Shively Labs®
a division of Howell Laboratories, Inc.

P. O. Box 389, 188 Harrison Rd.
Bridgton, Maine 04009 USA
(207) 647-3327
888-SHIVELY
Fax: (207) 647-8273
E-mail: sales@shively.com
Web site: www.shively.com

S.O. 33064

Report of Test 6810-4R-SS(0.5)-DA

for

SOUTH TEXAS BROADCASTING, INC.

KKSP 93.3 MHz BRYANT, AR.

OBJECTIVE:

The objective of this test was to demonstrate the directional characteristics of a 6810-4R-SS(0.5)-DA to meet the needs of KKSP and to comply with the requirements of the FCC construction permit, file number BPH-20151005AEU. This test characterizes only the radiation characteristics of the antenna when mounted on the tower as described. It does not represent or imply any guarantee of specific coverage which can be influenced by factors beyond the scope of this test.

RESULTS:

The following Figures are the results of the measurements from our pattern range:

Figure 1A - Measured Azimuth Pattern with the FCC Composite
Figure 1B - Measured Composite Azimuth Pattern with the FCC Composite
Figure 1C - Tabulation of the Horizontal Polarization for the Measured Azimuth Pattern
Figure 1D - Tabulation of the Vertical Polarization for the Measured Azimuth Pattern
Figure 1E - Tabulation of the Measured Composite Azimuth Pattern
Figure 1F - Tabulation of the FCC Composite

The calculated elevation pattern of the antenna is shown in Figure 3.

Construction permit file number BPH-20151005AEU indicates that the Horizontal radiation component shall not exceed 22.0 kW at any azimuth and is restricted to the following values at the azimuths specified:

North 50 Degrees True: 12.5 kilowatts

From Figure 1A, the maximum radiation of the Horizontal component occurs at 222 Degrees True to 231 Degrees True. At the restricted azimuth of 50 Degrees True the Horizontal component is 4.11 dB down from the maximum of 22.0 kW, or 8.539 kW.

The R.M.S. of the Horizontal component is 0.767. The total Horizontal power gain is 2.396. The R.M.S. of the Vertical component is 0.713. The total Vertical power gain is 2.325. See Figure 4 for calculations.

METHOD OF DIRECTIONALIZATION:

One bay of the 6810-4R-SS(0.5)-DA was mounted on a tower of precise scale to the 56-inch face LR03XC014 Snider tower at the KKSP site. The spacing of the antenna to the tower was varied and the additions of vertical parasitics were used to achieve the vertical pattern shown in Figure 1A. 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 1A was achieved. See Figure 2 for mechanical details.

METHOD OF MEASUREMENT:

As allowed by the construction permit, file number BPH-20151005AEU, a single level of the 6810-4R-SS(0.5)-DA was set up on the Shively Labs scale model antenna pattern measuring range. A scale of 4.5:1 was used.

EQUIPMENT:

The 4.5:1 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 4395-A Network Analyzer

PC Based Controller

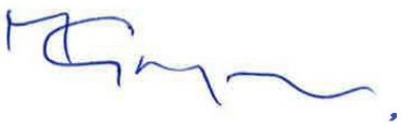
Output Standard Printer or 'pdf'

All testing is carried out in strict accordance with approved procedures under our ISO9001:2008.

TEST PROCEDURES:

The receiving antenna system is mounted so that the horizontal and vertical azimuth patterns are measured independently. The network analyzer was set to 419.85 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 1A.

Respectfully submitted by:



Martyn Gregory

Vice President, Shively Labs
S/O 33064
Date May 25, 2016

Shively Labs

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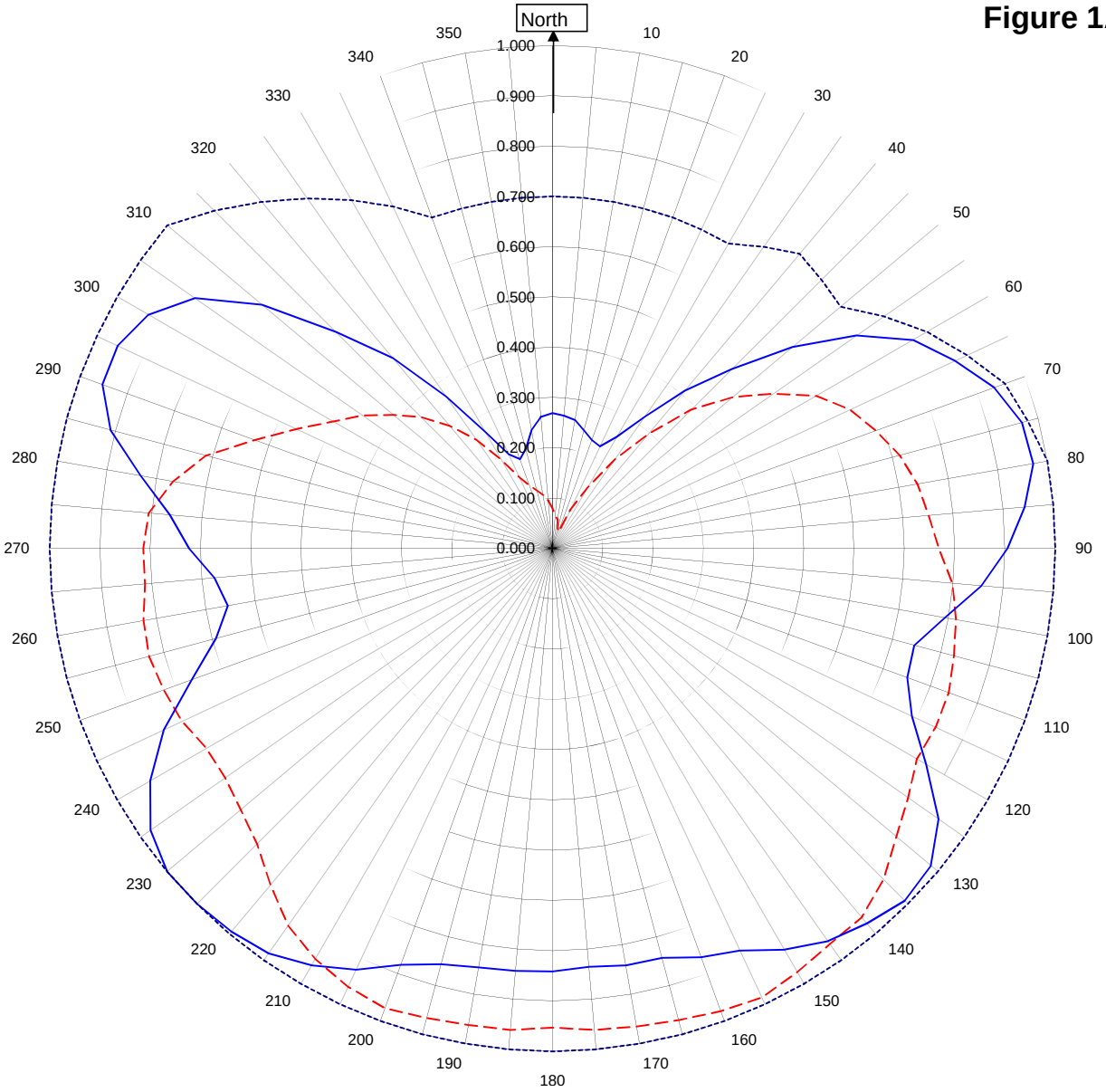
Figure 1A



KKSP BRYANT, AR.

