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S.O. 26440

Report of Test 6014-1/3-DA

for

AAA LICENSING LLC

WEHM 92.9 MHz Manorville, NY

OBJECTIVE:

The objective of this test was to demonstrate the directional characteristics of a 6014-1/3-DA to meet the needs of WEHM and to comply with the requirements of the FCC construction permit, file number BPH-20070119AAC.

RESULTS:

The measured azimuth pattern for the 6014-1/3-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 BPH-20070119AAC indicates that the Horizontal radiation component shall not exceed 3.1 kW at any azimuth and is restricted to the following values at the azimuths specified:

250 - 280 Degrees T: 0.40 kW

From Figure 1, the maximum radiation of the Horizontal component occurs at 35 Degrees T to 60 Degrees T and at 154 Degrees T to 160 Degrees T. At the restricted azimuth of 250 - 280 Degrees T the Horizontal component is 9.12 dB down from the maximum of 3.1 kW, or 0.38 kW.

The R.M.S. of the Horizontal component is 0.727. The total Horizontal power gain is 0.873. The R.M.S. of the Vertical component is 0.725. The total Vertical power gain is 0.838. See Figure 4 for calculations. The R.M.S. of the FCC composite pattern is 0.885. The R.M.S. of the measured composite pattern is 0.771. Eighty-five percent (85%) of the original authorized FCC composite pattern is 0.752. Therefore this pattern complies with the FCC requirement of 73.316(c)(2)(ix)(A).

METHOD OF DIRECTIONALIZATION:

One bay of the 6014-1/3-DA was mounted on a tower of precise scale to the 5 foot face tower at the WEHM site. The spacing of the panel antenna to the tower was varied to achieve the horizontal and vertical azimuth patterns shown in Figure 1. See Figure 2 for mechanical details.

METHOD OF MEASUREMENT:

As allowed by the construction permit, file number BPH-20070119AAC, a single level of the 6014-1/3-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 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 418.05 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.

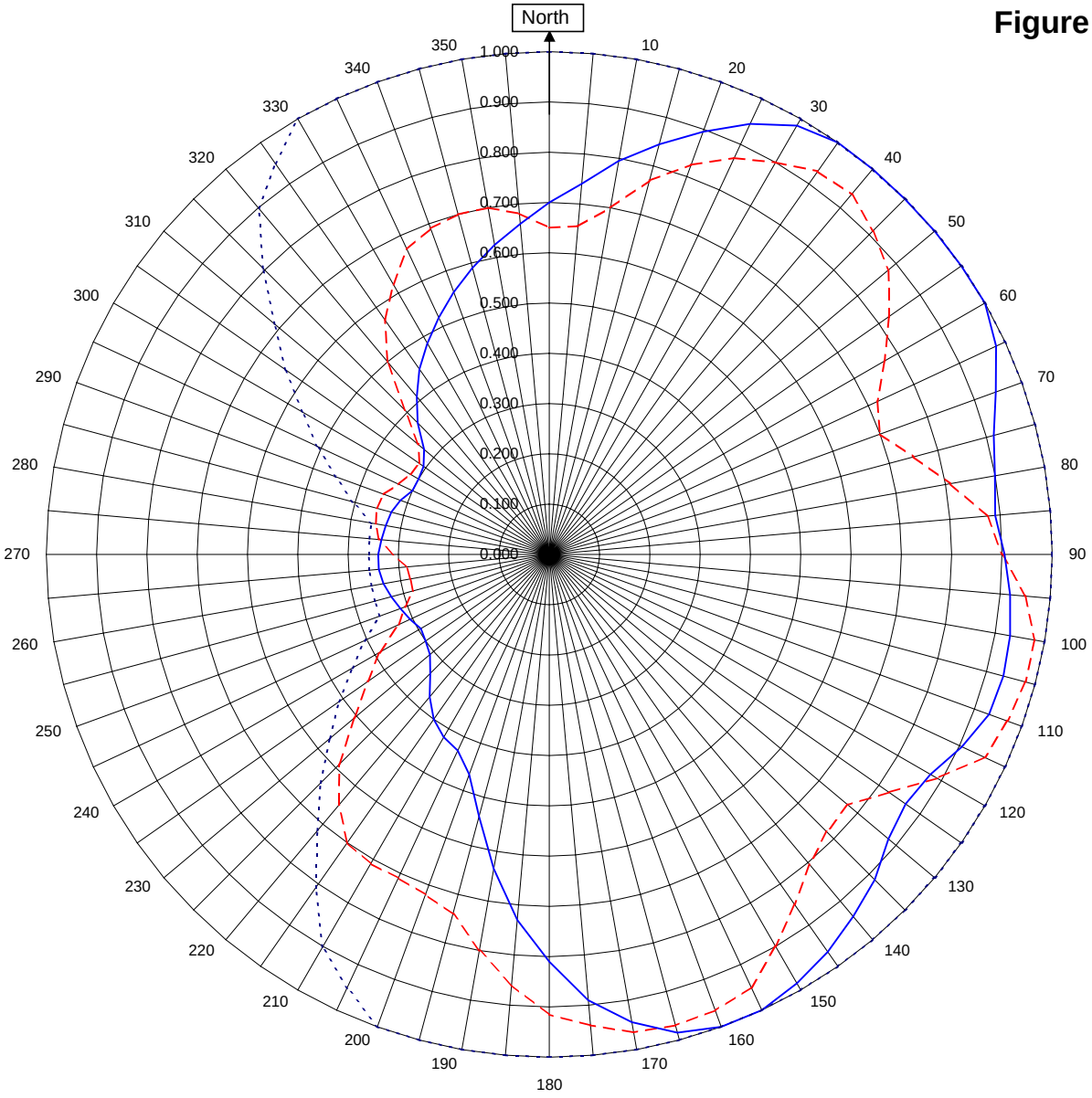
Respectfully submitted by:

