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S.O. 29376

Report of Test Aldena ALP.08.02.712 Slant (45°)-DA

for

Western New Life, Inc.

WQML 98.7 MHz Culebra, PR

OBJECTIVE:

The objective of this test was to demonstrate the directional characteristics of a Aldena ALP.08.02.712 Slant (45°)-DA to meet the needs of WQML and to comply with the requirements of the FCC construction permit, file number BPH-20121205ADK. 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-20121205ADK indicates that the Horizontal radiation component shall not exceed 9.5 kW at any azimuth and is restricted to the following values at the azimuths specified:

010 to 150 Degrees T: 0.19 kilowatts

From Figure 1A, the maximum radiation of the Horizontal component occurs at 255 Degrees T to 272 Degrees T. At the restricted azimuth of 010 to 150 Degrees True the Horizontal component is 16.833 dB down from the maximum of 6.0 kW, or 0.124 kW

The R.M.S. of the Horizontal component is 0.416. The total Horizontal power gain is 3.190. The R.M.S. of the Vertical component is 0.414. The total Vertical power gain is 1.975. See Figure 4 for calculations. The R.M.S. of the FCC composite pattern is 0.547. The R.M.S. of the measured composite pattern is 0.467. Eighty-five percent (85%) of the original authorized FCC composite pattern is 0.465. Therefore this pattern complies with the FCC requirement of 73.316(c)(2)(ix)(A).

METHOD OF DIRECTIONALIZATION:

One bay of the Aldena ALP.08.02.712 Slant (45°)-DA was mounted on a pole of precise scale to the 3" Pipe at the WQML site. The spacing of the antenna to the tower was varied to achieve the horizontal and vertical patterns shown in Figure 1A. See Figure 2 for mechanical details.

METHOD OF MEASUREMENT:

As allowed by the construction permit, file number BPH-20121205ADK, a single level of the Aldena ALP.08.02.712 Slant (45°)-DA was set up on the Shively Labs 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

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 459.45 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 1A.

Respectfully submitted by:

Robert A. Surette
Director of Sales Engineering
S/O 29376
April 22, 2013

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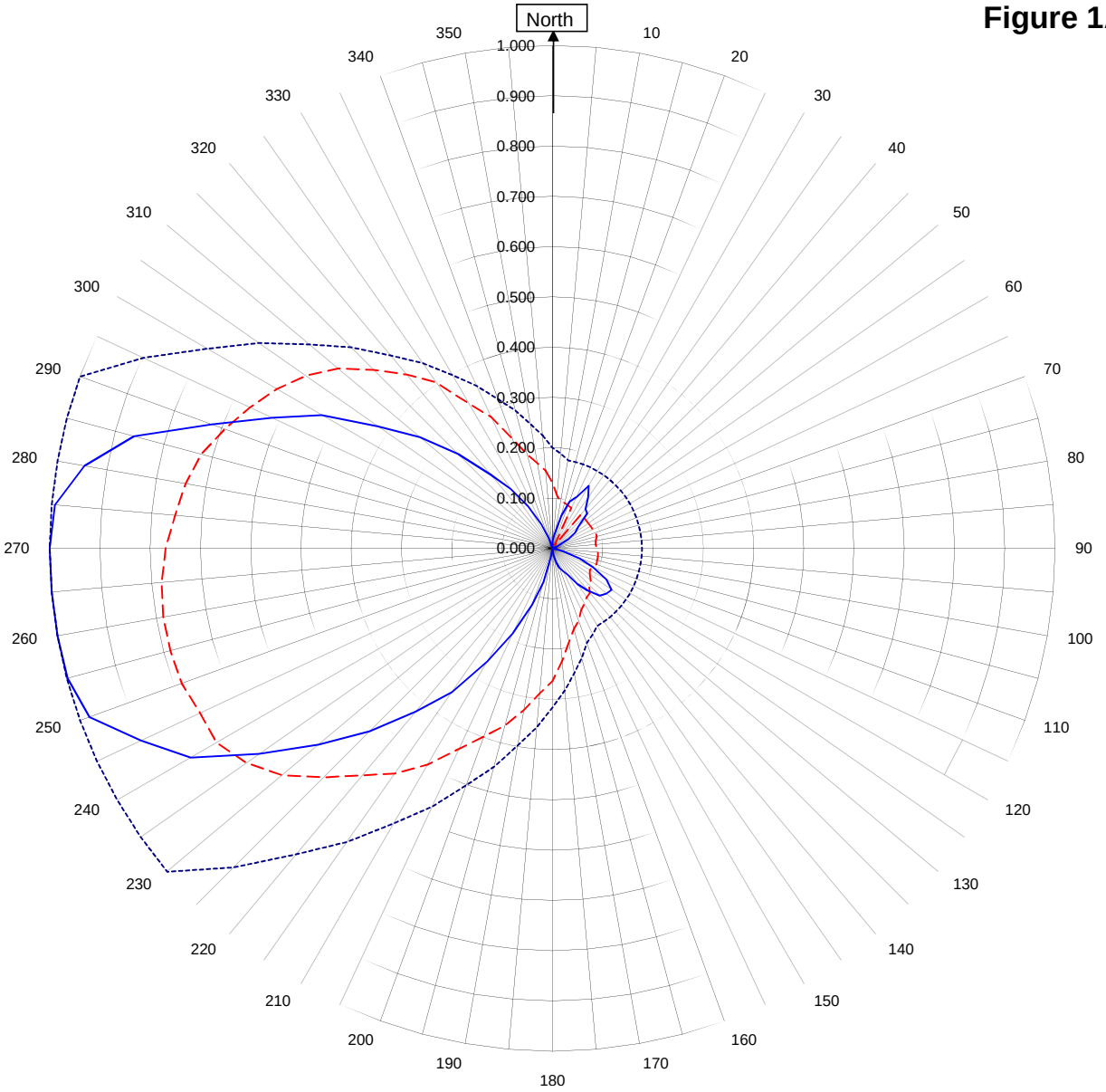
Figure 1A



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Horizontal RMS	0.416
Vertical RMS	0.414
H/V Composite RMS	0.467
FCC Composite RMS	0.547

Frequency	98.7 / 444.15 mHz
Plot	Relative Field
Scale	4.5 : 1
	See Figure 2 for Mechanical Details

