

**WPSM**  
**License to Cover Construction Permit**

This report summarizes the documentation for the WPSM license to cover documentation. The construction permit for 14 kW ERP utilized the existing, installed directional antenna with no physical or electrical changes. Only the transmitter power output has been increased to 5.5 kW to achieve the new ERP.

Only the FCC envelope pattern was modified for the construction permit. The underlying measured pattern did not change and continues to achieve better than 85% of the theoretical pattern RMS.

Documentation attached:

- (1) New FCC composite pattern
- (2) Original antenna proof
- (3) Surveyors certification
- (4) Installing engineer's certification
- (5) 60 dBu contour map utilizing measured pattern.

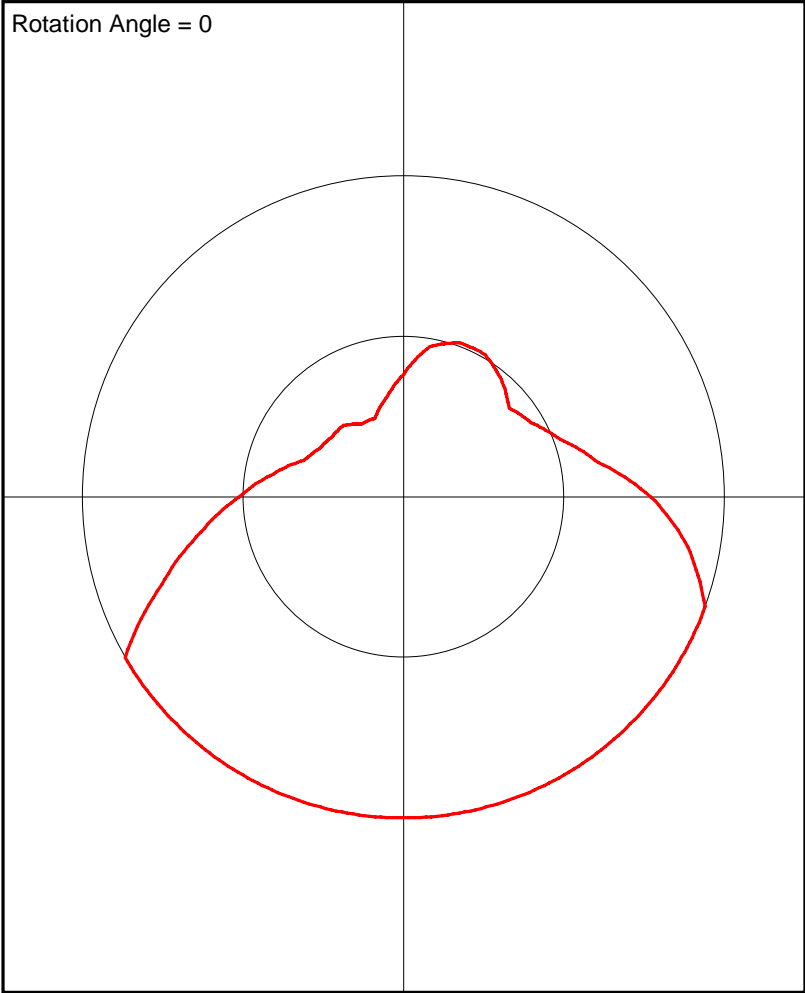


Charles M. Anderson March 3, 2022  
270-535-4432  
cma@andersonassociatesradio.com

Antenna Pattern

Pre-Rotation Antenna Pattern....

Azimuth (deg)	Relative Field
0.0	0.38
10.0	0.475
20.0	0.51
30.0	0.51
40.0	0.475
50.0	0.43
60.0	0.46
70.0	0.52
80.0	0.615
90.0	0.77
100.0	0.9
110.0	1.0
120.0	1.0
130.0	1.0
140.0	1.0
150.0	1.0
160.0	1.0
170.0	1.0
180.0	1.0
190.0	1.0
200.0	1.0
210.0	1.0
220.0	1.0
230.0	1.0
240.0	1.0
250.0	0.8
260.0	0.64
270.0	0.51
280.0	0.41
290.0	0.33
300.0	0.3
310.0	0.29
320.0	0.29
330.0	0.26
340.0	0.26
350.0	0.31



S.O. 25504

Report of Test 6810-3-DA

for

FORT WALTON BEACH EDUCATIONAL BROADCASTING

WPSM    91.1 MHz    FORT WALTON BEACH, FL

## OBJECTIVE:

The objective of this test was to demonstrate the directional characteristics of a 6810-3-DA to meet the needs of WPSM and to comply with the requirements of the FCC construction permit, file number BMPED-20060531ALH.

