

Miami Master Directional Antenna System

August 12, 2013

Electronics Research Inc. is providing a custom fabricated multi-station directional antenna system that is specially designed to meet the FCC requirements and the general needs of ten radio stations in the Miami, Florida area.

The antenna is the ERI model COG1184-8CP-DA configuration. The circular polarized system consists of eight 100" spaced bays using four driven circular polarized radiating elements per bay. The antenna was tested on a 48" rhombus tower, which is the structure planed to use to support the array. All tests were performed at each of the 10 station's carrier frequencies.

The FM stations that will be transmitting from this directional antenna are WFEZ @ 93.1 MHz, WPOW @ 96.5 MHz, WFLC @ 97.3 MHz, WEDR @ 99.1 MHz, WKIS @ 99.9 MHz, WLYF @ 101.5 MHz, WAXY @ 104.3 MHz, WHQT @ 105.1 MHz, WBBG @ 105.9Mhz and WRMA @ 106.7 MHz.

DESCRIPTION OF THE TEST PROCEDURE

The test antenna consisted of one bay level of the circular polarized system. The elements and brackets that were used in this test are electrically equivalent to those that will be supplied with the antenna. The lines were properly grounded during all tests.

The power distribution and phase relationship to the antenna elements was adjusted in order to achieve the directional radiation patterns for both horizontal and vertical polarization components.

Miami Master Directional Antenna System

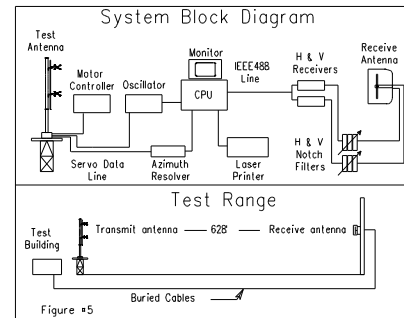
(Continued)

The proof-of-performance was accomplished using a 48" rhombus tower with identical dimension and configuration including all braces, ladders, conduits, coaxial lines and other appurtenances that will be included in the actual aperture at which the antenna will be installed. The structure was erected vertically on a turntable mounted on a non-metallic building with the antenna centered vertically on the structure, making the center of radiation of the test approximately 30 feet above ground. The turntable is equipped with a motor drive and azimuth indicating mechanism, resolution of this azimuth-measuring device is one-tenth of a degree.

The antenna under test was operated in the transmitting mode and fed from a HP8657D signal generator. The frequency of the signal source was set at each station's carrier frequency and was constantly monitored by a Rohde & Schwarz ESVD measuring receiver.

A broadband horizontal and vertical dipole system, located approximately 628 feet from the test antenna, was used to receive the emitted test signals. The dipole system was mounted at the same height above terrain as the center of the antenna under test. The signals received by the dipole system were fed to the test building by way of two buried Heliax cables to a Rohde & Schwarz ESVD measuring receiver. This data was interfaced to a laser jet printer by means of a computer system. Relative field strength was plotted as a function of azimuth.

The measurements were performed by rotating the test antenna in a counter-clockwise direction and plotting the received signal on polar coordinated graph paper in a clockwise direction. Both horizontal and vertical components for each of the 10 stations were recorded separately.

