Shively Labs
a division of Howell Laboratories,Inc.

P. O. Box 389 Harrison Rd.,
Bridgton, Maine 04009 USA

- An Employee-Owned Company -

(207) 647-3327
888-SHIVELY
Fax: (207) 647-8273
E-mail: sales@shively.com
Web site: www.shively.com

S.O. 26305

Report of Test 6810-6R-BT-DA

for

RAMAR COMMUNICATIONS II, LTD.

KSTQ-FM 97.3 MHz New Deal, TX

OBJECTIVE:

The objective of this test was to demonstrate the directional characteristics of a 6810-6R-BT-DA to meet the needs of KSTQ-FM and to comply with the requirements of the FCC construction permit, file number BPH-20070521AGR.

RESULTS:

The measured azimuth pattern for the 6810-6R-BT-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 BPH-20070521AGR indicates that the Horizontal radiation component shall not exceed 32.0 kW at any azimuth and is restricted to the following values at the azimuths specified:

230 - 240 Degrees T: 11.0 kW

From Figure 1, the maximum radiation of the Horizontal component occurs at 045 Degrees T to 050 Degrees T and at 335 Degrees T to 337 Degrees T. At the restricted azimuth of 230 - 240 Degrees T the Vertical component is 13.2 dB down from the maximum of 32.0 kW, or 1.6 kW.

The R.M.S. of the Horizontal component is 0.773. The total Horizontal power gain is 5.910. The R.M.S. of the Vertical component is 0.718. The total Vertical power gain is 5.851. See Figure 4 for calculations. The R.M.S. of the FCC composite pattern is 0.952. The R.M.S. of the measured composite pattern is 0.814. Eighty-five percent (85%) of the original authorized FCC composite pattern is 0.809. Therefore this pattern complies with the FCC requirement of 73.316(c)(2)(ix)(A).

METHOD OF DIRECTIONALIZATION:

One bay of the 6810-6R-BT-DA was mounted on a tower of precise scale to the Stainless G-65 tower at the KSTQ-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 BPH-20070521AGR, a single level of the 6810-6R-BT-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 437.85 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 26305
March 17, 2008

Shively Labs

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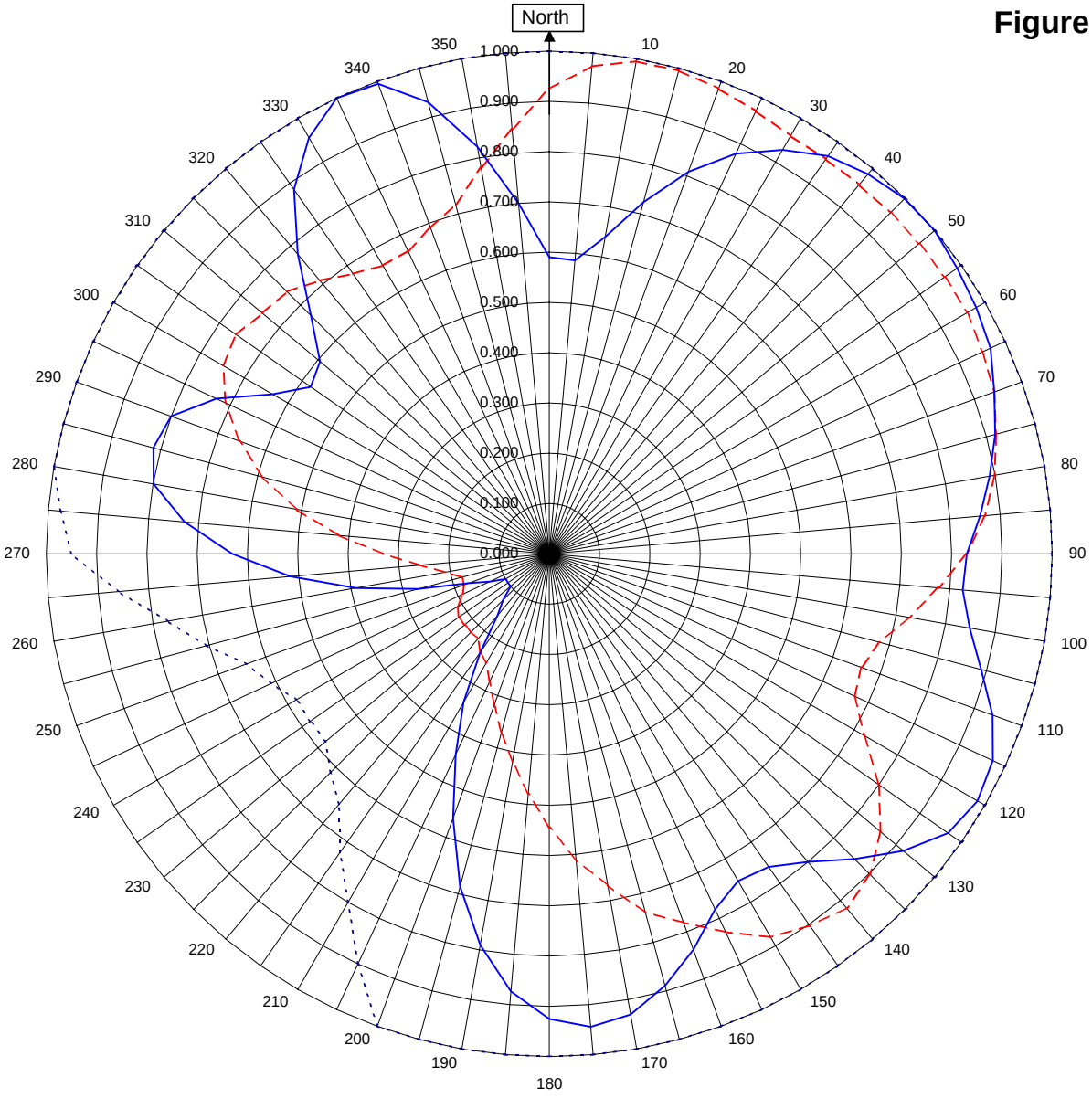
Figure 1