## RESULTS:

The measured azimuth pattern for the 6810-3-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 BMPED-20060531ALH indicates that the Horizontal radiation component shall not exceed 11.0 kW at any azimuth and is restricted to the following values at the azimuths specified:

50 - 60 Degrees T: 2.750 kW  
300 - 310 Degrees T: 1.279 kW  
330 - 340 Degrees T: 1.474 kW

From Figure 1, the maximum radiation of the Horizontal component occurs at 166 Degrees T to 185 Degrees T. At the restricted azimuth of 50 - 60 Degrees T the Vertical component is 6.745 dB down from the maximum of 11.0 kW, or 2.328 kW. At the restricted azimuth of 300 - 310 Degrees T the Horizontal component is 11.373 dB down from the maximum of 11.0 kW, or 0.802 kW. At the restricted azimuth of 330 - 340 Degrees T the Horizontal component is 11.701 dB down from the maximum of 11.0 kW, or 0.744 kW.

The R.M.S. of the Horizontal component is 0.701. The total Horizontal power gain is 3.377. The R.M.S. of the Vertical component is 0.659. The total Vertical power gain is 3.310. See Figure 4 for calculations. The R.M.S. of the FCC composite pattern is 0.757. The R.M.S. of the measured composite pattern is 0.711. Eighty-five percent (85%) of the original authorized FCC composite pattern is 0.643. Therefore this pattern complies with the FCC requirement of 73.316(c)(2)(ix)(A).

**METHOD OF DIRECTIONALIZATION:**

One bay of the 6810-3-DA was mounted on a tower of precise scale to the Stainless G7 tower at the WPSM 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 BMPED-20060531ALH, a single level of the 6810-3-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 9<sup>th</sup> and 10<sup>th</sup> Edition 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 409.95 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 unpadding 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:

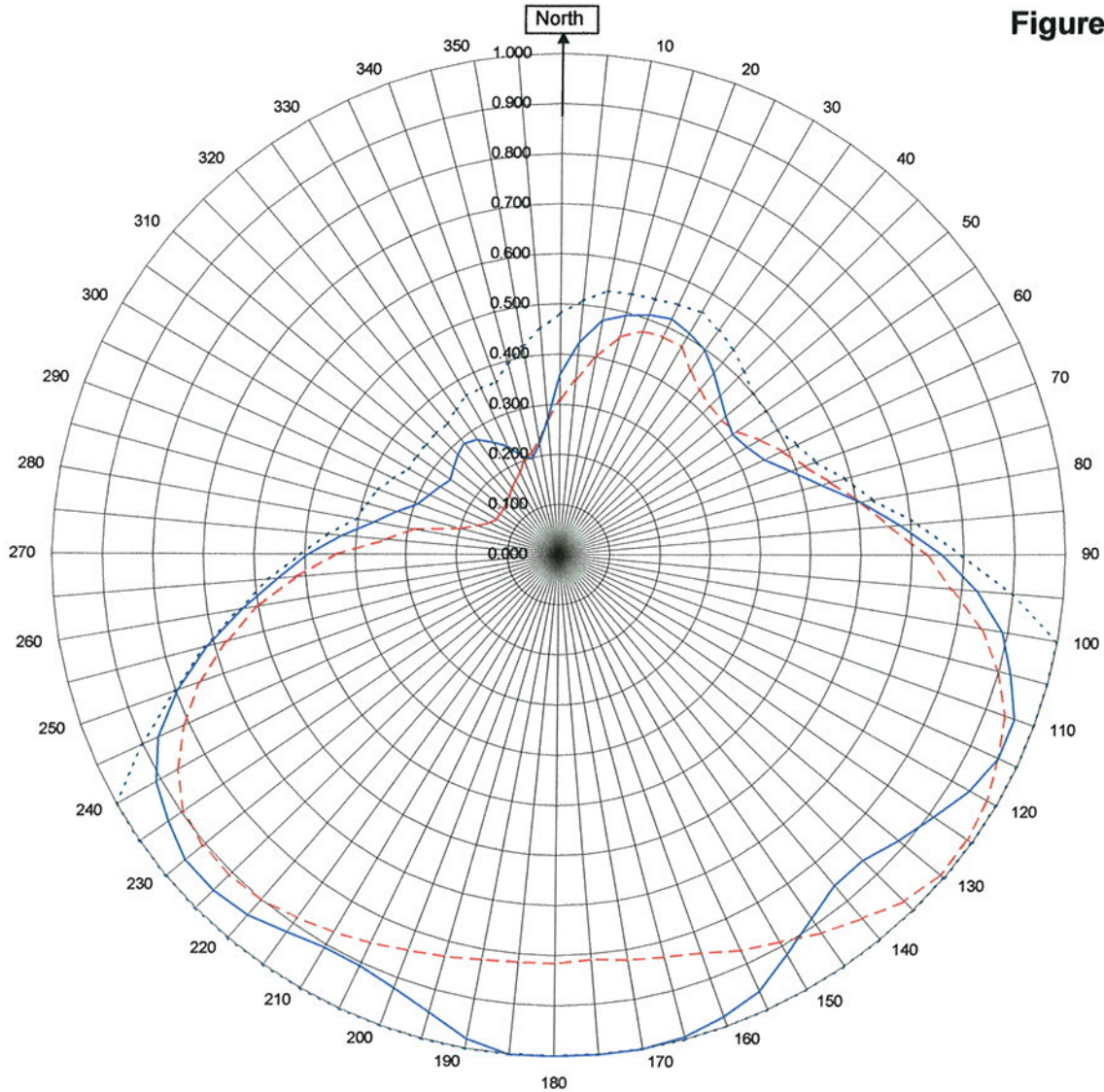


Robert A. Surette  
Director of Sales Engineering  
S/O 25504  
July 23, 2007

# Shively Labs

Shively Labs, a division of Howell Laboratories, Inc. Bridgton, ME (207)647-3327

Figure 1



## WPSM Ft. Walton Beach

25504

July 23, 2007

Horizontal RMS	0.701
Vertical RMS	0.659
H/V Composite RMS	0.711
FCC Composite RMS	0.757

Frequency	91.1 / 409.95 MHz
Plot	Relative Field
Scale	4.5 : 1
See Figure 2 for Mechanical Details	

Antenna Model	6810-3-DA
Pattern Type	Directional Azimuth

Figure 1a

Tabulation of Horizontal Azimuth Pattern  
WPSM Ft. Walton Beach

Azimuth	Rel Field	Azimuth	Rel Field
0	0.360	180	1.000
10	0.475	190	0.980
20	0.510	200	0.920
30	0.510	210	0.905
40	0.475	220	0.940
45	0.450	225	0.950
50	0.430	230	0.950
60	0.430	240	0.910
70	0.490	250	0.795
80	0.610	260	0.630
90	0.760	270	0.495
100	0.890	280	0.370
110	0.960	290	0.295
120	0.940	300	0.270
130	0.885	310	0.270
135	0.860	315	0.280
140	0.860	320	0.290
150	0.920	330	0.260
160	0.980	340	0.210
170	1.000	350	0.225