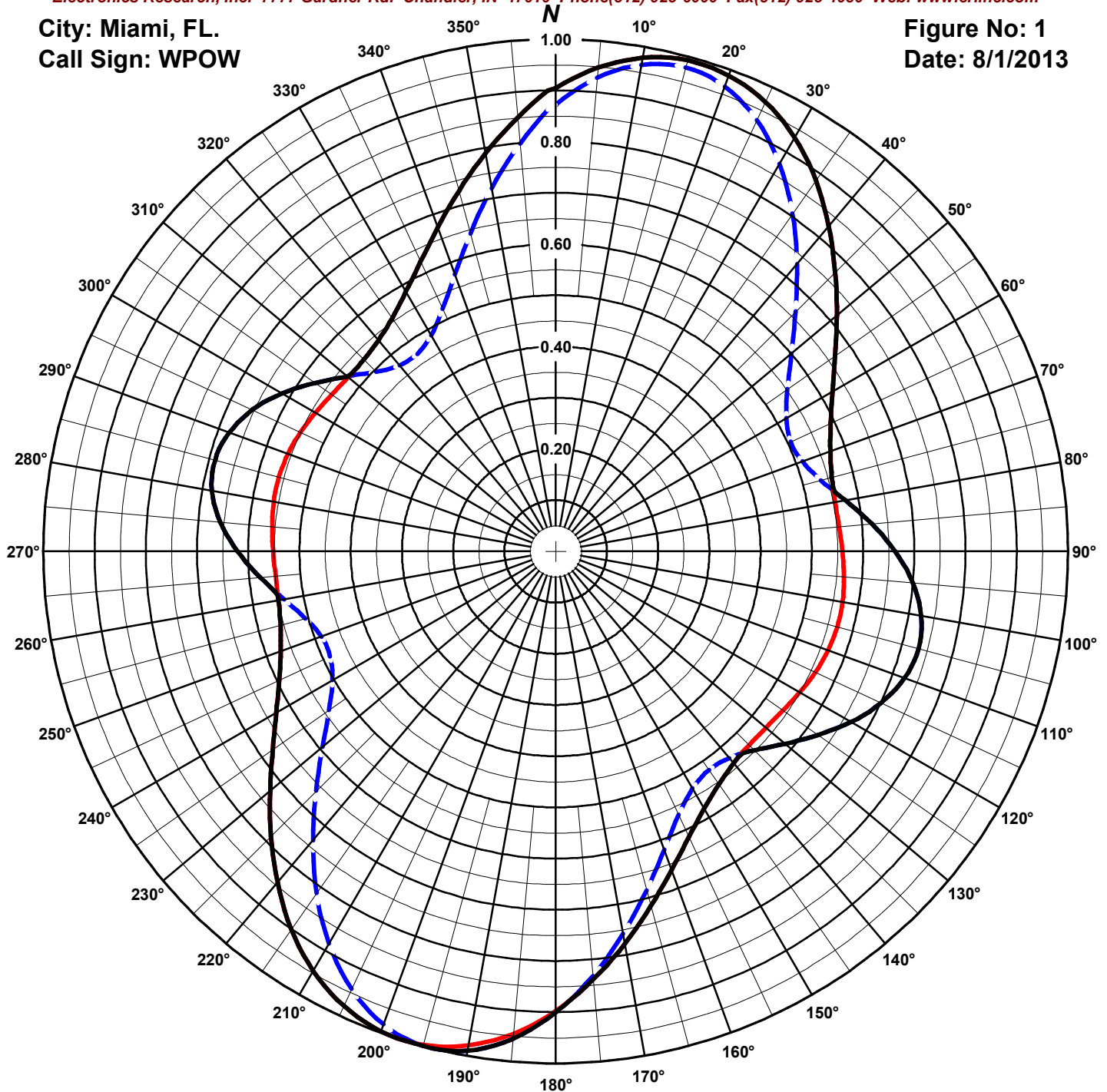


ERI[®] Horizontal Plane Relative Field Pattern

Electronics Research, Inc. 7777 Gardner Rd. Chandler, IN 47610 Phone(812) 925-6000 Fax(812) 925-4030 Web: www.eriinc.com