33064

May 25, 2016

Horizontal RMS	0.767
Vertical RMS	0.713
H/V Composite RMS	0.800
FCC Composite RMS	0.931

Frequency	93.3 / 419.85 mHz
Plot	Relative Field
Scale	4.5 : 1
	See Figure 2 for Mechanical Details

Antenna Model	6810-4R-SS(0.5)-DA
Pattern Type	Directional Azimuth

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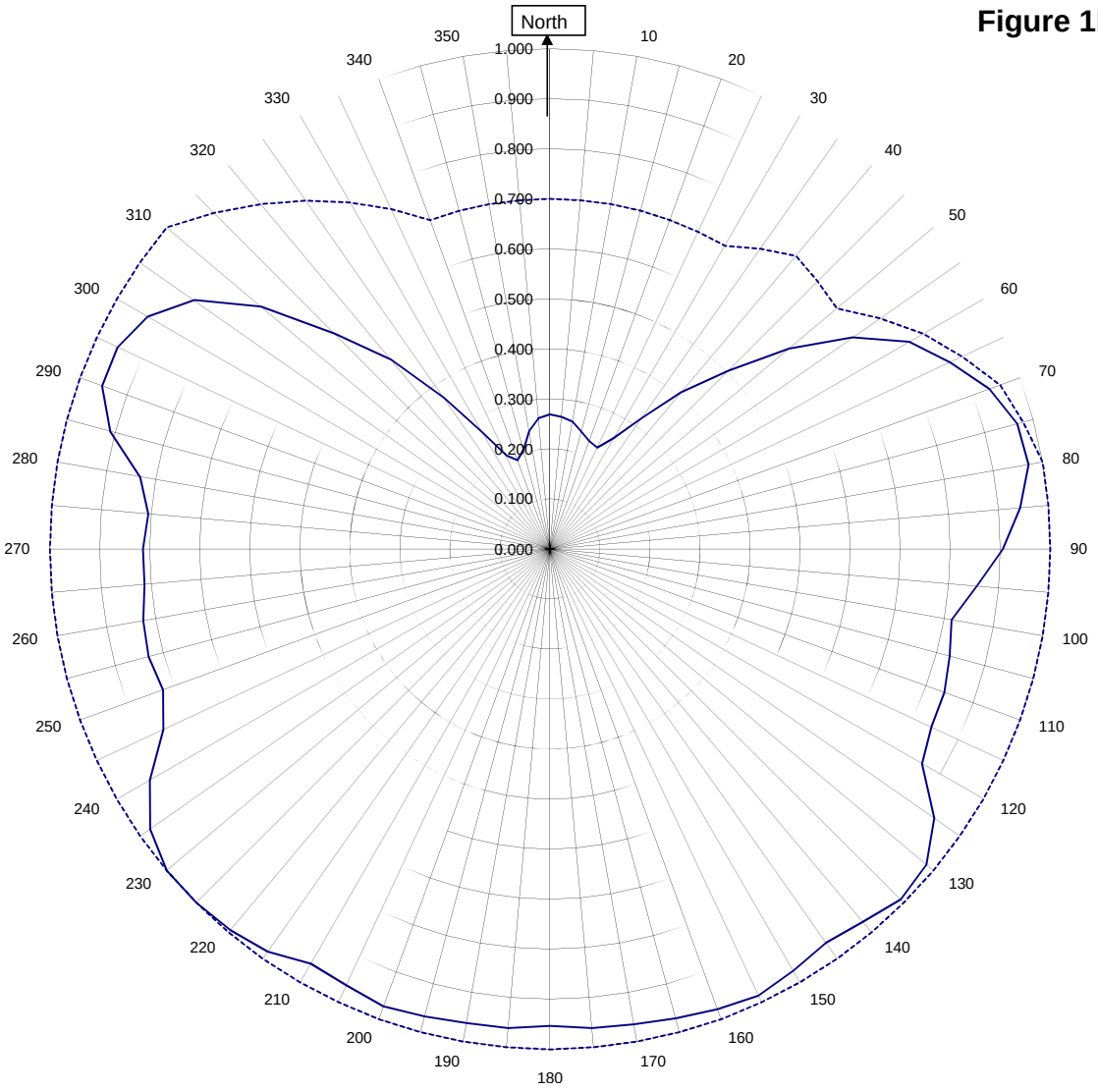
Figure 1B



KKSP BRYANT, AR.

