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S.O. 24512

Report of Test Scala 2 x YA7-V

for

LIVING PROOF, INC.

WWTE 90.1 MHz Wellfleet, MA

OBJECTIVE:

The objective of this test was to demonstrate the directional characteristics of a Scala 2 x YA7-V to meet the needs of WWTE and to comply with the requirements of the FCC construction permit, file number BMPED-20051026AAR.

RESULTS:

The measured azimuth pattern for the Scala 2 x YA7-V is shown in Figure 1. Figure 1A shows the Tabulation of the Vertical Polarization. The calculated elevation pattern of the antenna is shown in Figure 3. Construction permit file number BMPED-20051026AAR indicates that the Vertical radiation component shall not exceed 2.50 kW at any azimuth and is restricted to the following values at the azimuths specified:

040 Degrees T: 0.264 kW
220 Degrees T: 0.571 kW

From Figure 1, the maximum radiation of the Vertical component occurs at 150 Degrees T to 155 Degrees T and at 285 Degrees T to 290 Degrees T. At the restricted azimuth of 040 Degrees T the Vertical component is 11.37 dB down from the maximum of 2.50 kW, or 0.182 kW. At the restricted azimuth of 220 Degrees T the Vertical component is 8.179 dB down from the maximum of 2.50 kW, or 0.380 kW.

The R.M.S. of the Vertical component is 0.665. The total Vertical power gain is 2.342. See Figure 4 for calculations. The R.M.S. of the FCC composite pattern is 0.6974. The R.M.S. of the measured composite pattern is 0.665. Eighty-five percent (85%) of the original authorized FCC composite pattern is 0.5928. Therefore this pattern complies with the FCC requirement of 73.316(c)(2)(ix)(A).

METHOD OF DIRECTIONALIZATION:

The Scala 2 x YA7-V was mounted on a tower of exact scale to a Rohn G-10. The spacing and rotation of the antenna to the tower was varied to achieve the vertical azimuth pattern shown in Figure 1. See Figure 2 for mechanical details.

METHOD OF MEASUREMENT:

As allowed by the construction permit, file number BMPED-20051026AAR, a single level of the Scala 2 x YA7-V 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 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 405.45 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
Manager of RF Engineering
S/O 24512
January 20, 2006

Shively Labs

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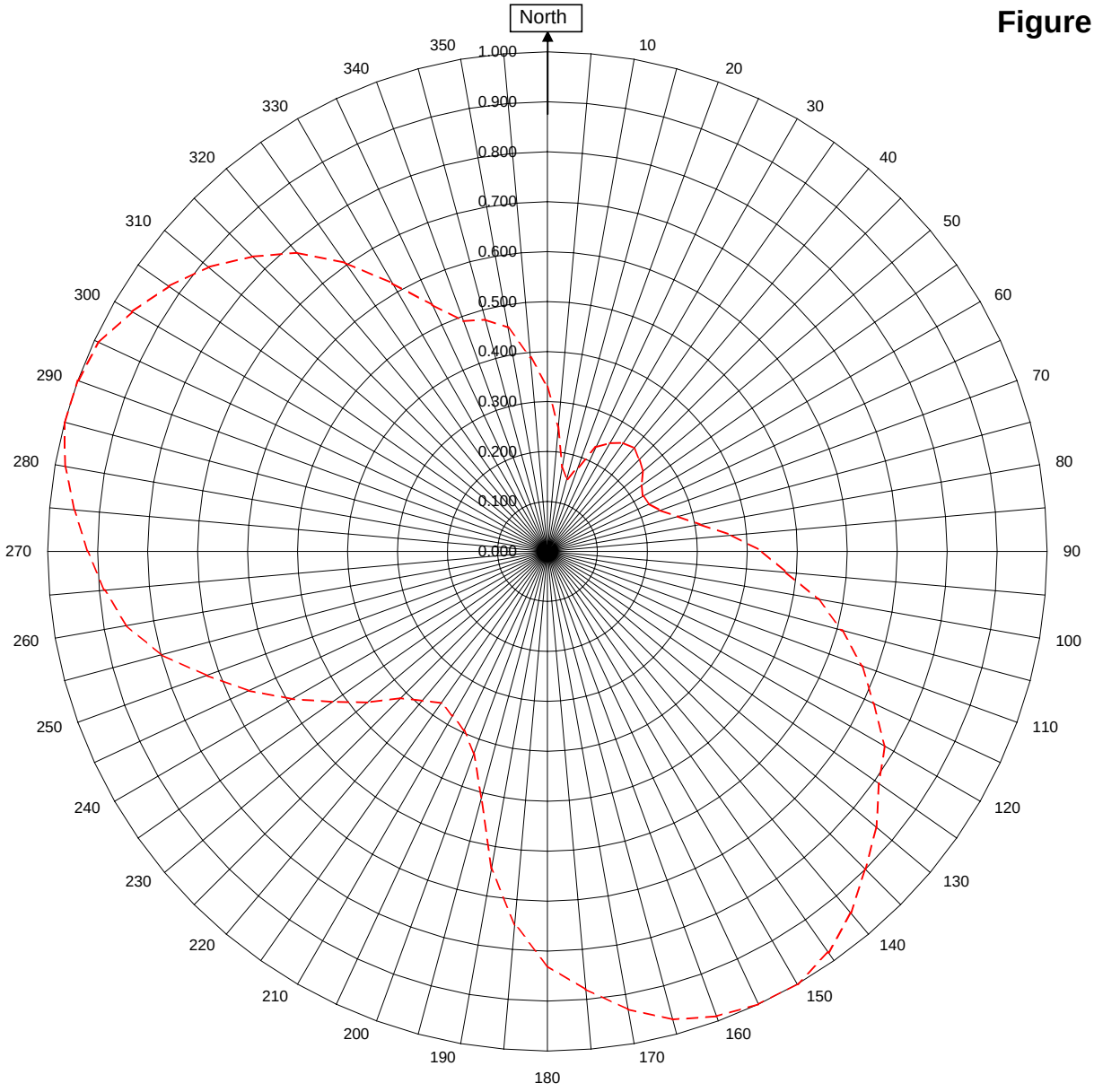
Figure 1