Robert A. Surette
Director of Sales Engineering
S/O 26440
May 29, 2008

Shively Labs

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

Figure 1



WEHM Manorville, NY

26440

May 29, 2008

Horizontal RMS	0.727
Vertical RMS	0.725
H/V Composite RMS	0.771
FCC Composite RMS	0.885

Frequency	92.9 / 418.05 mHz
Plot	Relative Field
Scale	4.5 : 1
	See Figure 2 for Mechanical Details

Antenna Model	6014-1/3-DA
Pattern Type	Directional Azimuth

Figure 1a

Tabulation of Horizontal Azimuth Pattern
WEHM Manorville, NY

Azimuth	Rel Field	Azimuth	Rel Field
0	0.700	180	0.810
10	0.795	190	0.635
20	0.895	200	0.465
30	0.985	210	0.420
40	1.000	220	0.370
45	1.000	225	0.335
50	1.000	230	0.310
60	1.000	240	0.295
70	0.945	250	0.315
80	0.900	260	0.335
90	0.905	270	0.340
100	0.930	280	0.330
110	0.930	290	0.315
120	0.875	300	0.300
130	0.880	310	0.325
135	0.915	315	0.370
140	0.940	320	0.410
150	0.985	330	0.485
160	1.000	340	0.555
170	0.945	350	0.625

Figure 1b

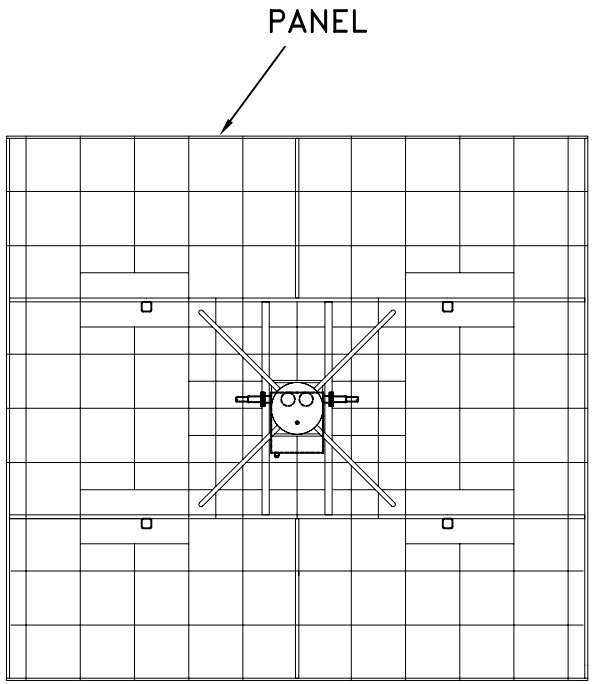
Tabulation of Vertical Azimuth Pattern
WEHM Manorville, NY

Azimuth	Rel Field	Azimuth	Rel Field
0	0.650	180	0.915
10	0.700	190	0.800
20	0.825	200	0.720
30	0.900	210	0.710
40	0.935	220	0.650
45	0.910	225	0.590
50	0.880	230	0.505
60	0.770	240	0.390
70	0.700	250	0.305
80	0.810	260	0.280
90	0.900	270	0.310
100	0.980	280	0.350
110	0.970	290	0.350
120	0.890	300	0.320
130	0.775	310	0.340
135	0.780	315	0.405
140	0.805	320	0.500
150	0.900	330	0.620
160	0.965	340	0.690
170	0.965	350	0.700