33064

May 25, 2016

_____H/VComposite RMS	0.800
……FCC Composite RMS	0.931

Frequency	93.3 / 419.85 mHz
Plot	Relative Field
Scale	4.5 : 1
	See Figure 2 for Mechanical Details

Antenna Model	6810-4R-SS(0.5)-DA
Pattern Type	Directional H/V Composite

Figure 1C

Tabulation of Horizontal Azimuth Pattern
KKSP BRYANT, AR.

Azimuth	Rel Field	Azimuth	Rel Field
0	0.269	180	0.841
10	0.259	190	0.846
20	0.230	200	0.881
30	0.256	210	0.957
40	0.409	220	0.994
45	0.504	225	1.000
50	0.623	230	1.000
60	0.829	240	0.924
70	0.935	250	0.764
80	0.971	260	0.656
90	0.905	270	0.723
100	0.793	280	0.832
110	0.751	290	0.953
120	0.858	300	0.929
130	0.982	310	0.754
135	0.991	315	0.609
140	0.973	320	0.494
150	0.921	330	0.268
160	0.865	340	0.189
170	0.842	350	0.239

Figure 1D

Tabulation of Vertical Azimuth Pattern
KKSP BRYANT, AR.

Azimuth	Rel Field	Azimuth	Rel Field
0	0.080	180	0.953
10	0.058	190	0.962
20	0.035	200	0.973
30	0.140	210	0.943
40	0.298	220	0.873
45	0.391	225	0.831
50	0.468	230	0.809
60	0.607	240	0.795
70	0.685	250	0.823
80	0.737	260	0.826
90	0.769	270	0.814
100	0.815	280	0.766
110	0.839	290	0.630
120	0.837	300	0.504
130	0.893	310	0.413
135	0.931	315	0.369
140	0.957	320	0.318
150	0.973	330	0.205
160	0.979	340	0.134
170	0.965	350	0.108

Figure 1E

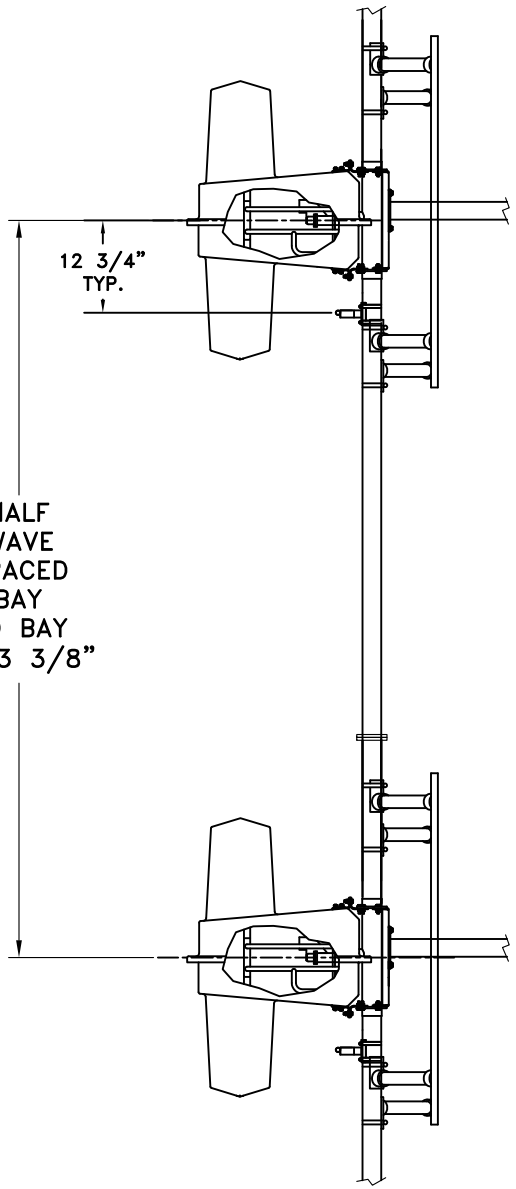
Tabulation of Composite Azimuth Pattern
KKSP BRYANT, AR.