Figure 1b

Tabulation of Vertical Azimuth Pattern  
WPSM Ft. Walton Beach

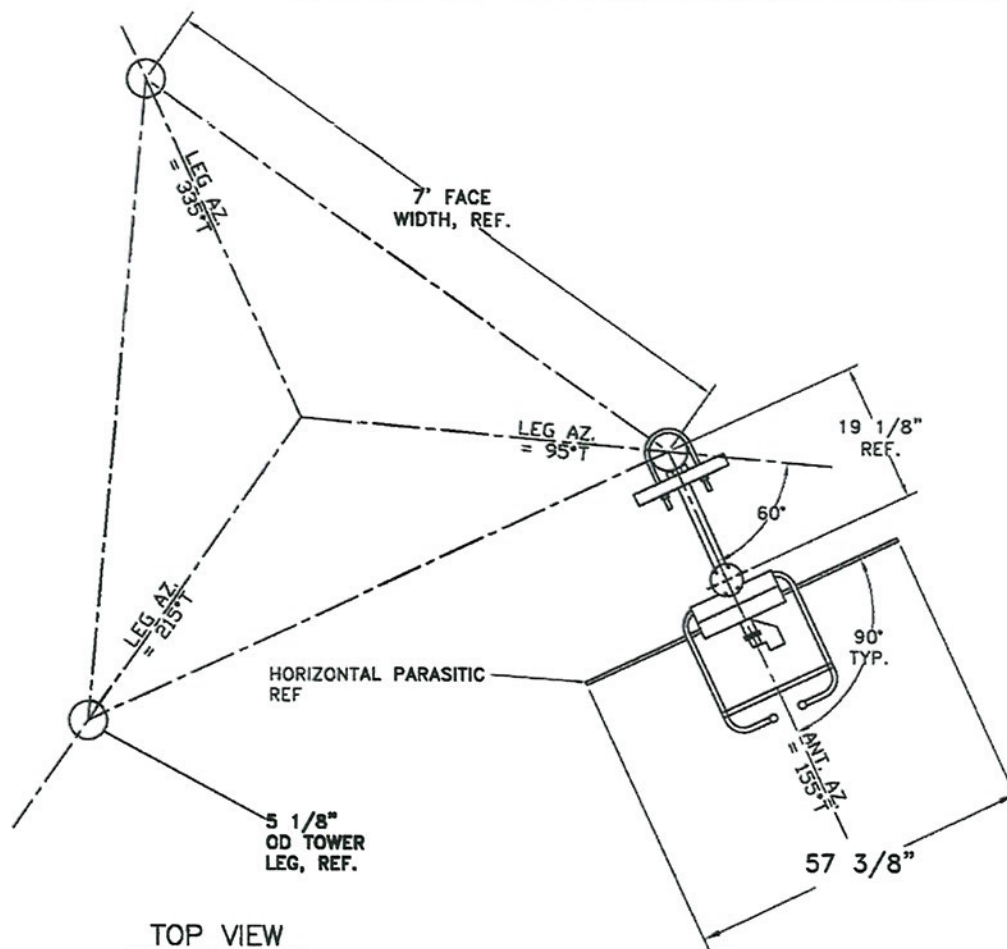
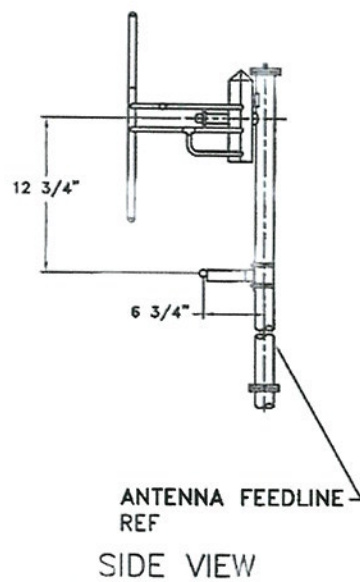
Azimuth	Rel Field	Azimuth	Rel Field
0	0.310	180	0.815
10	0.400	190	0.820
20	0.475	200	0.840
30	0.480	210	0.870
40	0.430	220	0.900
45	0.420	225	0.905
50	0.420	230	0.905
60	0.460	240	0.860
70	0.520	250	0.750
80	0.610	260	0.600
90	0.730	270	0.440
100	0.850	280	0.290
110	0.940	290	0.170
120	0.980	300	0.140
130	0.990	310	0.140
135	0.975	315	0.145
140	0.945	320	0.150
150	0.890	330	0.170
160	0.845	340	0.200
170	0.820	350	0.230



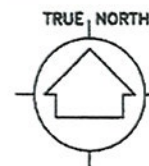
Figure 1c

Tabulation of FCC Directional Composite  
WPSM Ft. Walton Beach

Azimuth	Rel Field	Azimuth	Rel Field
0	0.482	180	1.000
10	0.535	190	1.000
20	0.543	200	1.000
30	0.559	210	1.000
40	0.535	220	1.000
50	0.500	230	1.000
60	0.500	240	1.000
70	0.543	250	0.802
80	0.634	260	0.638
90	0.796	270	0.509
100	1.000	280	0.405
110	1.000	290	0.378
120	1.000	300	0.341
130	1.000	310	0.341
140	1.000	320	0.341
150	1.000	330	0.366
160	1.000	340	0.366
170	1.000	350	0.423



