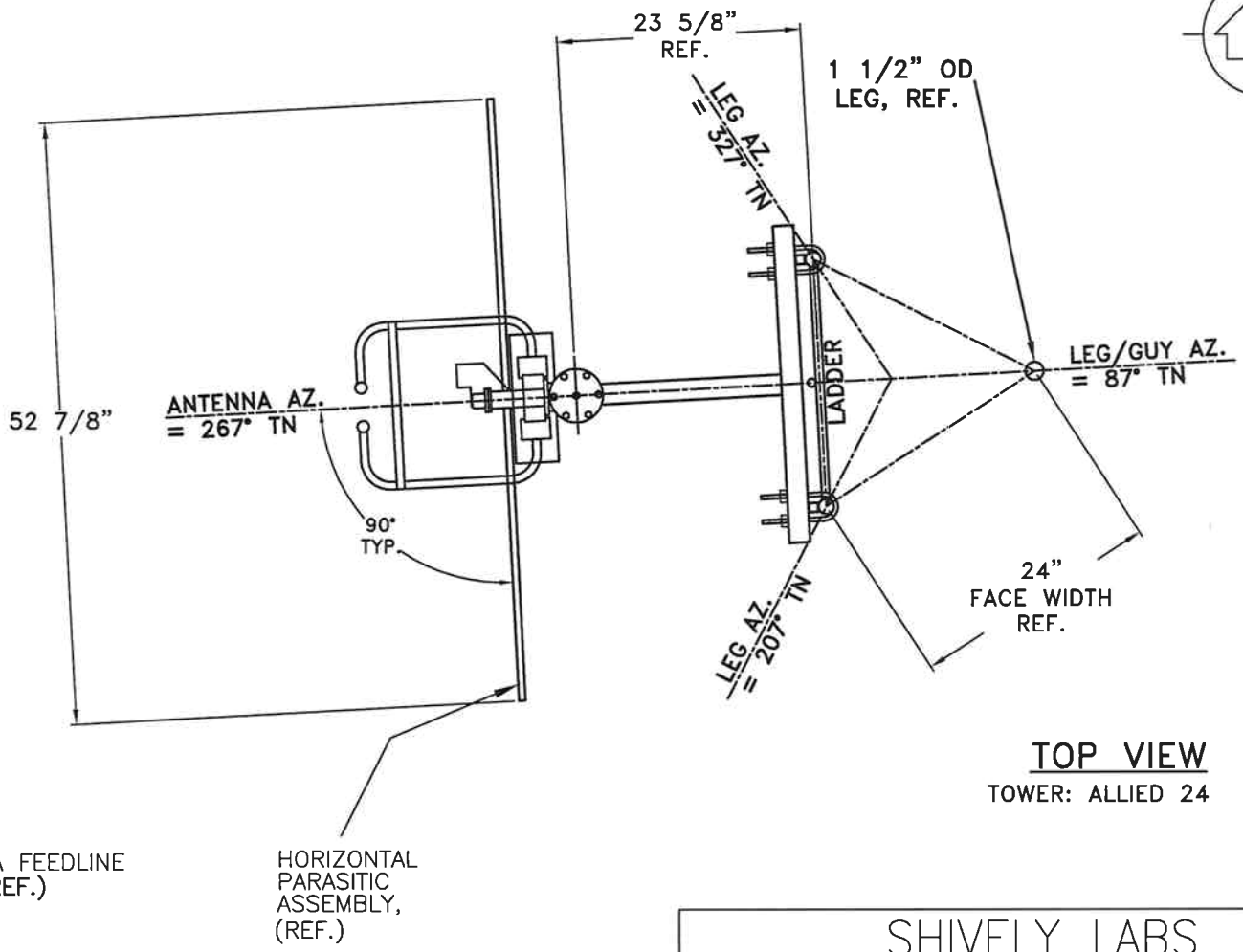
Figure 1c

Tabulation of FCC Directional Composite
KBAR-FM Victoria, TX

Azimuth	Rel Field	Azimuth	Rel Field
0	1.000	180	1.000
10	0.880	190	1.000
20	0.765	200	1.000
30	0.629	210	1.000
40	0.518	220	1.000
50	0.445	230	1.000
60	0.444	240	1.000
70	0.473	250	1.000
80	0.540	260	1.000
90	0.607	270	1.000
100	0.598	280	1.000
110	0.604	290	1.000
120	0.710	300	1.000
130	0.880	310	1.000
140	1.000	320	1.000
150	1.000	330	1.000
160	1.000	340	1.000
170	1.000	350	1.000