Azimuth	Rel Field	Azimuth	Rel Field
0	0.269	180	0.953
10	0.259	190	0.962
20	0.230	200	0.973
30	0.256	210	0.957
40	0.409	220	0.994
45	0.504	225	1.000
50	0.623	230	1.000
60	0.829	240	0.924
70	0.935	250	0.823
80	0.971	260	0.826
90	0.905	270	0.814
100	0.815	280	0.832
110	0.839	290	0.953
120	0.858	300	0.929
130	0.982	310	0.754
135	0.991	315	0.609
140	0.973	320	0.494
150	0.973	330	0.268
160	0.979	340	0.189
170	0.965	350	0.239

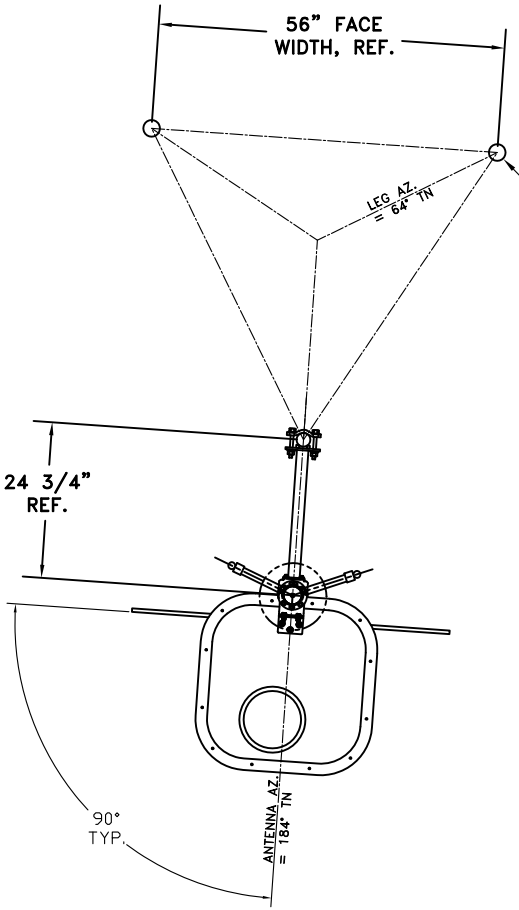
Figure 1F

Tabulation of FCC Directional Composite
KKSP BRYANT, AR.

Azimuth	Rel Field	Azimuth	Rel Field
0	0.700	180	1.000
10	0.700	190	1.000
20	0.700	200	1.000
30	0.700	210	1.000
40	0.765	220	1.000
50	0.748	230	1.000
60	0.861	240	1.000
70	0.958	250	1.000
80	1.000	260	1.000
90	1.000	270	1.000
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	0.900
150	1.000	330	0.800
160	1.000	340	0.700
170	1.000	350	0.700



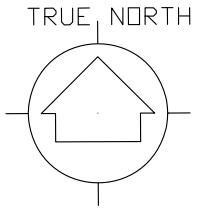
SIDE VIEW



TOP VIEW

TOWER MAKE:

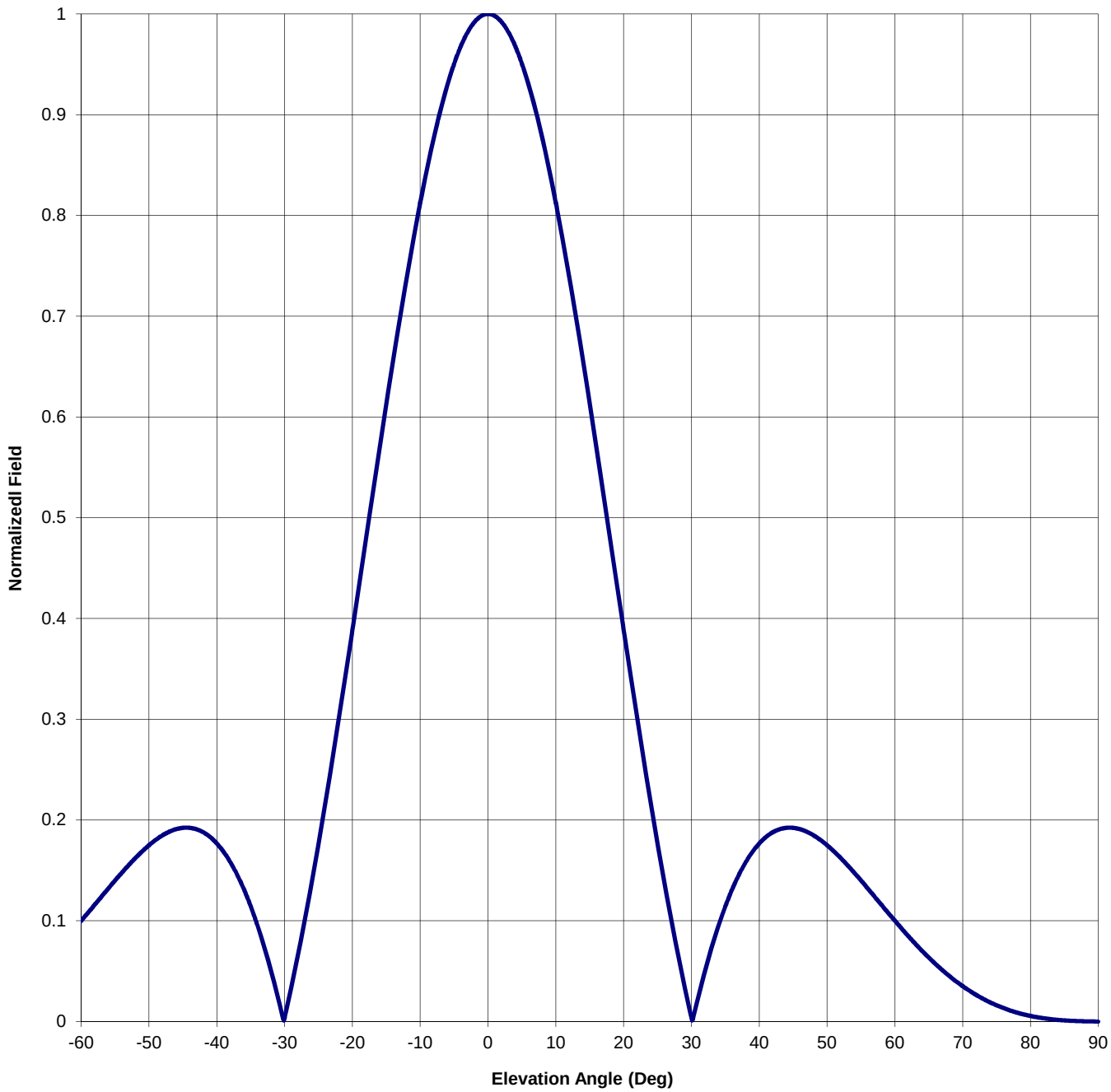
56" FACE STRAIGHT ON SSV TOWER



ANTENNA HEADING 184° TRUE NORTH

SHIVELY LABS A DIVISION OF HOWELL LABORATORIES INC.,BRIDGTON, MAINE			
SHOP ORDER: 33064	FREQUENCY: 93.3	SCALE: N.T.S.	DRAWN BY: ASP APPROVED BY: DAB
TITLE: MODEL-6810-4R-SS-DIRECTIONAL ANTENNA			
DATE: 5/25/16	FIGURE 2		

Antenna Mfg.:	**Shively Labs**			**Date:**	**5/25/2016**
Antenna Type:	**6810-4R-SS(0.5)-DA**				
Station:	**KKSP**	**Beam Tilt**	**0**		
Frequency:	**93.3**	**Gain (Max)**	**2.396**	**3.795**	**dB**
Channel #:	**227**	**Gain (Horizon)**	**2.396**	**3.795**	**dB**
Figure:	**Figure 3**				