TOP VIEW  
TOWER MAKE: STAINLESS G-7



ANTENNA HEADING: 155° TRUE NORTH

SHIVELY LABS			
A DIVISION OF HOWELL LABORATORIES INC., BRIDGTON, MAINE			
SHOP ORDER: 25504	FREQUENCY: 91.1 MHz.	SCALE: N.T.S.	DRAWN BY: ASP
MODEL: 6810-3-DIRECTIONAL ANTENNA			APPROVED BY:
DATE: 7/3/07	FIGURE 2		

Antenna Mfg.: Shively Labs

Antenna Type: 6810-3-DA

Station: WPSM

Frequency: 91.1

Channel #: 216

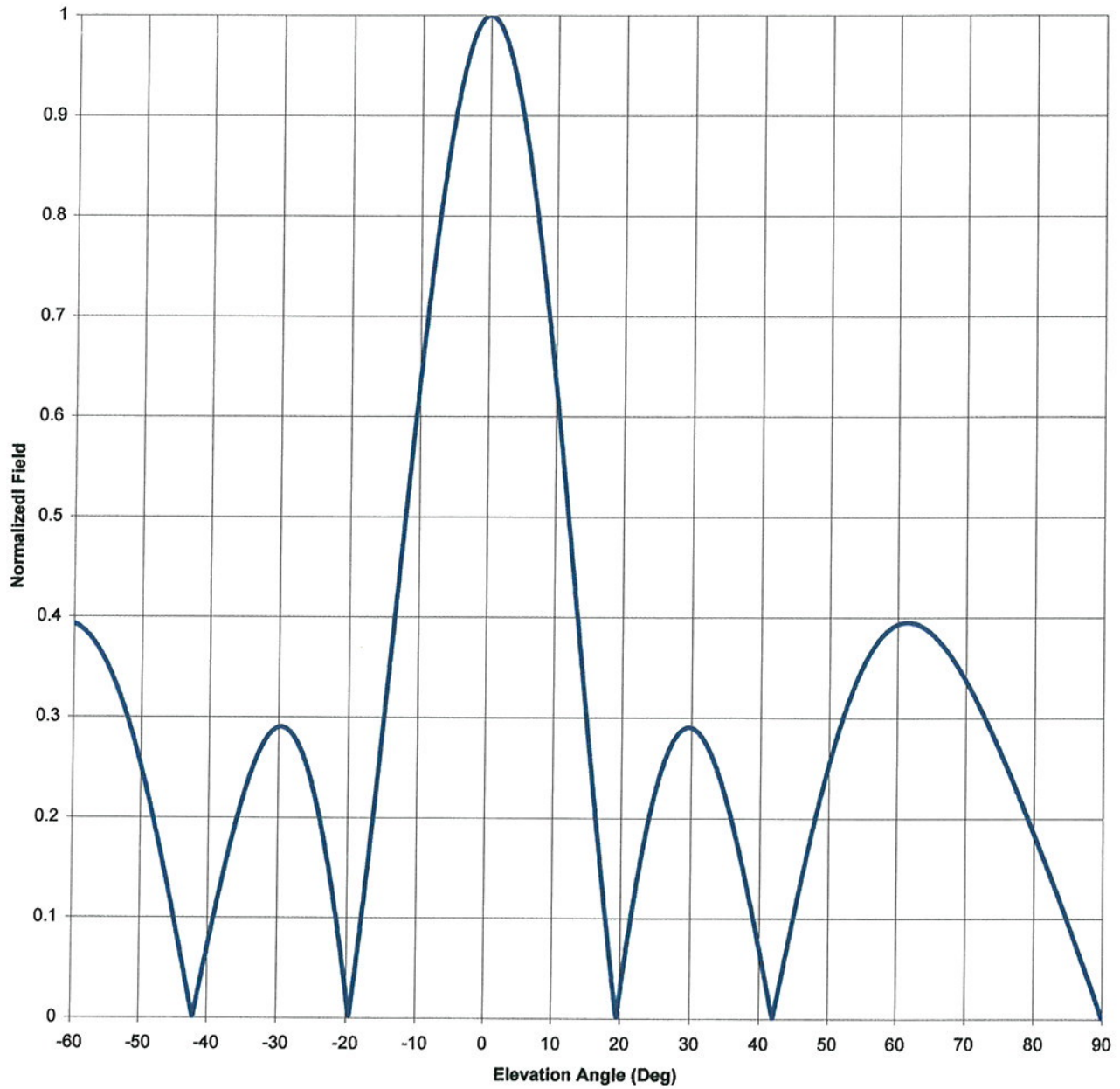
Figure: 3

Date: 7/23/2007

Beam Tilt 0

Gain (Max) 3.377 5.285 dB

Gain (Horizon) 3.377 5.285 dB



Antenna Mfg.: Shively Labs  
 Antenna Type: 6810-3-DA  
 Station: WPSM  
 Frequency: 91.1  
 Channel #: 216  
 Figure: 3

Date: 7/23/2007

Beam Tilt 0  
 Gain (Max) 3.377 5.285 dB  
 Gain (Horizon) 3.377 5.285 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	0.069	0	1.000	46	0.136
-89	0.021	-43	0.034	1	0.996	47	0.168
-88	0.040	-42	0.001	2	0.984	48	0.198
-87	0.059	-41	0.036	3	0.963	49	0.226
-86	0.078	-40	0.071	4	0.935	50	0.253
-85	0.096	-39	0.105	5	0.900	51	0.277
-84	0.114	-38	0.137	6	0.858	52	0.300
-83	0.132	-37	0.168	7	0.810	53	0.319
-82	0.150	-36	0.196	8	0.756	54	0.337
-81	0.168	-35	0.221	9	0.697	55	0.352
-80	0.185	-34	0.243	10	0.634	56	0.365
-79	0.203	-33	0.262	11	0.569	57	0.375
-78	0.219	-32	0.276	12	0.500	58	0.384
-77	0.236	-31	0.286	13	0.431	59	0.390
-76	0.252	-30	0.290	14	0.361	60	0.394
-75	0.268	-29	0.290	15	0.291	61	0.395
-74	0.283	-28	0.283	16	0.223	62	0.395