City: Miami, FL.
Call Sign: WPOW

Figure No: 1
Date: 8/1/2013



Antenna Orientation: 14° True

Frequency: 96.5 MHz

Antenna Type: COG1184-8CP-2-DA

Antenna Mounting: Custom

Tower Type: 48" Rhombus

HORIZONTAL

RMS: .711

Maximum: 1 @ 197°

Minimum: .528 @ 312°

VERTICAL

RMS: .696

Maximum: 1 @ 194°

Minimum: .47 @ 323°

COMPOSITE

RMS: .735

Maximum: 1 @ 194°

Minimum: .528 @ 312°

FCC ENVELOPE

RMS: 0

Maximum: 0 @ 0°

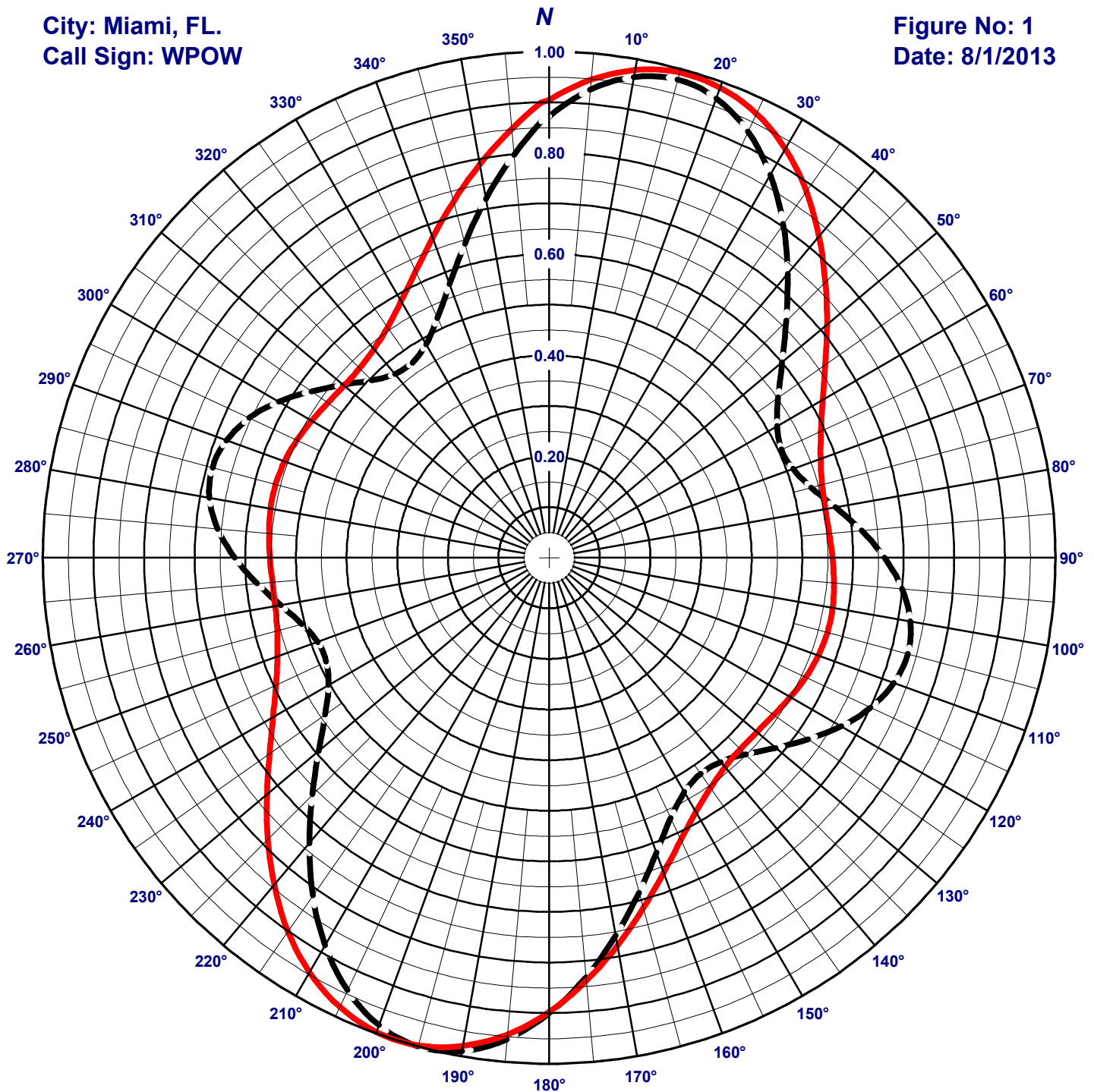
Minimum: 0 @ 230°

Composite maximum of either the horizontal or vertical components.