Antenna Mfg.: Shively Labs **Date:** 5/25/2016

Antenna Type: 6810-4R-SS(0.5)-DA

Station: KKSP **Beam Tilt** 0

Frequency: 93.3 **Gain (Max)** 2.396 3.795 dB

Channel #: 227 **Gain (Horizon)** 2.396 3.795 dB

Figure: Figure 3

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	0.192	0	1.000	46	0.191
-89	0.000	-43	0.191	1	0.998	47	0.188
-88	0.000	-42	0.188	2	0.992	48	0.185
-87	0.000	-41	0.183	3	0.982	49	0.180
-86	0.001	-40	0.177	4	0.968	50	0.175
-85	0.001	-39	0.168	5	0.951	51	0.169
-84	0.002	-38	0.158	6	0.929	52	0.162
-83	0.002	-37	0.146	7	0.905	53	0.155
-82	0.003	-36	0.131	8	0.877	54	0.148
-81	0.004	-35	0.114	9	0.846	55	0.140
-80	0.006	-34	0.095	10	0.813	56	0.132
-79	0.007	-33	0.074	11	0.776	57	0.124
-78	0.009	-32	0.050	12	0.738	58	0.116
-77	0.011	-31	0.024	13	0.698	59	0.108
-76	0.013	-30	0.004	14	0.656	60	0.100
-75	0.016	-29	0.034	15	0.613	61	0.092
-74	0.019	-28	0.067	16	0.569	62	0.085
-73	0.023	-27	0.102	17	0.524	63	0.077
-72	0.026	-26	0.138	18	0.479	64	0.070
-71	0.031	-25	0.177	19	0.434	65	0.064
-70	0.035	-24	0.217	20	0.389	66	0.057
-69	0.040	-23	0.258	21	0.344	67	0.051
-68	0.045	-22	0.301	22	0.301	68	0.045
-67	0.051	-21	0.344	23	0.258	69	0.040
-66	0.057	-20	0.389	24	0.217	70	0.035
-65	0.064	-19	0.434	25	0.177	71	0.031
-64	0.070	-18	0.479	26	0.138	72	0.026
-63	0.077	-17	0.524	27	0.102	73	0.023
-62	0.085	-16	0.569	28	0.067	74	0.019
-61	0.092	-15	0.613	29	0.034	75	0.016
-60	0.100	-14	0.656	30	0.004	76	0.013
-59	0.108	-13	0.698	31	0.024	77	0.011
-58	0.116	-12	0.738	32	0.050	78	0.009
-57	0.124	-11	0.776	33	0.074	79	0.007
-56	0.132	-10	0.813	34	0.095	80	0.006
-55	0.140	-9	0.846	35	0.114	81	0.004
-54	0.148	-8	0.877	36	0.131	82	0.003
-53	0.155	-7	0.905	37	0.146	83	0.002
-52	0.162	-6	0.929	38	0.158	84	0.002
-51	0.169	-5	0.951	39	0.168	85	0.001
-50	0.175	-4	0.968	40	0.177	86	0.001
-49	0.180	-3	0.982	41	0.183	87	0.000
-48	0.185	-2	0.992	42	0.188	88	0.000
-47	0.188	-1	0.998	43	0.191	89	0.000
-46	0.191	0	1.000	44	0.192	90	0.000
-45	0.192			45	0.192		

S.O. 33064 Figure 4

VALIDATION OF TOTAL POWER GAIN CALCULATION

KKSP BRYANT, AR.

MODEL 6810-4R-SS(0.5)-DA

Elevation Gain of Antenna 1.31

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

H RMS 0.767241 V RMS 0.712566 H/V Ratio 1.077

Elevation Gain of Horizontal Component 1.411

Elevation Gain of Vertical Component 1.217

Horizontal Azimuth Gain equals $1/(RMS)^2$. 1.699

Vertical Azimuth Gain equals $1/(RMS/Max\ Vert)^2$. 1.911

Max. Vertical 0.985

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

Total Horizontal Power Gain = **2.396**

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

Total Vertical Power Gain = **2.325**

==========

ERP divided by Horizontal Power Gain equals Antenna Input Power

22 kW ERP Divided by H Gain 2.396 equals 9.181 kW H Antenna Input Power

Antenna Input Power times Vertical Power Gain equals Vertical ERP

9.181 kW Times V Gain 2.325 equals 21.345 kW V ERP

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

(0.985)^2 Times 22.00 Equals 21.345 kW Vertical ERP

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