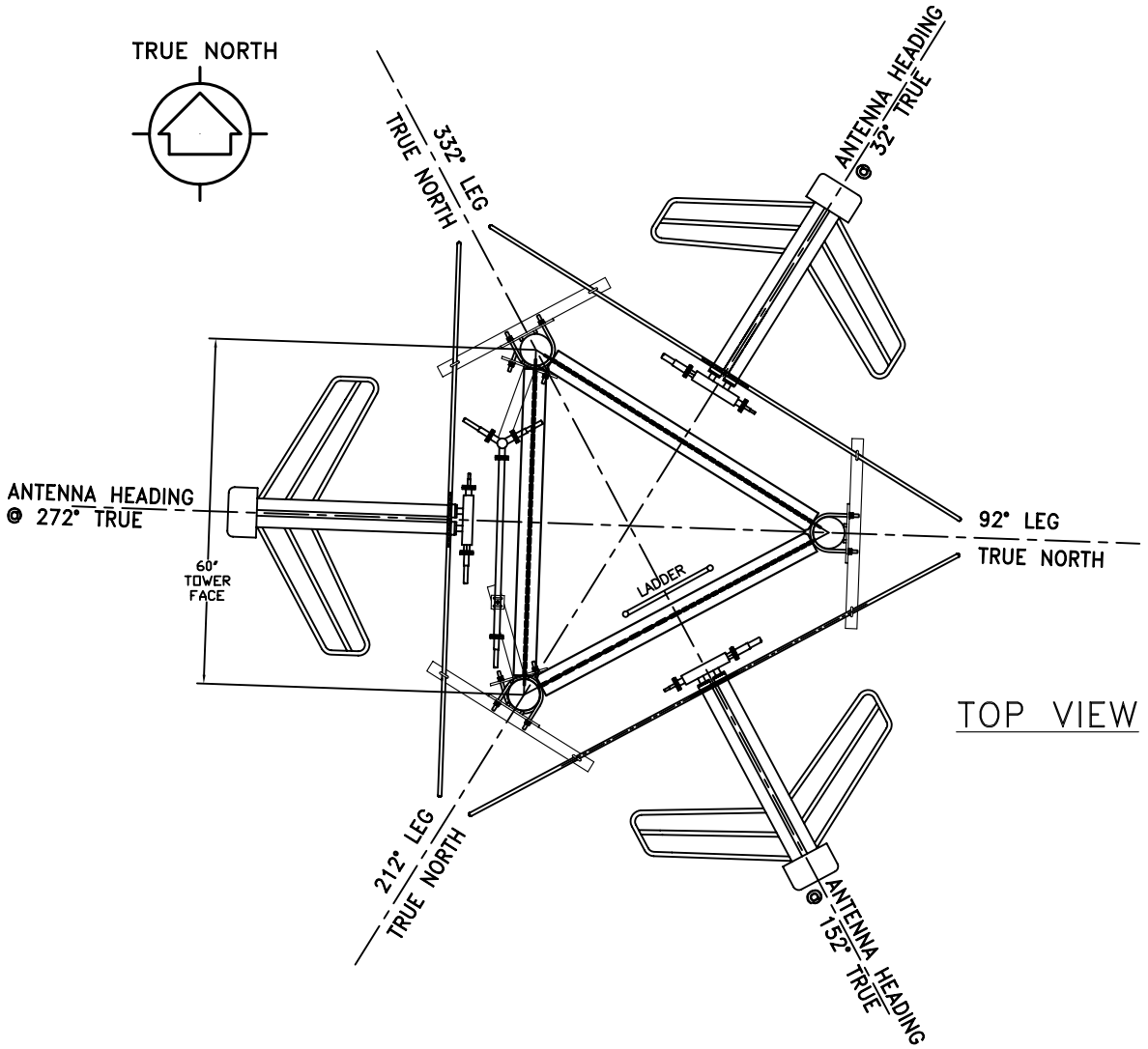
Figure 1c

Tabulation of FCC Directional Composite
WEHM Manorville, NY

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	0.902
40	1.000	220	0.717
50	1.000	230	0.569
60	1.000	240	0.452
70	1.000	250	0.359
80	1.000	260	0.359
90	1.000	270	0.359
100	1.000	280	0.359
110	1.000	290	0.452
120	1.000	300	0.567
130	1.000	310	0.713
140	1.000	320	0.898
150	1.000	330	1.000
160	1.000	340	1.000
170	1.000	350	1.000