KSTQ-FM New Deal, TX

26305

March 17, 2008

Horizontal RMS	0.773
Vertical RMS	0.718
H/V Composite RMS	0.814
FCC Composite RMS	0.952

Frequency	97.3 / 437.85 mHz
Plot	Relative Field
Scale	4.5 : 1
	See Figure 2 for Mechanical Details

Antenna Model	6810-6R-BT-DA Pattern 04
Pattern Type	Directional Azimuth

Figure 1a

Tabulation of Horizontal Azimuth Pattern
KSTQ-FM New Deal, TX

Azimuth	Rel Field	Azimuth	Rel Field
0	0.590	180	0.925
10	0.640	190	0.790
20	0.809	200	0.560
30	0.928	210	0.340
40	0.986	220	0.160
45	0.999	225	0.130
50	1.000	230	0.100
60	0.980	240	0.100
70	0.942	250	0.170
80	0.889	260	0.390
90	0.830	270	0.630
100	0.849	280	0.799
110	0.938	290	0.800
120	0.983	300	0.635
130	0.919	310	0.595
135	0.859	315	0.670
140	0.800	320	0.778
150	0.751	330	0.955
160	0.838	340	0.995
170	0.930	350	0.822

Figure 1b

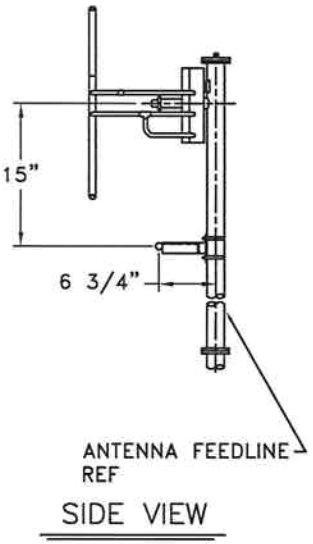
Tabulation of Vertical Azimuth Pattern
KSTQ-FM New Deal, TX

Azimuth	Rel Field	Azimuth	Rel Field
0	0.925	180	0.544
10	0.995	190	0.420
20	0.985	200	0.319
30	0.960	210	0.250
40	0.959	220	0.220
45	0.960	225	0.220
50	0.960	230	0.220
60	0.960	240	0.210
70	0.942	250	0.180
80	0.899	260	0.210
90	0.830	270	0.330
100	0.726	280	0.510
110	0.660	290	0.656
120	0.724	300	0.748
130	0.860	310	0.745
135	0.902	315	0.738
140	0.920	320	0.710
150	0.880	330	0.662
160	0.780	340	0.690
170	0.670	350	0.780

