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S.O. 26171

Report of Test 6810-2R-SS-DA

for

WAY-FM MEDIA GROUP, INC.

WAYM 88.7 MHz Spring Hill, TN

OBJECTIVE:

The objective of this test was to demonstrate the directional characteristics of a 6810-2R-SS-DA to meet the needs of WAYM and to comply with the requirements of the FCC construction permit, file number BPED-20070803ADB.

RESULTS:

The measured azimuth pattern for the 6810-2R-SS-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 BPED-20070803ADB indicates that the Horizontal radiation component shall not exceed 5.0 kW at any azimuth and is restricted to the following values at the azimuths specified:

350 - 50 Degrees T: 0.160 kW

From Figure 1, the maximum radiation of the Horizontal component occurs at 179 Degrees T to 218 Degrees T. At the restricted azimuth of 350 - 50 Degrees T the Horizontal component is 15.55 dB down from the maximum of 5.0 kW, or 0.139 kW.

The R.M.S. of the Horizontal component is 0.657. The total Horizontal power gain is 1.632. The R.M.S. of the Vertical component is 0.653. The total Vertical power gain is 1.583. See Figure 4 for calculations. The R.M.S. of the FCC composite pattern is 0.733. The R.M.S. of the measured composite pattern is 0.675. Eighty-five percent (85%) of the original authorized FCC composite pattern is 0.623. Therefore this pattern complies with the FCC requirement of 73.316(c)(2)(ix)(A).

METHOD OF DIRECTIONALIZATION:

One bay of the 6810-2R-SS-DA was mounted on a tower of precise scale to the Stainless G-7 tower at the WAYM 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 BPED-20070803ADB, a single level of the 6810-2R-SS-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 399.15 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.

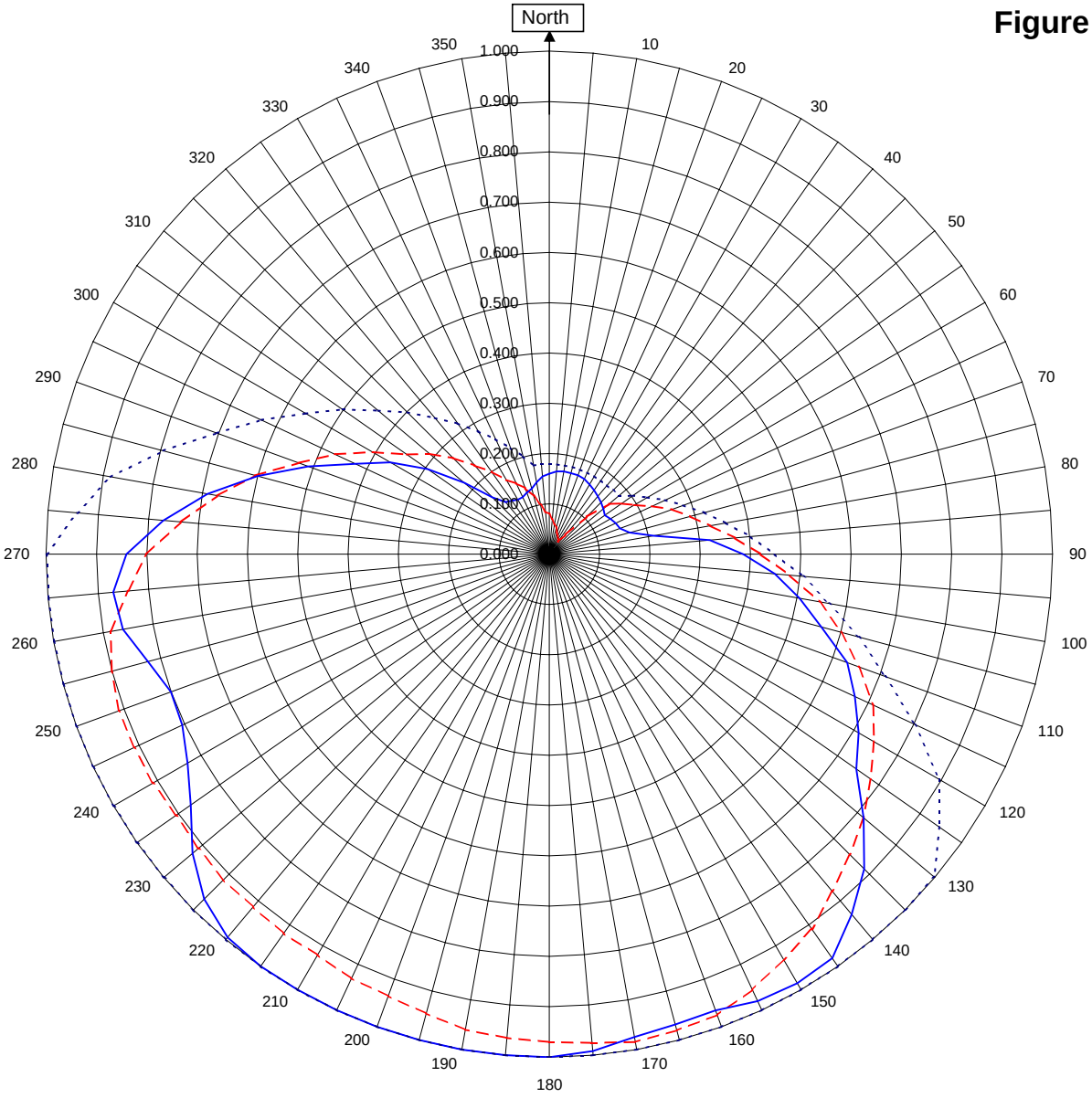
Respectfully submitted by:

Robert A. Surette
Director of Sales Engineering
S/O 26171
November 20, 2007

Shively Labs

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

Figure 1



WAYM Spring Hill, TN

26171

November 20, 2007

Horizontal RMS	0.657
Vertical RMS	0.653
H/V Composite RMS	0.675
FCC Composite RMS	0.733

Frequency	88.7 / 399.15 mHz
Plot	Relative Field
Scale	4.5 : 1
	See Figure 2 for Mechanical Details

Antenna Model	6810-2R-SS-DA
Pattern Type	Directional Azimuth

Figure 1a

Tabulation of Horizontal Azimuth Pattern
WAYM Spring Hill, TN

Azimuth	Rel Field	Azimuth	Rel Field
0	0.160	180	1.000
10	0.167	190	1.000
20	0.167	200	1.000
30	0.160	210	1.000
40	0.150	220	0.995
45	0.145	225	0.970
50	0.140	230	0.925
60	0.140	240	0.830
70	0.150	250	0.800
80	0.210	260	0.860
90	0.385	270	0.840
100	0.505	280	0.690
110	0.630	290	0.510
120	0.710	300	0.365
130	0.815	310	0.220
135	0.885	315	0.160
140	0.935	320	0.135
150	0.985	330	0.125
160	0.965	340	0.130
170	0.975	350	0.145

Figure 1b

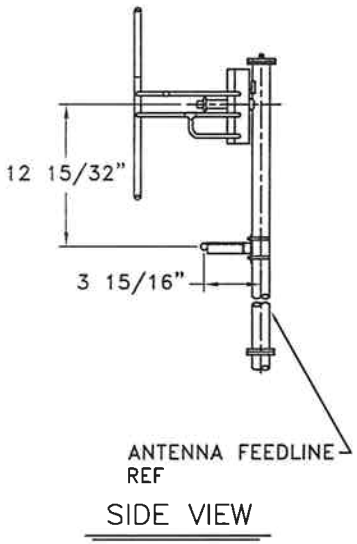
Tabulation of Vertical Azimuth Pattern
WAYM Spring Hill, TN

Azimuth	Rel Field	Azimuth	Rel Field
0	0.080	180	0.970
10	0.060	190	0.960
20	0.045	200	0.935
30	0.035	210	0.920
40	0.050	220	0.915
45	0.105	225	0.915
50	0.155	230	0.910
60	0.195	240	0.910
70	0.260	250	0.910
80	0.325	260	0.885
90	0.420	270	0.800
100	0.545	280	0.670
110	0.655	290	0.530
120	0.745	300	0.405
130	0.815	310	0.310
135	0.845	315	0.270
140	0.875	320	0.230
150	0.930	330	0.170
160	0.975	340	0.140
170	0.985	350	0.100