FRONT VIEW



TOP VIEW

SHIVELY LABS
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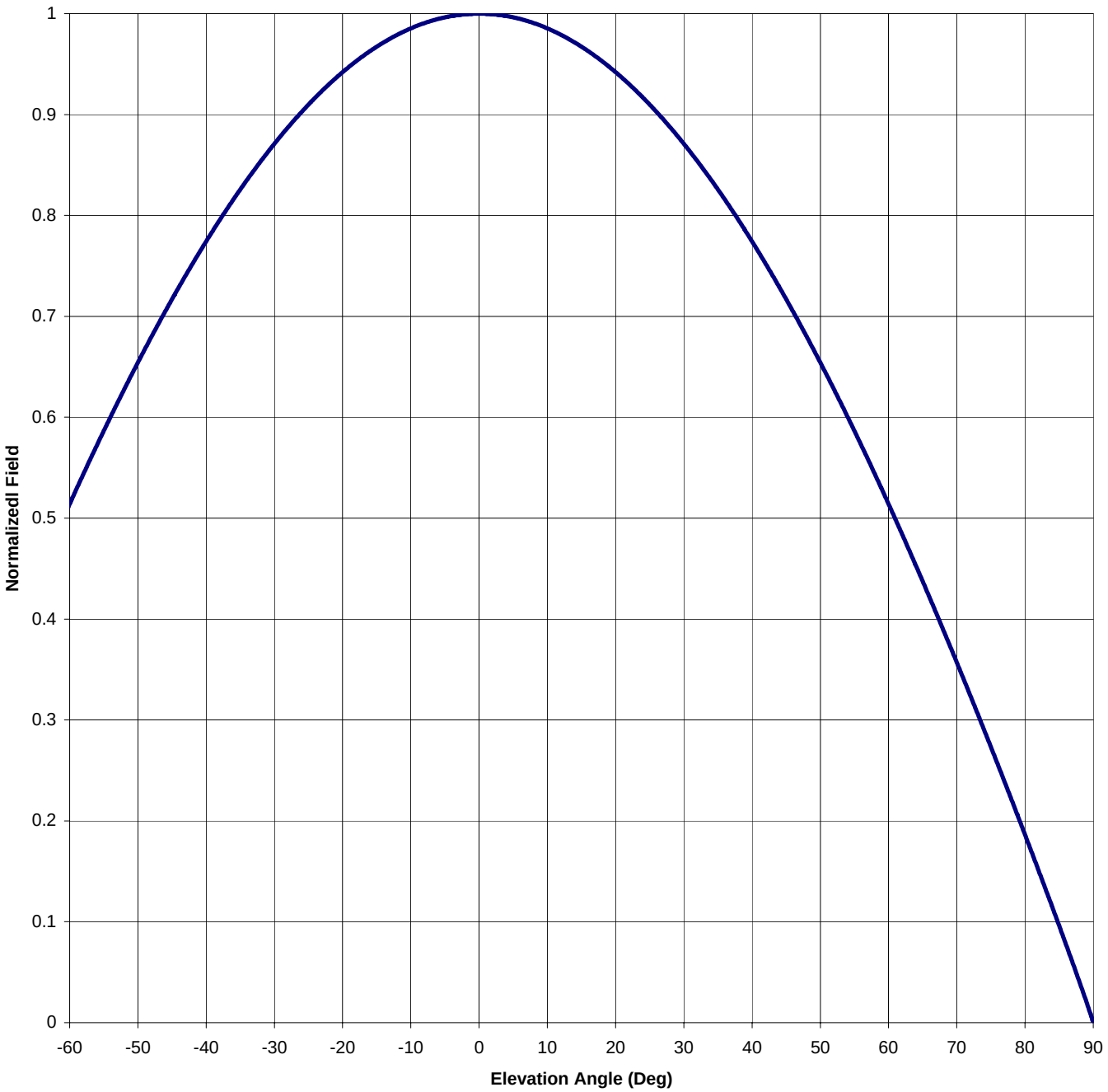
SHOP ORDER:	FREQUENCY:	SCALE:	DRAWN BY:
26440-A	92.9 MHz	N.T.S.	DAB
			APPROVED BY: RAS

TITLE: MODEL-6014-1/3-DIRECTIONAL ANTENNA

DATE: 6/9/08

FIGURE 2

Antenna Mfg.:	**Shively Labs**			**Date: 5/29/2008**
Antenna Type:	**6014-1/3-DA**			
Station:	**WEHM**	**Beam Tilt**	**0**	
Frequency:	**92.9**	**Gain (Max)**	**0.873**	**-0.588 dB**
Channel #:	**225**	**Gain (Horizon)**	**0.873**	**-0.588 dB**
Figure:	**3**			