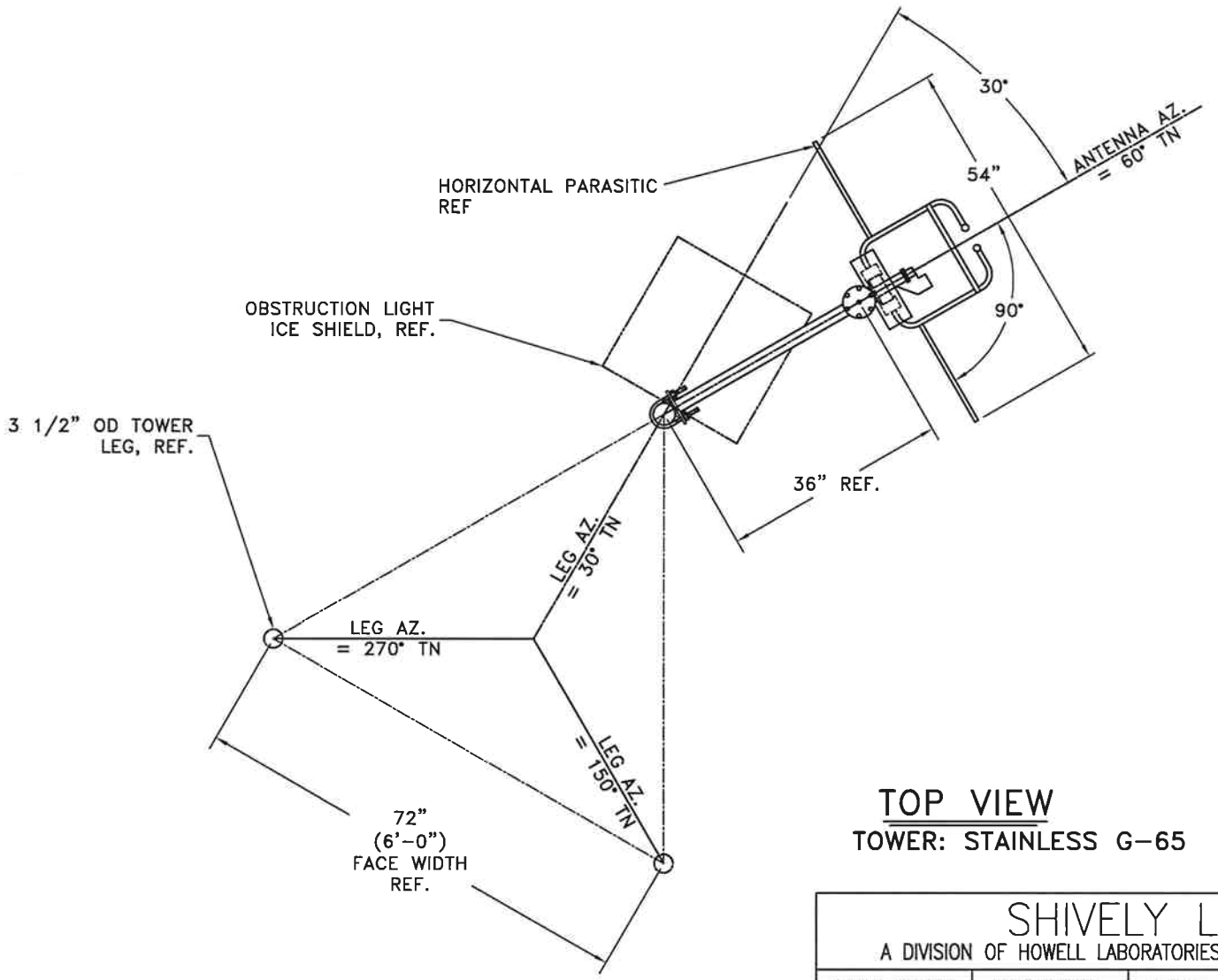
Figure 1c

Tabulation of FCC Directional Composite
KSTQ-FM New Deal, TX

Azimuth	Rel Field	Azimuth	Rel Field
0	1.000	180	1.000
10	1.000	190	1.000
20	1.000	200	1.000
30	1.000	210	0.800
40	1.000	220	0.650
50	1.000	230	0.580
60	1.000	240	0.580
70	1.000	250	0.640
80	1.000	260	0.770
90	1.000	270	0.950
100	1.000	280	1.000
110	1.000	290	1.000
120	1.000	300	1.000
130	1.000	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