SIDE VIEW



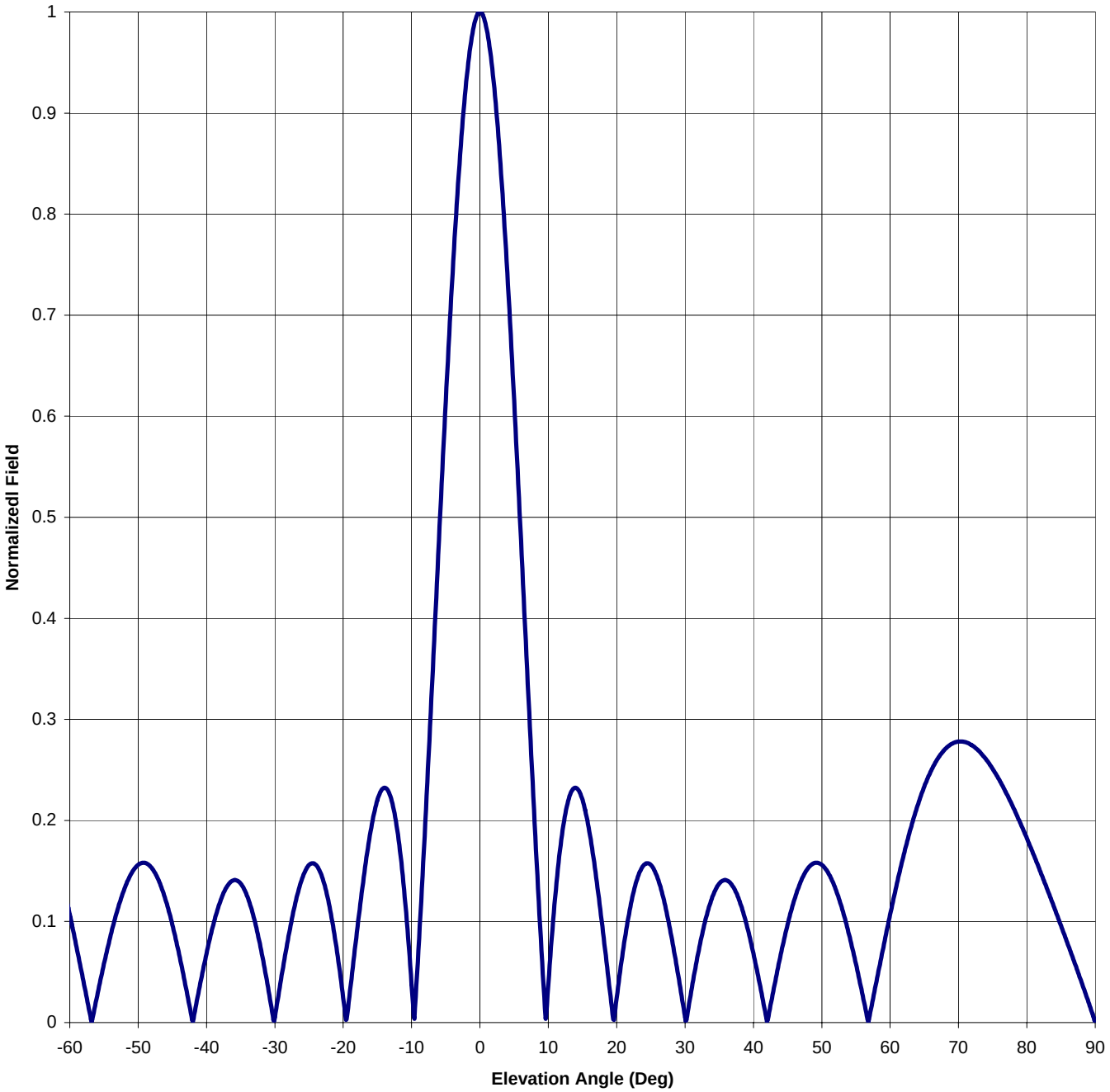
TOP VIEW

TOWER: ALLIED 24

ANTENNA HEADING 267° TRUE NORTH

SHIVELY LABS A DIVISION OF HOWELL LABORATORIES INC.,BRIDGTON, MAINE			
SHOP ORDER: 26680B	FREQUENCY: 100.9 MHz.	SCALE: N.T.S.	DRAWN BY: ASP APPROVED BY: DAB
TITLE: MODEL-6810-6-DIRECTIONAL ANTENNA			
DATE: 7/31/08	FIGURE 2		

Antenna Mfg.:	**Shively Labs**			**Date:**	**8/1/2008**
Antenna Type:	**6810-6-DA**				
Station:	**KBAR-FM**	**Beam Tilt**	**0**		
Frequency:	**100.9**	**Gain (Max)**	**6.380**	**8.048**	**dB**
Channel #:	**265**	**Gain (Horizon)**	**6.380**	**8.048**	**dB**
Figure:	**3**				