WWTE
Wellfleet, MA

24512

December 30, 2005

Horizontal RMS	0.000
Vertical RMS	0.665
H/V Composite RMS	0.665

Frequency	90.1 / 405.45 mHz
Plot	Relative Field
Scale	4.5 : 1

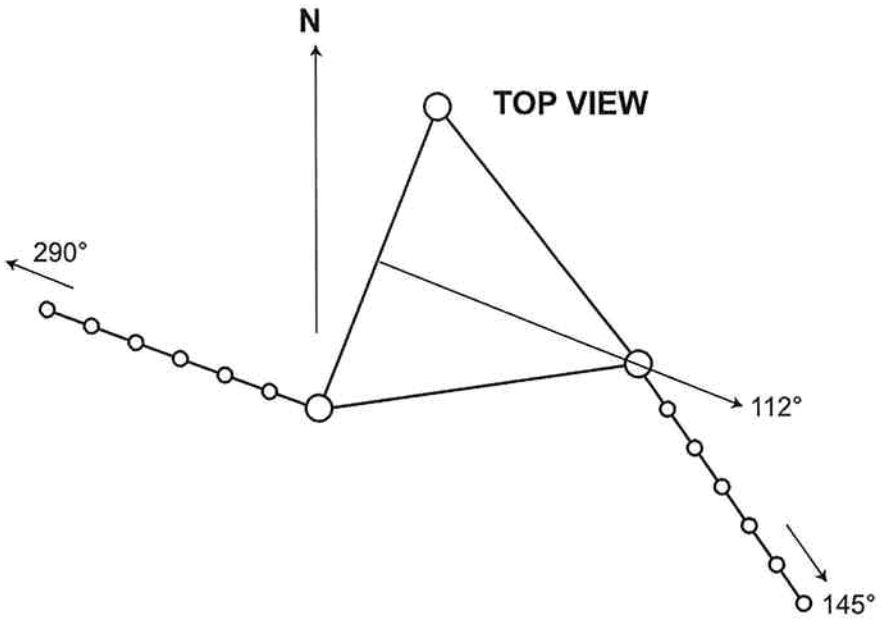
Antenna Model	Scala Yagi
Pattern Type	Directional Azimuth