Antenna Model	ALP.08.02.712 Slant (45°)-DA
Pattern Type	Directional Azimuth

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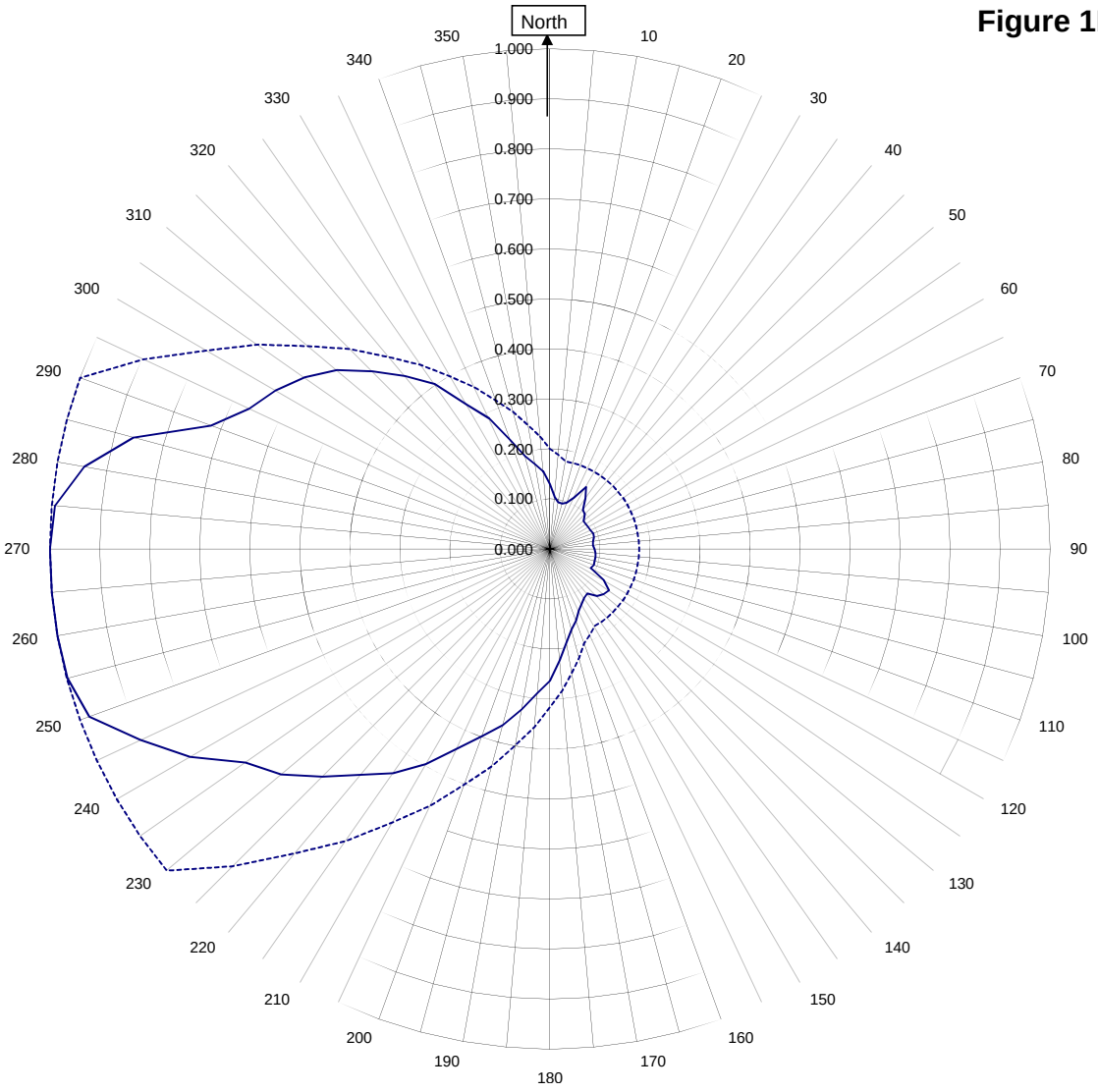
Figure 1B



WQML CULEBRA, PR.

29376

April 22, 2013

_____H/VComposite RMS	0.467
……FCC Composite RMS	0.547

Frequency	98.7 / 444.15 mHz
Plot	Relative Field
Scale	4.5 : 1
	See Figure 2 for Mechanical Details

Antenna Model	ALP.08.02.712 Slant (45°)-DA
Pattern Type	Directional H/V Composite

Figure 1C

Tabulation of Horizontal Azimuth Pattern
WQML CULEBRA, PR.

Azimuth	Rel Field	Azimuth	Rel Field
0	0.014	180	0.000
10	0.035	190	0.016
20	0.099	200	0.119
30	0.144	210	0.259
40	0.102	220	0.423
45	0.098	225	0.514
50	0.067	230	0.607
60	0.036	240	0.831
70	0.000	250	0.980
80	0.000	260	1.000
90	0.000	270	1.000
100	0.005	280	0.946
110	0.057	290	0.722
120	0.124	300	0.530
130	0.140	310	0.345
135	0.133	315	0.266
140	0.109	320	0.192
150	0.061	330	0.097
160	0.041	340	0.022
170	0.015	350	0.000

Figure 1D

Tabulation of Vertical Azimuth Pattern
WQML CULEBRA, PR.