Antenna Mfg.: Shively Labs
Antenna Type: 6810-6-DA
Station: KBAR-FM
Frequency: 100.9
Channel #: 265
Figure: 3

Date: 8/1/2008

Beam Tilt 0
Gain (Max) 6.380 — 8.048 dB
Gain (Horizon) 6.380 — 8.048 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	0.067	0	1.000	46	0.122
-89	0.020	-43	0.034	1	0.983	47	0.141
-88	0.040	-42	0.001	2	0.931	48	0.153
-87	0.059	-41	0.036	3	0.849	49	0.158
-86	0.077	-40	0.068	4	0.742	50	0.156
-85	0.096	-39	0.097	5	0.615	51	0.147
-84	0.114	-38	0.120	6	0.477	52	0.132
-83	0.132	-37	0.135	7	0.335	53	0.112
-82	0.149	-36	0.141	8	0.198	54	0.087
-81	0.166	-35	0.137	9	0.071	55	0.058
-80	0.182	-34	0.124	10	0.037	56	0.026
-79	0.198	-33	0.102	11	0.124	57	0.007
-78	0.213	-32	0.071	12	0.186	58	0.041
-77	0.227	-31	0.035	13	0.222	59	0.074
-76	0.240	-30	0.006	14	0.232	60	0.107
-75	0.251	-29	0.047	15	0.220	61	0.138
-74	0.261	-28	0.085	16	0.189	62	0.166
-73	0.269	-27	0.118	17	0.144	63	0.192
-72	0.274	-26	0.143	18	0.089	64	0.214
-71	0.277	-25	0.156	19	0.032	65	0.234
-70	0.278	-24	0.156	20	0.025	66	0.249
-69	0.276	-23	0.142	21	0.074	67	0.262
-68	0.270	-22	0.115	22	0.115	68	0.270
-67	0.262	-21	0.074	23	0.142	69	0.276
-66	0.249	-20	0.025	24	0.156	70	0.278
-65	0.234	-19	0.032	25	0.156	71	0.277
-64	0.214	-18	0.089	26	0.143	72	0.274
-63	0.192	-17	0.144	27	0.118	73	0.269
-62	0.166	-16	0.189	28	0.085	74	0.261
-61	0.138	-15	0.220	29	0.047	75	0.251
-60	0.107	-14	0.232	30	0.006	76	0.240
-59	0.074	-13	0.222	31	0.035	77	0.227
-58	0.041	-12	0.186	32	0.071	78	0.213
-57	0.007	-11	0.124	33	0.102	79	0.198
-56	0.026	-10	0.037	34	0.124	80	0.182
-55	0.058	-9	0.071	35	0.137	81	0.166
-54	0.087	-8	0.198	36	0.141	82	0.149
-53	0.112	-7	0.335	37	0.135	83	0.132
-52	0.132	-6	0.477	38	0.120	84	0.114
-51	0.147	-5	0.615	39	0.097	85	0.096
-50	0.156	-4	0.742	40	0.068	86	0.077
-49	0.158	-3	0.849	41	0.036	87	0.059
-48	0.153	-2	0.931	42	0.001	88	0.040
-47	0.141	-1	0.983	43	0.034	89	0.020
-46	0.122	0	1.000	44	0.067	90	0.000
-45	0.097			45	0.097		

S.O. 26680-3 Figure 4

VALIDATION OF TOTAL POWER GAIN CALCULATION

KBAR-FM 100.9 MHz Victoria, TX

Model 6810-6-DA

Elevation Gain of Antenna 3.28

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

H RMS 0.719 V RMS 0.715 H/V Ratio 1.006

Elevation Gain of Horizontal Component 3.298

Elevation Gain of Vertical Component 3.262

Horizontal Azimuth Gain equals $1/(RMS)^2$. 1.934

Vertical Azimuth Gain equals $1/(RMS/Max\ Vert)^2$. 1.917

Max. Vertical 0.99

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

Total Horizontal Power Gain = **6.380**

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

Total Vertical Power Gain = **6.253**

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ERP divided by Horizontal Power Gain equals Antenna Input Power

15 kW ERP Divided by H Gain 6.380 equals 2.35 kW H Antenna Input Power

Antenna Input Power times Vertical Power Gain equals Vertical ERP

2.351 kW Times V Gain 6.253 equals 14.702 kW V ERP

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

(0.99)^2 Times 15.00 Equals 14.702 kW Vertical ERP

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