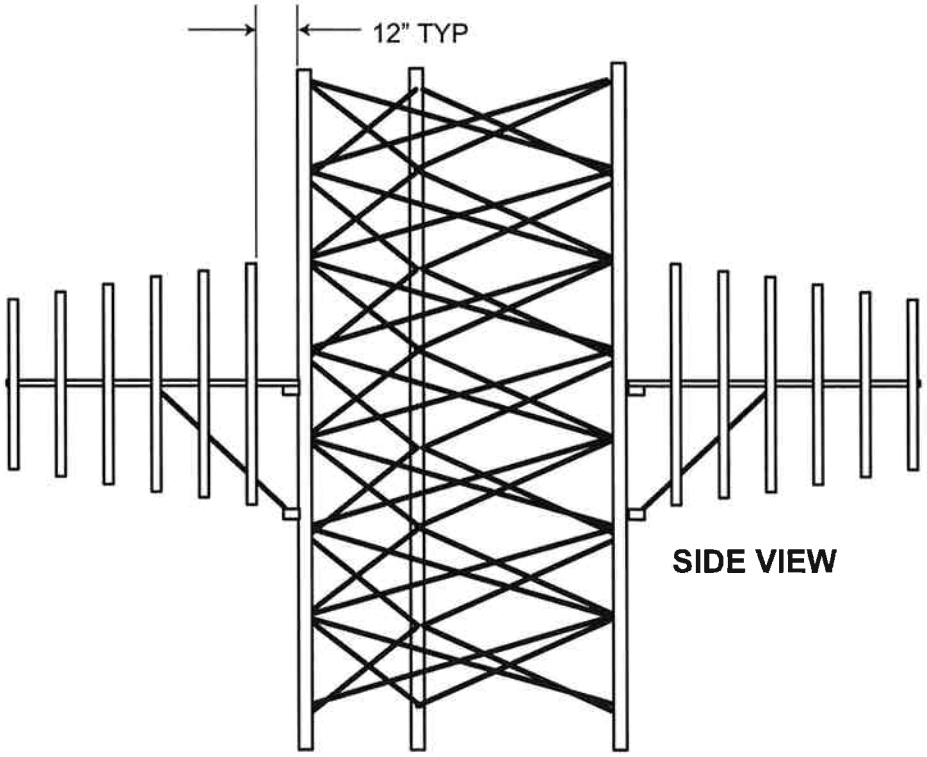
See Figure 2 for Mechanical Details

Figure 1a

Tabulation of Vertical Azimuth Pattern
WWTE Wellfleet, MA

Azimuth	Rel Field	Azimuth	Rel Field
0	0.330	180	0.830
10	0.170	190	0.645
20	0.180	200	0.430
30	0.250	210	0.380
40	0.270	220	0.390
45	0.260	225	0.415
50	0.250	230	0.470
60	0.220	240	0.590
70	0.240	250	0.725
80	0.310	260	0.855
90	0.430	270	0.920
100	0.550	280	0.980
110	0.670	290	1.000
120	0.780	300	0.960
130	0.860	310	0.885
135	0.900	315	0.835
140	0.945	320	0.780
150	1.000	330	0.620
160	0.990	340	0.490
170	0.931	350	0.455