ERI[®] Horizontal Plane Relative Field Pattern

City: Miami, FL.
Call Sign: WPOW

Figure No: 1
Date: 8/1/2013



Frequency: 96.5 MHz
Antenna Type: COG1184-8CP-2-DA
Antenna Orientation: 14° True
Antenna Mounting: Custom
Tower Type 48" Rhombus

VERTICAL
RMS: .696
Maximum: 1 @ 194°
Minimum: .47 @ 323°

HORIZONTAL
RMS: .711
Maximum: 1 @ 197°
Minimum: .528 @ 312°

Measured patterns of the horizontal and vertical components. Two-bay test.

ERI[®] Horizontal Plane Relative Field Pattern

Electronics Research, Inc. 7777 Gardner Rd. Chandler, IN 47610 Phone(812) 925-6000 Fax(812) 925-4030 Web: www.eriinc.com

Figure# 1

Date: 8/1/2013

Station: WPOW

Antenna: COG1184-8CP-2-DA

Location: Miami, FL.

Antenna Orientation: 14° True

Frequency: 96.5 MHz

Number of Bays: 8

Azimuth	Envelope			Polarization	Azimuth	Envelope			Polarization
	Field	kW	dBk			Field	kW	dBk	
0°	0.904	81.790	19.127	Horizontal	180°	0.900	81.077	19.089	Vertical
5°	0.948	89.876	19.536	Horizontal	185°	0.955	91.267	19.603	Vertical
10°	0.978	95.720	19.810	Horizontal	190°	0.990	98.070	19.915	Vertical
15°	0.993	98.510	19.935	Horizontal	195°	1.000	99.948	19.998	Vertical
20°	0.988	97.698	19.899	Horizontal	200°	0.998	99.505	19.978	Horizontal
25°	0.969	93.808	19.722	Horizontal	205°	0.979	95.832	19.815	Horizontal
30°	0.933	87.025	19.396	Horizontal	210°	0.946	89.513	19.519	Horizontal
35°	0.885	78.333	18.939	Horizontal	215°	0.900	80.968	19.083	Horizontal
40°	0.829	68.742	18.372	Horizontal	220°	0.845	71.334	18.533	Horizontal
45°	0.771	59.489	17.744	Horizontal	225°	0.786	61.790	17.909	Horizontal
50°	0.717	51.346	17.105	Horizontal	230°	0.727	52.909	17.235	Horizontal
55°	0.666	44.316	16.466	Horizontal	235°	0.674	45.430	16.573	Horizontal
60°	0.624	38.891	15.898	Horizontal	240°	0.630	39.647	15.982	Horizontal
65°	0.592	35.087	15.451	Horizontal	245°	0.595	35.436	15.494	Horizontal
70°	0.571	32.563	15.127	Horizontal	250°	0.571	32.591	15.131	Horizontal
75°	0.558	31.138	14.933	Horizontal	255°	0.556	30.909	14.901	Horizontal
80°	0.574	32.916	15.174	Vertical	260°	0.549	30.173	14.796	Horizontal
85°	0.619	38.338	15.836	Vertical	265°	0.579	33.571	15.260	Vertical
90°	0.662	43.876	16.422	Vertical	270°	0.621	38.558	15.861	Vertical
95°	0.700	48.936	16.896	Vertical	275°	0.657	43.158	16.351	Vertical
100°	0.724	52.413	17.194	Vertical	280°	0.681	46.422	16.667	Vertical
105°	0.733	53.793	17.307	Vertical	285°	0.688	47.381	16.756	Vertical
110°	0.724	52.459	17.198	Vertical	290°	0.678	45.951	16.623	Vertical
115°	0.701	49.093	16.910	Vertical	295°	0.653	42.690	16.303	Vertical
120°	0.666	44.380	16.472	Vertical	300°	0.617	38.045	15.803	Vertical
125°	0.625	39.061	15.917	Vertical	305°	0.573	32.876	15.169	Vertical
130°	0.585	34.168	15.336	Vertical	310°	0.531	28.223	14.506	Vertical
135°	0.549	30.161	14.794	Vertical	315°	0.530	28.040	14.478	Horizontal
140°	0.540	29.182	14.651	Horizontal	320°	0.538	28.962	14.618	Horizontal
145°	0.555	30.828	14.889	Horizontal	325°	0.556	30.948	14.906	Horizontal
150°	0.580	33.629	15.267	Horizontal	330°	0.585	34.209	15.341	Horizontal
155°	0.615	37.858	15.782	Horizontal	335°	0.624	38.910	15.901	Horizontal
160°	0.662	43.830	16.418	Horizontal	340°	0.673	45.266	16.558	Horizontal
165°	0.717	51.447	17.114	Horizontal	345°	0.729	53.150	17.255	Horizontal
170°	0.778	60.545	17.821	Horizontal	350°	0.789	62.277	17.943	Horizontal
175°	0.839	70.471	18.480	Horizontal	355°	0.850	72.242	18.588	Horizontal