Azimuth	Rel Field	Azimuth	Rel Field
0	0.130	180	0.264
10	0.095	190	0.326
20	0.091	200	0.398
30	0.009	210	0.497
40	0.088	220	0.589
45	0.088	225	0.644
50	0.087	230	0.702
60	0.088	240	0.772
70	0.092	250	0.785
80	0.087	260	0.786
90	0.089	270	0.770
100	0.092	280	0.742
110	0.093	290	0.694
120	0.086	300	0.634
130	0.099	310	0.556
135	0.102	315	0.502
140	0.116	320	0.451
150	0.127	330	0.333
160	0.153	340	0.232
170	0.189	350	0.172

Figure 1E

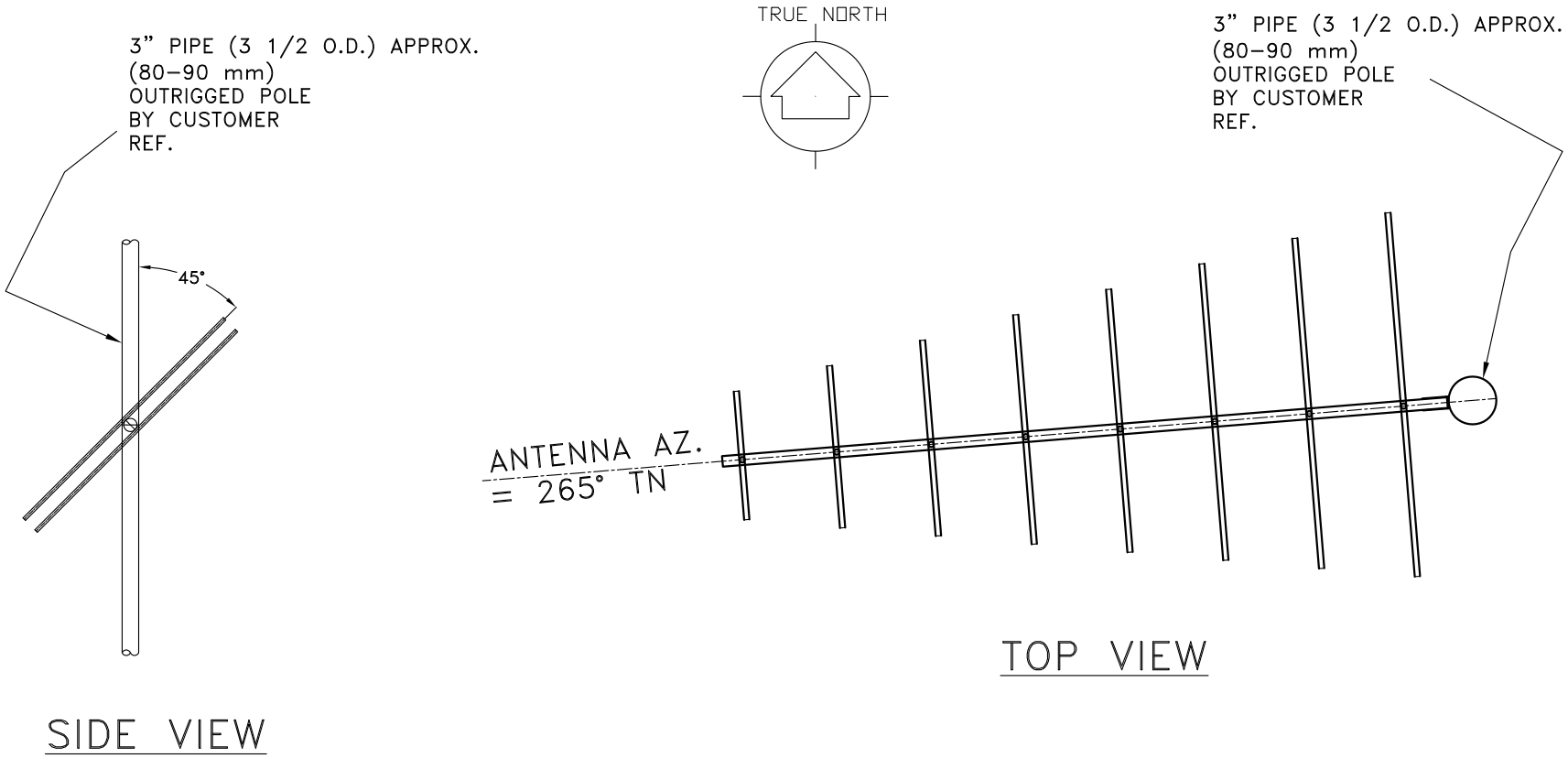
Tabulation of Composite Azimuth Pattern
WQML CULEBRA, PR.