SIDE VIEW

ROHN G-10 TOWER
SCALA YA7-V ANTENNAS

SHIVELY LABS			
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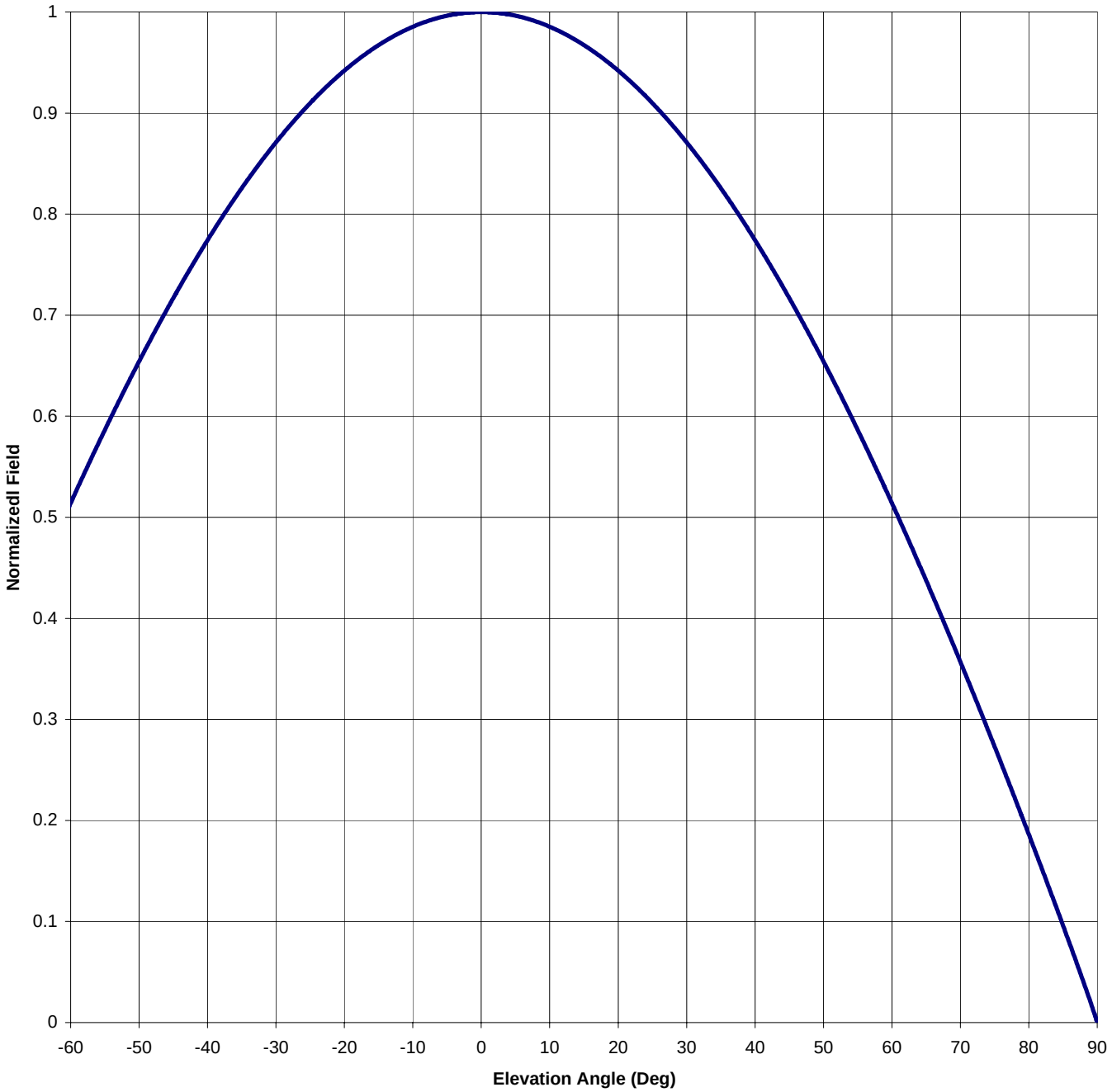
Figure 2 WWTE			
SIZE C	CODE IDENT NO. 22501	DRAWING NO. AGF051230-001	REV
SCALE NONE	G00339	SHEET 1 of 1	

Antenna Mfg.:	**Shively Labs**			**Date:**	**1/20/2006**
Antenna Type:	**Scala 2 x YA7-V Yagi**				
Station:	**WWTE**	**Beam Tilt**	**0**		
Frequency:	**90.1**	**Gain (Max)**	**2.342**	**3.696**	**dB**
Channel #:	**211**	**Gain (Horizon)**	**2.342**	**3.696**	**dB**
Figure:	**3**				



Antenna Mfg.: Shively Labs **Date:** 1/20/2006

Antenna Type: Scala 2 x YA7-V Yagi

Station: WWTE **Beam Tilt** 0

Frequency: 90.1 **Gain (Max)** 2.342 3.696 dB

Channel #: 211 **Gain (Horizon)** 2.342 3.696 dB

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	0.729	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		

FIGURE 4

S.O. 24512

VALIDATION OF GAIN CALCULATION

WWTE 90.1 MHz Wellfleet, MA

Scala 2 x YA7-V Yagi

Elevation Gain of **2 x YA7-V Yagi** equals 1.036

Vertical Azimuth Gain equals $1/(RMS)^2$
$1/(0.665)^2 = 2.261$

*** Total Vertical Gain is Elevation Gain times Azimuth Gain**
1.036 x 2.261 = 2.342

ERP divided by Vertical Gain equals Antenna Input Power
2.50 kW ÷ 2.342 = 1.067