-73	0.298	-27	0.271	17	0.156	63	0.393
-72	0.312	-26	0.254	18	0.092	64	0.390
-71	0.325	-25	0.230	19	0.032	65	0.384
-70	0.338	-24	0.200	20	0.024	66	0.378
-69	0.349	-23	0.164	21	0.076	67	0.369
-68	0.360	-22	0.123	22	0.123	68	0.360
-67	0.369	-21	0.076	23	0.164	69	0.349
-66	0.378	-20	0.024	24	0.200	70	0.338
-65	0.384	-19	0.032	25	0.230	71	0.325
-64	0.390	-18	0.092	26	0.254	72	0.312
-63	0.393	-17	0.156	27	0.271	73	0.298
-62	0.395	-16	0.223	28	0.283	74	0.283
-61	0.395	-15	0.291	29	0.290	75	0.268
-60	0.394	-14	0.361	30	0.290	76	0.252
-59	0.390	-13	0.431	31	0.286	77	0.236
-58	0.384	-12	0.500	32	0.276	78	0.219
-57	0.375	-11	0.569	33	0.262	79	0.203
-56	0.365	-10	0.634	34	0.243	80	0.185
-55	0.352	-9	0.697	35	0.221	81	0.168
-54	0.337	-8	0.756	36	0.196	82	0.150
-53	0.319	-7	0.810	37	0.168	83	0.132
-52	0.300	-6	0.858	38	0.137	84	0.114
-51	0.277	-5	0.900	39	0.105	85	0.096
-50	0.253	-4	0.935	40	0.071	86	0.078
-49	0.226	-3	0.963	41	0.036	87	0.059
-48	0.198	-2	0.984	42	0.001	88	0.040
-47	0.168	-1	0.996	43	0.034	89	0.021
-46	0.136	0	1.000	44	0.069	90	0.000
-45	0.103			45	0.103		



## VALIDATION OF TOTAL POWER GAIN CALCULATION

WPSM 91.1 MHz FORT WALTON BEACH, FL

MODEL 6810-3-DA

Elevation Gain of Antenna 1.56

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

H RMS	0.701	V RMS	0.659	H/V Ratio	1.064
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Elevation Gain of Horizontal Component 1.659