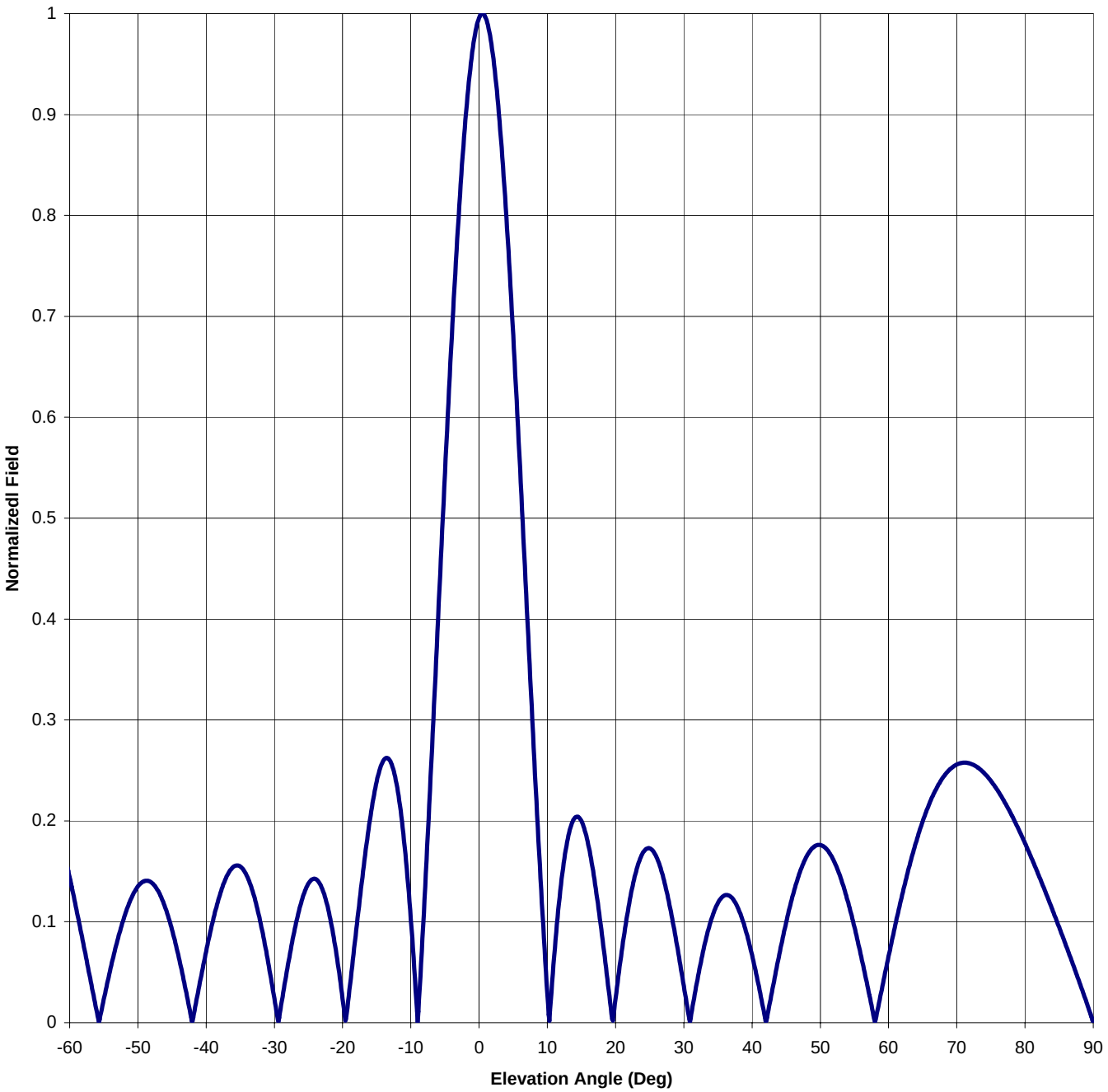
TOP VIEW

TOWER: STAINLESS G-65

ANTENNA HEADING: 60° TRUE NORTH

SHIVELY LABS A DIVISION OF HOWELL LABORATORIES INC.,BRIDGTON, MAINE			
SHOP ORDER: 26305	FREQUENCY: 97.3 MHz.	SCALE: N.T.S.	DRAWN BY: ASP APPROVED BY:
MODEL: 6810-6R-CF-BT-DIRECTIONAL ANTENNA			
DATE: 3/13/08	FIGURE 2		

Antenna Mfg.:	**Shively Labs**			**Date:**	**3/17/2008**
Antenna Type:	**6810-6R-BT-DA**				
Station:	**KSTQ-FM**	**Beam Tilt**	**0.5**		
Frequency:	**97.3**	**Gain (Max)**	**5.910**	**7.716**	**dB**
Channel #:	**247**	**Gain (Horizon)**	**5.862**	**7.680**	**dB**
Figure:	**3**				