Horizontal Polarization:

Maximum: 7.426 (8.707 dB)

Horizontal Plane: 7.310 (8.639 dB)

Maximum ERP: 100.000 kW

Vertical Polarization:

Maximum: 7.426 (8.707 dB)

Horizontal Plane: 7.310 (8.639 dB)

Maximum ERP: 100.000 kW

Total Input Power: 13.467 kW

Reference: WPOW1 A.FIG

This list shows the the maximum azimuth values of either the horizontal or vertical components.

ERI[®] Horizontal Plane Relative Field Pattern

Electronics Research, Inc. 7777 Gardner Rd. Chandler, IN 47610 Phone(812) 925-6000 Fax(812) 925-4030 Web: www.eriinc.com

Figure# 1A

Date: 8/1/2013

Station: WPOW

Antenna: COG1184-8CP-2-DA

Location: Miami, FL.

Antenna Orientation: 14° True

Frequency: 96.5 MHz

Number of Bays: 8

Azimuth	Horizontal			Vertical			Azimuth	Horizontal			Vertical		
	Field	kW	dBk	Field	kW	dBk		Field	kW	dBk	Field	kW	dBk
0°	0.904	81.790	19.127	0.872	76.009	18.809	180°	0.898	80.572	19.062	0.900	81.077	19.089
5°	0.948	89.876	19.536	0.928	86.190	19.355	185°	0.946	89.436	19.515	0.955	91.267	19.603
10°	0.978	95.720	19.810	0.965	93.029	19.686	190°	0.979	95.933	19.820	0.990	98.070	19.915
15°	0.993	98.510	19.935	0.978	95.702	19.809	195°	0.998	99.556	19.981	1.000	99.948	19.998
20°	0.988	97.698	19.899	0.966	93.263	19.697	200°	0.998	99.505	19.978	0.983	96.652	19.852
25°	0.969	93.808	19.722	0.929	86.362	19.363	205°	0.979	95.832	19.815	0.943	88.908	19.489
30°	0.933	87.025	19.396	0.873	76.246	18.822	210°	0.946	89.513	19.519	0.885	78.269	18.936
35°	0.885	78.333	18.939	0.806	64.927	18.124	215°	0.900	80.968	19.083	0.814	66.304	18.215
40°	0.829	68.742	18.372	0.733	53.676	17.298	220°	0.845	71.334	18.533	0.737	54.259	17.345
45°	0.771	59.489	17.744	0.662	43.851	16.420	225°	0.786	61.790	17.909	0.661	43.690	16.404
50°	0.717	51.346	17.105	0.601	36.068	15.571	230°	0.727	52.909	17.235	0.594	35.246	15.471
55°	0.666	44.316	16.466	0.552	30.512	14.845	235°	0.674	45.430	16.573	0.540	29.145	14.646
60°	0.624	38.891	15.898	0.520	27.022	14.317	240°	0.630	39.647	15.982	0.503	25.314	14.034
65°	0.592	35.087	15.451	0.506	25.619	14.086	245°	0.595	35.436	15.494	0.486	23.604	13.730
70°	0.571	32.563	15.127	0.513	26.270	14.195	250°	0.571	32.591	15.131	0.487	23.669	13.742
75°	0.558	31.138	14.933	0.536	28.722	14.582	255°	0.556	30.909	14.901	0.506	25.593	14.081