Elevation Gain of Vertical Component 1.467

Horizontal Azimuth Gain equals 1/(RMS)SQ. 2.035

Vertical Azimuth Gain equals 1/(RMS/Max Vert)SQ. 2.257

Max. Vertical 0.99

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

Total Horizontal Power Gain = 3.377

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

Total Vertical Power Gain = 3.310

ERP divided by Horizontal Power Gain equals Antenna Input Power

11 KW ERP Equals 3.257 KW Antenna Input Power

Antenna Input Power times Vertical Power Gain equals Vertical ERP

3.257 KW Times 3.310 KW Equals 10.781 KW ERP

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

0.99 Equals 10.781 KW Vertical ERP

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

**Gerald W. Wilson  
Consulting Broadcast Engineer  
1098 Park Lane  
Gulf Breeze, FL 32563**

**Monday October 8, 2007**

**RE: Engineers Affidavit**

**QUALIFICATIONS**

**Gerald W. Wilson is a practicing broadcast engineer in Santa Rosa County, FL. Mr. Wilson has been in this occupation since 1962 and has prepared and filed numerous technical exhibits as part of FCC applications and procedures. Mr. Wilson is a 1968 graduate of the Cleveland Institute of Electronics. His qualifications are a matter of record with the Federal Communications Commission.**

**AFFIDAVIT**

**I, Gerald W. Wilson, do hereby affirm that this date I supervised the assembly and installation of a Shively Model 6810-3-DA, Serial #2280 Three Bay Directional FM Antenna pursuant to the manufacturer's instructions. This antenna will be used by WPSM in Fort Walton Beach Florida, Facility ID 22811, by authority of FCC construction permit BMPED-20060531ALH.**



**Gerald W. Wilson  
Director of Engineering  
WPSM FM Radio  
322 Hill Avenue  
Fort Walton Beach, FL 32548**

**EXHIBIT #B1  
APP FOR STATION LICENSE  
FORT WALTON BEACH  
EDUCATIONAL BROADCASTING  
WPSM (FM) RADIO STATION  
FORT WALTON BEACH, FLORIDA  
November 2007**

# **PSM, INC.**

## **PASCOE SURVEYING & MAPPING, INC.**

21 BERWICK CIRCLE  
SHALIMAR, FL 32579

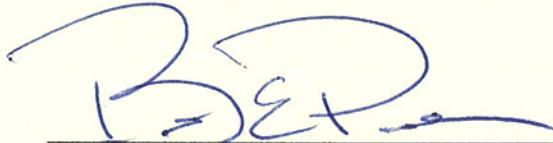
PHONE: 850-651-4200  
FAX: 850-651-4222

### **TOWER SITE CERTIFICATION**

October 10, 2007

RE: STAR TOWERS OF FLORIDA, LLC  
5.35 ACRES IN THE SW1/4 OF SECTION 14-T2S-R24W  
OKALOOSA COUNTY, FLORIDA  
SITUATED ON HOLLYWOOD BOULEVARD  
FORT WALTON BEACH, FL 32548

I hereby certify that the directional antenna is aligned to an Azimuth of 155° from North.



Brian E. Pascoe, PSM #5930

Not valid unless signed and sealed with a embossed Florida Surveyors Seal

PASCOE SURVEYING & MAPPING, INC. LB# 7237  
21 Berwick Circle  
Shalimar, Fl 32579

EXHIBIT #B2  
APP FOR STATION LICENSE  
FORT WALTON BEACH  
EDUCATIONAL BROADCASTING  
WPSM (FM) RADIO STATION  
FORT WALTON BEACH, FLORIDA  
November 2007

WPSM.C  
0000184324  
Latitude: 30-24-35.90 N  
Longitude: 086-37-23.60 W  
ERP: 14.00 kW  
Channel: 216  
Frequency: 91.1 MHz  
AMSL Height: 108.0 m  
Elevation: 4.0 m  
Horiz. Pattern: Directional  
Vert. Pattern: No  
Prop Model: None

Measured Pattern 60 dBu  
encompasses 100% of Fort Walton Beach

Fort Walton Beach, FL 2010 Boundaries (Yellow)

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Scale 1:300,000

0 10 20 30 km