Antenna Mfg.: Shively Labs
Antenna Type: 6014-1/3-DA
Station: WEHM
Frequency: 92.9
Channel #: 225
Figure: 3

Beam Tilt 0
Gain (Max) 0.873 **-0.588 dB**
Gain (Horizon) 0.873 **-0.588 dB**

Date: 5/29/2008

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	0.729	0	1.000	46	0.705
-89	0.021	-43	0.741	1	1.000	47	0.693
-88	0.040	-42	0.752	2	0.999	48	0.680
-87	0.059	-41	0.763	3	0.999	49	0.667
-86	0.078	-40	0.774	4	0.998	50	0.654
-85	0.096	-39	0.785	5	0.996	51	0.641
-84	0.114	-38	0.796	6	0.995	52	0.628
-83	0.133	-37	0.806	7	0.993	53	0.614
-82	0.151	-36	0.816	8	0.991	54	0.600
-81	0.168	-35	0.826	9	0.988	55	0.586
-80	0.186	-34	0.835	10	0.985	56	0.572
-79	0.204	-33	0.845	11	0.982	57	0.558
-78	0.221	-32	0.854	12	0.979	58	0.544
-77	0.239	-31	0.862	13	0.975	59	0.529
-76	0.256	-30	0.871	14	0.971	60	0.514
-75	0.273	-29	0.879	15	0.967	61	0.499
-74	0.290	-28	0.887	16	0.963	62	0.484
-73	0.307	-27	0.895	17	0.958	63	0.469
-72	0.324	-26	0.903	18	0.953	64	0.453
-71	0.341	-25	0.910	19	0.948	65	0.437
-70	0.357	-24	0.917	20	0.942	66	0.422
-69	0.373	-23	0.924	21	0.936	67	0.406
-68	0.390	-22	0.930	22	0.930	68	0.390
-67	0.406	-21	0.936	23	0.924	69	0.373
-66	0.422	-20	0.942	24	0.917	70	0.357
-65	0.437	-19	0.948	25	0.910	71	0.341
-64	0.453	-18	0.953	26	0.903	72	0.324
-63	0.469	-17	0.958	27	0.895	73	0.307
-62	0.484	-16	0.963	28	0.887	74	0.290
-61	0.499	-15	0.967	29	0.879	75	0.273
-60	0.514	-14	0.971	30	0.871	76	0.256
-59	0.529	-13	0.975	31	0.862	77	0.239
-58	0.544	-12	0.979	32	0.854	78	0.221
-57	0.558	-11	0.982	33	0.845	79	0.204
-56	0.572	-10	0.985	34	0.835	80	0.186
-55	0.586	-9	0.988	35	0.826	81	0.168
-54	0.600	-8	0.991	36	0.816	82	0.151
-53	0.614	-7	0.993	37	0.806	83	0.133
-52	0.628	-6	0.995	38	0.796	84	0.114
-51	0.641	-5	0.996	39	0.785	85	0.096
-50	0.654	-4	0.998	40	0.774	86	0.078
-49	0.667	-3	0.999	41	0.763	87	0.059
-48	0.680	-2	0.999	42	0.752	88	0.040
-47	0.693	-1	1.000	43	0.741	89	0.021
-46	0.705	0	1.000	44	0.729	90	0.000
-45	0.717			45	0.717		

S.O. 26440 Figure 4

VALIDATION OF TOTAL POWER GAIN CALCULATION

WEHM 92.9 MHz Manorville, NY

MODEL 6014-1/3-DA

Elevation Gain of Antenna 0.46

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

H RMS 0.727 V RMS 0.725 H/V Ratio 1.003

Elevation Gain of Horizontal Component 0.461

Elevation Gain of Vertical Component 0.459

Horizontal Azimuth Gain equals $1/(RMS)^2$. 1.892

Vertical Azimuth Gain equals $1/(RMS/Max\ Vert)^2$. 1.827

Max. Vertical 0.98

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

Total Horizontal Power Gain = **0.873**

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

Total Vertical Power Gain = **0.838**

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ERP divided by Horizontal Power Gain equals Antenna Input Power

3.1 KW ERP Equals **3.552** KW Antenna Input Power

Antenna Input Power times Vertical Power Gain equals Vertical ERP

3.552 KW Times 0.838 KW Equals 2.977 KW ERP

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

0.98 Equals 2.977 KW Vertical ERP

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