Antenna Mfg.: Shively Labs
Antenna Type: 6810-6R-BT-DA
Station: KSTQ-FM
Frequency: 97.3
Channel #: 247
Figure: 3

Beam Tilt 0.5
Gain (Max) 5.910 — 7.716 dB
Gain (Horizon) 5.862 — 7.680 dB

Date: 3/17/2008

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	0.065	0	0.996	46	0.127
-89	0.021	-43	0.033	1	0.995	47	0.149
-88	0.040	-42	0.002	2	0.960	48	0.165
-87	0.059	-41	0.037	3	0.893	49	0.174
-86	0.078	-40	0.071	4	0.798	50	0.176
-85	0.096	-39	0.101	5	0.681	51	0.171
-84	0.114	-38	0.126	6	0.549	52	0.160
-83	0.132	-37	0.145	7	0.411	53	0.143
-82	0.150	-36	0.154	8	0.273	54	0.121
-81	0.168	-35	0.155	9	0.143	55	0.095
-80	0.185	-34	0.145	10	0.029	56	0.065
-79	0.201	-33	0.126	11	0.066	57	0.034
-78	0.217	-32	0.098	12	0.137	58	0.001
-77	0.232	-31	0.063	13	0.182	59	0.033
-76	0.246	-30	0.024	14	0.203	60	0.066
-75	0.259	-29	0.018	15	0.200	61	0.097
-74	0.271	-28	0.058	16	0.176	62	0.127
-73	0.280	-27	0.093	17	0.137	63	0.154
-72	0.288	-26	0.121	18	0.087	64	0.178
-71	0.293	-25	0.138	19	0.032	65	0.199
-70	0.296	-24	0.142	20	0.024	66	0.217
-69	0.296	-23	0.133	21	0.075	67	0.232
-68	0.293	-22	0.109	22	0.118	68	0.243
-67	0.286	-21	0.072	23	0.150	69	0.251
-66	0.276	-20	0.024	24	0.168	70	0.256
-65	0.263	-19	0.032	25	0.173	71	0.258
-64	0.246	-18	0.092	26	0.164	72	0.257
-63	0.225	-17	0.150	27	0.144	73	0.253
-62	0.201	-16	0.201	28	0.113	74	0.247
-61	0.174	-15	0.239	29	0.077	75	0.240
-60	0.144	-14	0.260	30	0.036	76	0.230
-59	0.112	-13	0.259	31	0.005	77	0.219
-58	0.078	-12	0.233	32	0.043	78	0.206
-57	0.044	-11	0.181	33	0.076	79	0.193
-56	0.010	-10	0.102	34	0.102	80	0.178
-55	0.023	-9	0.000	35	0.119	81	0.162
-54	0.054	-8	0.122	36	0.126	82	0.146
-53	0.081	-7	0.258	37	0.124	83	0.129
-52	0.105	-6	0.402	38	0.113	84	0.112
-51	0.123	-5	0.545	39	0.093	85	0.095
-50	0.135	-4	0.680	40	0.067	86	0.077
-49	0.140	-3	0.799	41	0.036	87	0.058
-48	0.139	-2	0.895	42	0.002	88	0.039
-47	0.130	-1	0.962	43	0.034	89	0.020
-46	0.114	0	0.996	44	0.068	90	0.000
-45	0.092			45	0.099		

S.O. 26305 Figure 4

VALIDATION OF TOTAL POWER GAIN CALCULATION

KSTQ-FM 97.3 MHz New Deal, TX

MODEL 6810-6R-BT-DA

Elevation Gain of Antenna 3.28

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

H RMS 0.773 V RMS 0.718 H/V Ratio 1.077

Elevation Gain of Horizontal Component 3.531

Elevation Gain of Vertical Component 3.047

Horizontal Azimuth Gain equals $1/(RMS)^2$. 1.674

Vertical Azimuth Gain equals $1/(RMS/Max\ Vert)^2$. 1.920
Max. Vertical 0.995

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

Total Horizontal Power Gain = **5.910**

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

Total Vertical Power Gain = **5.851**

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ERP divided by Horizontal Power Gain equals Antenna Input Power

32 KW ERP Equals **5.415** KW Antenna Input Power

Antenna Input Power times Vertical Power Gain equals Vertical ERP

5.415 KW Times 5.851 KW Equals 31.681 KW ERP

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

0.995 Equals 31.681 KW Vertical ERP

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