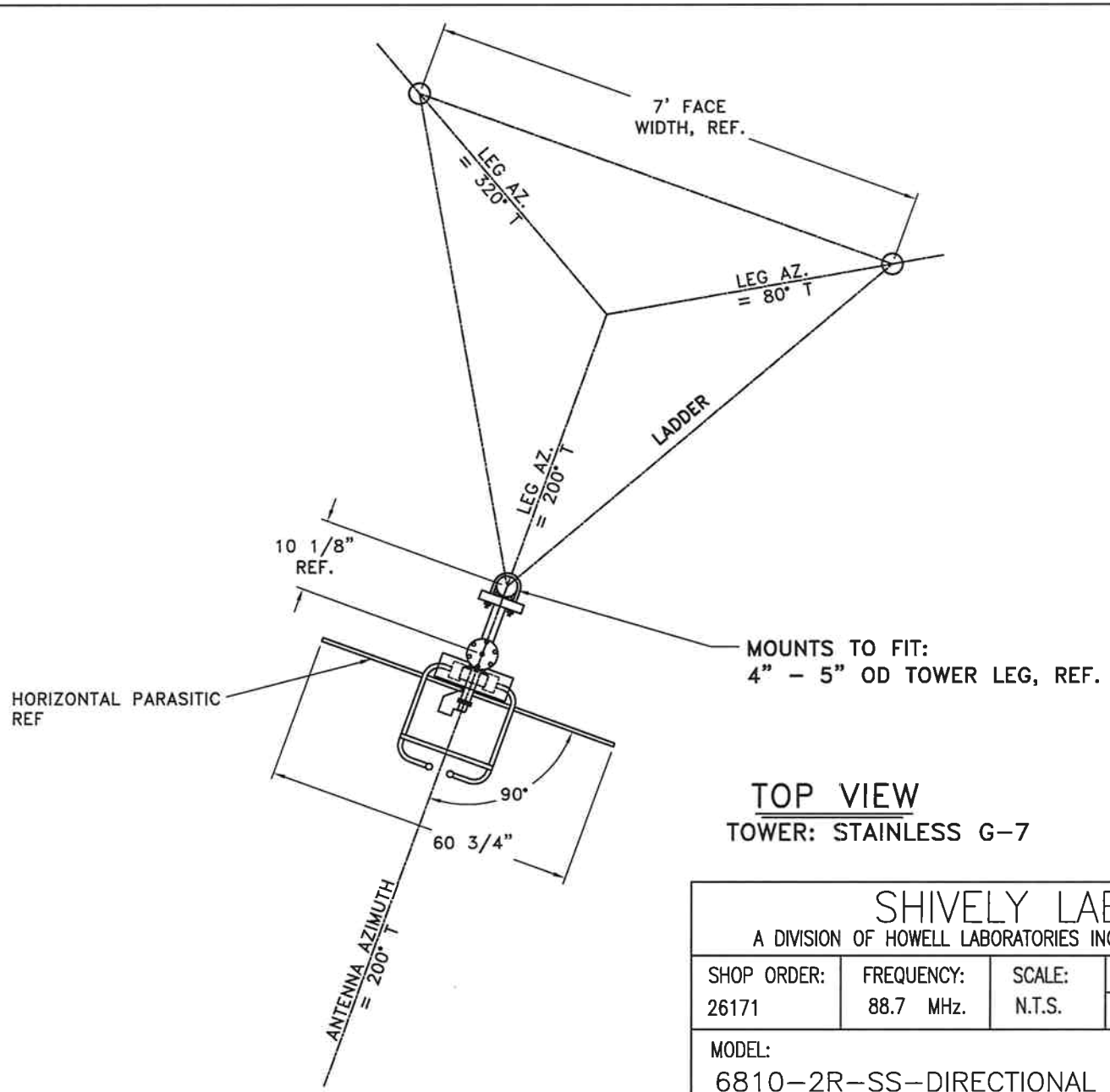
Figure 1c

Tabulation of FCC Directional Composite
WAYM Spring Hill, TN

Azimuth	Rel Field	Azimuth	Rel Field
0	0.179	180	1.000
10	0.179	190	1.000
20	0.179	200	1.000
30	0.179	210	1.000
40	0.179	220	1.000
50	0.179	230	1.000
60	0.225	240	1.000
70	0.283	250	1.000
80	0.356	260	0.999
90	0.448	270	0.999
100	0.564	280	0.885
110	0.710	290	0.703
120	0.894	300	0.559
130	0.999	310	0.444
140	1.000	320	0.353
150	1.000	330	0.281
160	1.000	340	0.224
170	1.000	350	0.179