Azimuth	Rel Field	Azimuth	Rel Field
0	0.130	180	0.264
10	0.095	190	0.326
20	0.099	200	0.398
30	0.144	210	0.497
40	0.102	220	0.589
45	0.098	225	0.644
50	0.087	230	0.702
60	0.088	240	0.831
70	0.092	250	0.980
80	0.087	260	1.000
90	0.089	270	1.000
100	0.092	280	0.946
110	0.093	290	0.722
120	0.124	300	0.634
130	0.140	310	0.556
135	0.133	315	0.502
140	0.116	320	0.451
150	0.127	330	0.333
160	0.153	340	0.232
170	0.189	350	0.172

Figure 1F

Tabulation of FCC Directional Composite
WQML CULEBRA, PR.

Azimuth	Rel Field	Azimuth	Rel Field
0	0.200	180	0.316
10	0.178	190	0.398
20	0.178	200	0.501
30	0.178	210	0.631
40	0.178	220	0.794
50	0.178	230	1.000
60	0.178	240	1.000
70	0.178	250	1.000
80	0.178	260	1.000
90	0.178	270	1.000
100	0.178	280	1.000
110	0.178	290	1.000
120	0.178	300	0.794
130	0.178	310	0.631
140	0.178	320	0.501
150	0.178	330	0.398
160	0.200	340	0.316
170	0.251	350	0.251



ANTENNA HEADING 265° TRUE NORTH

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SHOP ORDER:	FREQUENCY:	SCALE:	DRAWN BY:
30711	102.1	N.T.S.	DAB
			APPROVED BY: RAS

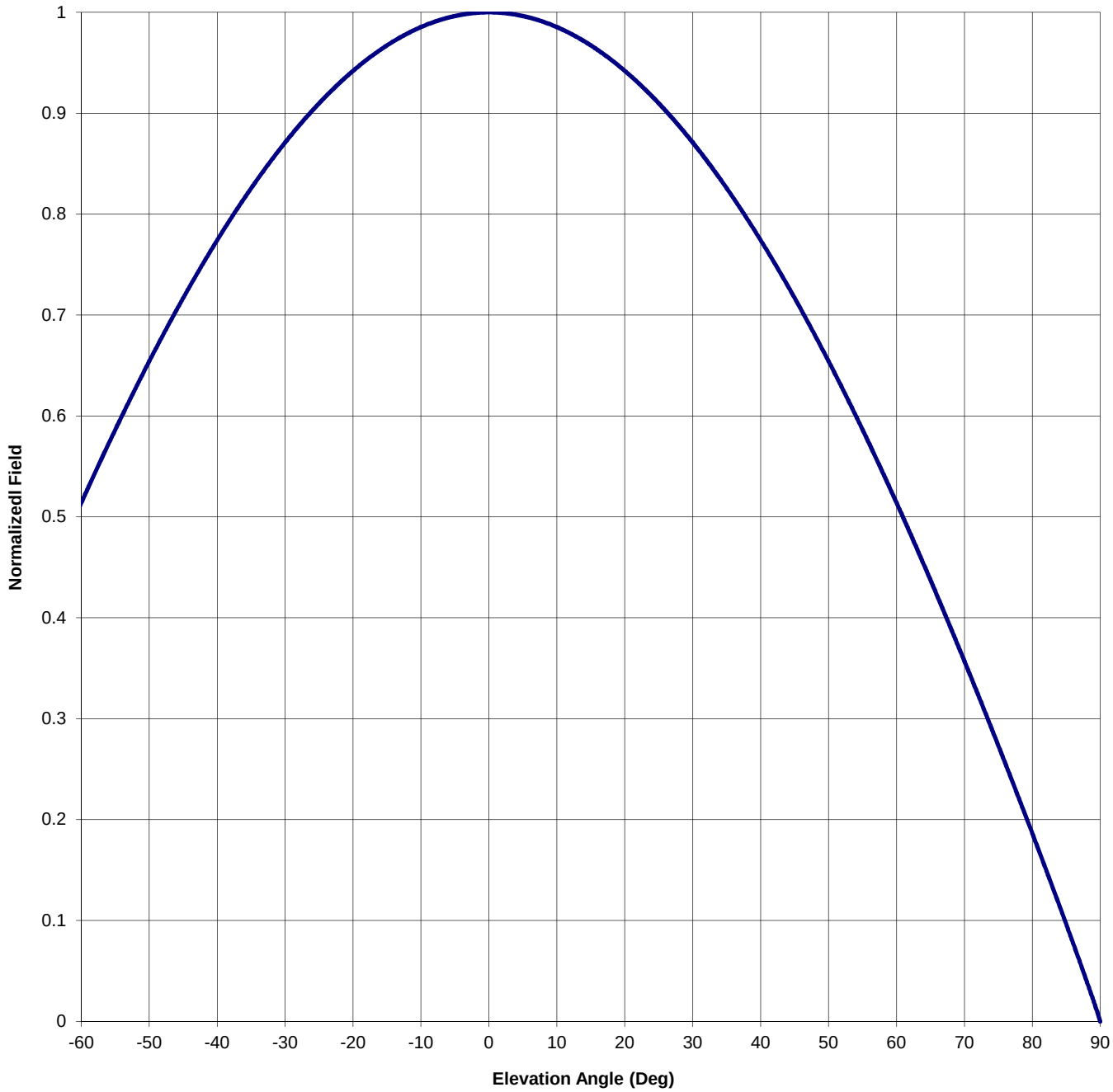
TITLE:

ALDENA ALP.08.02.712
WQML, CULEBRA, P.R.

DATE: 4/22/13

FIGURE 2

Antenna Mfg.:	**Shively Labs**				**Date: 4/22/2013**
Antenna Type:	**ALP.08.02 Slant (45°)-DA**				
Station:	**WQML**	**Beam Tilt**	**0**		
Frequency:	**98.7**	**Gain (Max)**	**3.190**	**5.037 dB**	
Channel #:	**254**	**Gain (Horizon)**	**3.190**	**5.037 dB**	
Figure:	**Figure 3**				



Antenna Mfg.: Shively Labs **Date:** 4/22/2013

Antenna Type: ALP.08.02 Slant (45°)-DA

Station: WQML **Beam Tilt** 0

Frequency: 98.7 **Gain (Max)** 3.190 5.037 dB

Channel #: 254 **Gain (Horizon)** 3.190 5.037 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	0.729	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. 29376 Figure 4

VALIDATION OF TOTAL POWER GAIN CALCULATION

WQML	CULEBRA, PR.
MODEL	ALP.08.02.712 Slant (45°)-DA

Elevation Gain of Antenna 0.55

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

H RMS 0.416276 V RMS 0.414246 H/V Ratio 1.005

Elevation Gain of Horizontal Component 0.553

Elevation Gain of Vertical Component 0.547

Horizontal Azimuth Gain equals $1/(RMS)^2$. 5.771

Vertical Azimuth Gain equals $1/(RMS/Max\ Vert)^2$. 3.609

Max. Vertical 0.787

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

Total Horizontal Power Gain = **3.190**

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

Total Vertical Power Gain = **1.975**

==========

ERP divided by Horizontal Power Gain equals Antenna Input Power

6 kW ERP Divided by H Gain 3.190 equals 1.881 kW H Antenna Input Power

Antenna Input Power times Vertical Power Gain equals Vertical ERP

1.881 kW Times V Gain 1.975 equals 3.716 kW V ERP

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

(0.787)^2 Times 6.00 Equals 3.716 kW Vertical ERP

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