SIDE VIEW



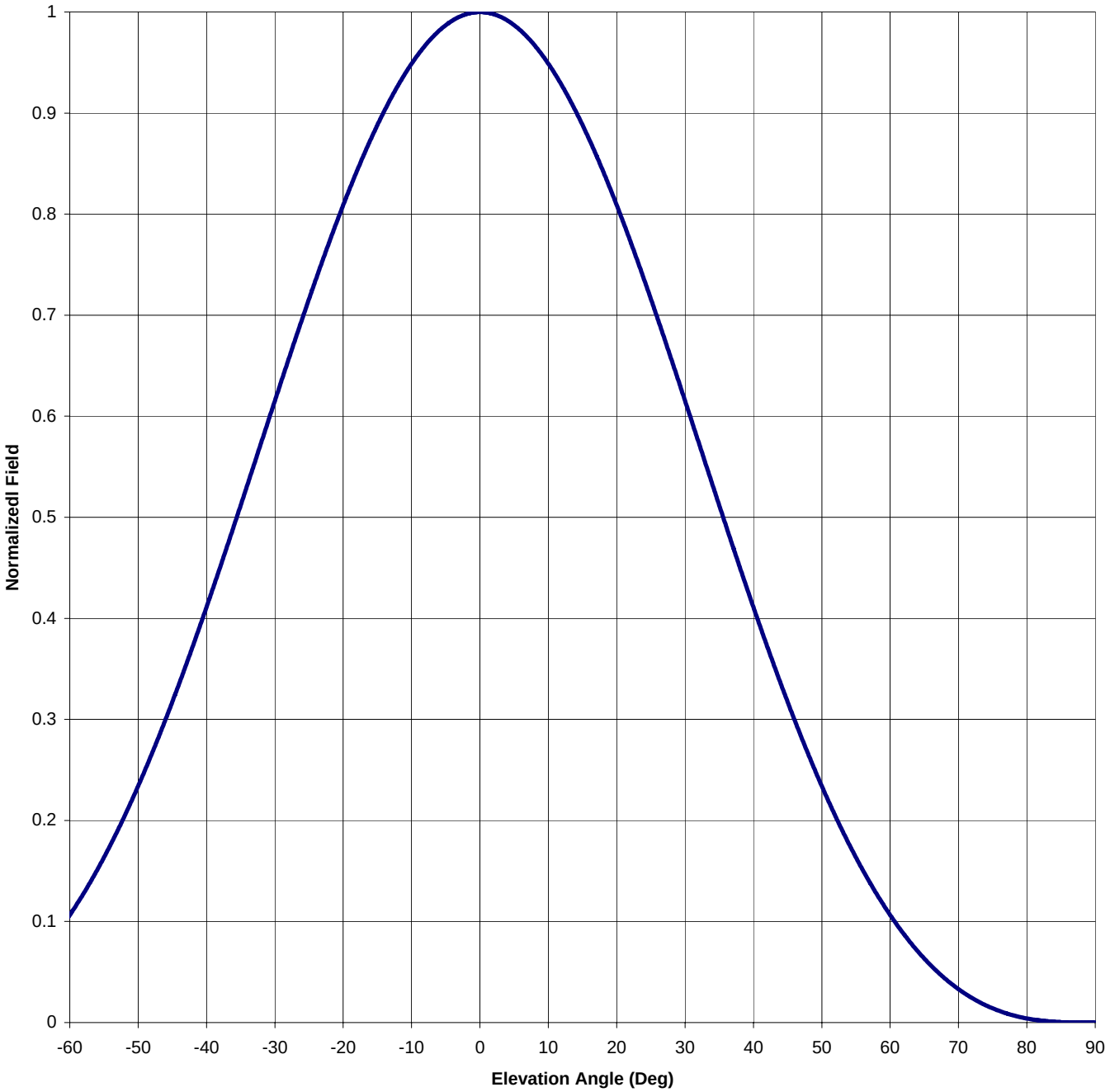
TOP VIEW

TOWER: STAINLESS G–7

ANTENNA HEADING: 200° TRUE NORTH

SHIVELY LABS A DIVISION OF HOWELL LABORATORIES INC.,BRIDGTON, MAINE			
SHOP ORDER: 26171	FREQUENCY: 88.7 MHz.	SCALE: N.T.S.	DRAWN BY: ASP APPROVED BY:
MODEL: 6810–2R–SS–DIRECTIONAL ANTENNA			
DATE: 11/12/07	FIGURE 2		

Antenna Mfg.:	**Shively Labs**			**Date: 11/20/2007**
Antenna Type:	**6810-2R-SS-DA**			
Station:	**WAYM**	**Beam Tilt**	**0**	
Frequency:	**88.7**	**Gain (Max)**	**1.632**	**2.127 dB**
Channel #:	**204**	**Gain (Horizon)**	**1.632**	**2.127 dB**
Figure:	**3**			



Antenna Mfg.: Shively Labs
Antenna Type: 6810-2R-SS-DA
Station: WAYM
Frequency: 88.7
Channel #: 204
Figure: 3

Beam Tilt 0
Gain (Max) 1.632 — 2.127 dB
Gain (Horizon) 1.632 — 2.127 dB

Date: 11/20/2007

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	0.335	0	1.000	46	0.300
-89	0.000	-43	0.354	1	0.999	47	0.283
-88	0.000	-42	0.373	2	0.998	48	0.266
-87	0.000	-41	0.392	3	0.995	49	0.250
-86	0.000	-40	0.411	4	0.992	50	0.234
-85	0.000	-39	0.431	5	0.987	51	0.219
-84	0.001	-38	0.451	6	0.981	52	0.204
-83	0.001	-37	0.471	7	0.975	53	0.190
-82	0.002	-36	0.491	8	0.967	54	0.176
-81	0.003	-35	0.512	9	0.958	55	0.163
-80	0.004	-34	0.532	10	0.949	56	0.151
-79	0.005	-33	0.553	11	0.938	57	0.139
-78	0.007	-32	0.574	12	0.927	58	0.128
-77	0.009	-31	0.595	13	0.915	59	0.117
-76	0.011	-30	0.615	14	0.902	60	0.106
-75	0.014	-29	0.636	15	0.888	61	0.097
-74	0.017	-28	0.656	16	0.874	62	0.088
-73	0.020	-27	0.676	17	0.858	63	0.079
-72	0.024	-26	0.696	18	0.843	64	0.071
-71	0.028	-25	0.716	19	0.826	65	0.063
-70	0.033	-24	0.736	20	0.809	66	0.056
-69	0.038	-23	0.755	21	0.791	67	0.050
-68	0.044	-22	0.773	22	0.773	68	0.044
-67	0.050	-21	0.791	23	0.755	69	0.038
-66	0.056	-20	0.809	24	0.736	70	0.033
-65	0.063	-19	0.826	25	0.716	71	0.028
-64	0.071	-18	0.843	26	0.696	72	0.024
-63	0.079	-17	0.858	27	0.676	73	0.020
-62	0.088	-16	0.874	28	0.656	74	0.017
-61	0.097	-15	0.888	29	0.636	75	0.014
-60	0.106	-14	0.902	30	0.615	76	0.011
-59	0.117	-13	0.915	31	0.595	77	0.009
-58	0.128	-12	0.927	32	0.574	78	0.007
-57	0.139	-11	0.938	33	0.553	79	0.005
-56	0.151	-10	0.949	34	0.532	80	0.004
-55	0.163	-9	0.958	35	0.512	81	0.003
-54	0.176	-8	0.967	36	0.491	82	0.002
-53	0.190	-7	0.975	37	0.471	83	0.001
-52	0.204	-6	0.981	38	0.451	84	0.001
-51	0.219	-5	0.987	39	0.431	85	0.000
-50	0.234	-4	0.992	40	0.411	86	0.000
-49	0.250	-3	0.995	41	0.392	87	0.000
-48	0.266	-2	0.998	42	0.373	88	0.000
-47	0.283	-1	0.999	43	0.354	89	0.000
-46	0.300	0	1.000	44	0.335	90	0.000
-45	0.317			45	0.317		

S.O. 26171 Figure 4

VALIDATION OF TOTAL POWER GAIN CALCULATION

WAYM 88.7 MHz SPRING HILL, TN

MODEL 6810-2R-SS-DA

Elevation Gain of Antenna 0.7

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

H RMS 0.657 V RMS 0.653 H/V Ratio 1.006

Elevation Gain of Horizontal Component 0.704

Elevation Gain of Vertical Component 0.696

Horizontal Azimuth Gain equals 1/(RMS)SQ. 2.317

Vertical Azimuth Gain equals 1/(RMS/Max Vert)SQ. 2.275
Max. Vertical 0.985

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

Total Horizontal Power Gain = **1.632**

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

Total Vertical Power Gain = **1.583**

==========

ERP divided by Horizontal Power Gain equals Antenna Input Power

5 KW ERP Equals 3.064 KW Antenna Input Power

Antenna Input Power times Vertical Power Gain equals Vertical ERP

3.064 KW Times 1.583 KW Equals 4.851 KW ERP

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

0.985 Equals 4.851 KW Vertical ERP

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

Cherry Land Surveying,Inc.

622 West Iris Drive

Nashville,Tennessee 37204

615-269-3972

Fax:615-269-9345

Email:cherryls@Comcast.net

Project:	08141 Way FM 1406 OHB
Supervisor:	T Bratcher
Date Created:	7/1/08 5:42
Antenna Type:	Compact L1/L2
Antenna Measurement Method:	Measured to bottom of antenna
Antenna Group:	GPSurvey
Receiver Type:	4000Ssi/Hiper Lite+
Coordinate System:	Geographic
Zone:	WGS84
Linear Unit:	Meter
Timezone:	Central Day USA : -5:00

**** Adjusted Coordinates ****

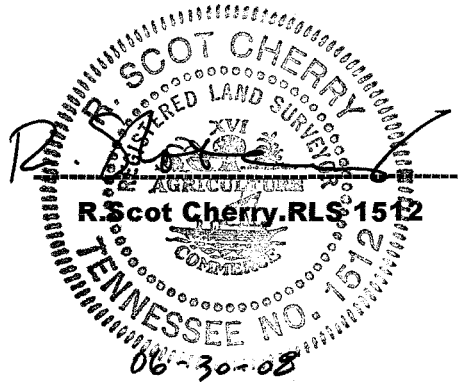
Projection Group:	User-defined Lambert
Zone Name:	TENN SPC (1995)
Linear Units:	US Survey Foot
Angular Units:	degrees
Datum Name:	Horz:NAD-83

Station	North	East
CL Tower	624949.95	1723060.70
GW	624385.84	1722852.55

Azimuth from tower to end Guy Wire: 200°15'14"

Control Point NGS FD1646:

GPS27	595199.84668	1730262.57013



R.Scot Cherry.RLS 1512

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Media Group, Inc.

P.O Box 64500, Colorado Springs, CO. 80962
Street: 5475 Tech Center Drive, Suite 210
Colorado Springs, CO 80919
(719)533-0300
FAX (719)278-4339

TO WHOM IT MAY CONCERN:

I, James A. Turvaville, have personally overseen the assembly and installation of the 2-bay half-wave spaced FM antenna for WAYM, Spring Hill, Tennessee at the tower site located at 36-02-50 by 86-49-49 (NAD27). At all times strict adherance to the written instructions provided by the antenna manufuacturer were made, as well strict adherance to the terms and conditions of the FCC Construction permit BPED-20070803ADB.

I have installed numerous FM directional antenna systems and have experience in following the instructions provided by antenna manufaturers. Careful oversight was made on the assembly and instalaltion of this specific antenna, and surveyor analysis confirms that the azimuth of the installed antenna is within 0.25 degrees of the 200 degrees specified by the manufuacturer and the FCC Construction Permit.

James A. Turvaville
SBE Certified Senior Radio Engineer
Corporate Director of Engineering
WAY-FM Media Group, Inc.