80°	0.554	30.680	14.869	0.574	32.916	15.174	260°	0.549	30.173	14.796	0.539	29.013	14.626
85°	0.555	30.858	14.894	0.619	38.338	15.836	265°	0.549	30.098	14.785	0.579	33.571	15.260
90°	0.560	31.326	14.959	0.662	43.876	16.422	270°	0.551	30.410	14.830	0.621	38.558	15.861
95°	0.565	31.911	15.039	0.700	48.936	16.896	275°	0.555	30.840	14.891	0.657	43.158	16.351
100°	0.569	32.330	15.096	0.724	52.413	17.194	280°	0.559	31.198	14.941	0.681	46.422	16.667
105°	0.569	32.373	15.102	0.733	53.793	17.307	285°	0.559	31.279	14.953	0.688	47.381	16.756
110°	0.566	32.010	15.053	0.724	52.459	17.198	290°	0.556	30.911	14.901	0.678	45.951	16.623
115°	0.559	31.266	14.951	0.701	49.093	16.910	295°	0.549	30.182	14.798	0.653	42.690	16.303
120°	0.550	30.289	14.813	0.666	44.380	16.472	300°	0.541	29.289	14.667	0.617	38.045	15.803
125°	0.542	29.329	14.673	0.625	39.061	15.917	305°	0.533	28.452	14.541	0.573	32.876	15.169
130°	0.536	28.701	14.579	0.585	34.168	15.336	310°	0.529	27.944	14.463	0.531	28.223	14.506
135°	0.534	28.542	14.555	0.549	30.161	14.794	315°	0.530	28.040	14.478	0.496	24.589	13.907
140°	0.540	29.182	14.651	0.527	27.758	14.434	320°	0.538	28.962	14.618	0.474	22.466	13.515
145°	0.555	30.828	14.889	0.522	27.204	14.346	325°	0.556	30.948	14.906	0.471	22.169	13.458
150°	0.580	33.629	15.267	0.534	28.569	14.559	330°	0.585	34.209	15.341	0.486	23.655	13.739
155°	0.615	37.858	15.782	0.568	32.262	15.087	335°	0.624	38.910	15.901	0.522	27.283	14.359
160°	0.662	43.830	16.418	0.620	38.408	15.844	340°	0.673	45.266	16.558	0.575	33.099	15.198
165°	0.717	51.447	17.114	0.685	46.977	16.719	345°	0.729	53.150	17.255	0.643	41.320	16.162
170°	0.778	60.545	17.821	0.758	57.430	17.591	350°	0.789	62.277	17.943	0.720	51.831	17.146
175°	0.839	70.471	18.480	0.833	69.340	18.410	355°	0.850	72.242	18.588	0.799	63.899	18.055

Horizontal Polarization:

Maximum: 7.426 (8.707 dB)

Horizontal Plane: 7.310 (8.639 dB)

Maximum ERP: 100.000 kW

Vertical Polarization:

Maximum: 7.426 (8.707 dB)

Horizontal Plane: 7.310 (8.639 dB)

Maximum ERP: 100.000 kW

Total Input Power: 13.467 kW

Reference: WPOW1 A.FIG

This list shows the azimuth values for the horizontal and vertical components.

ELECTRONICS RESEARCH, INC.
7777 GARDNER ROAD
CHANDLER, IN. 47610

FIGURE 2

-----THEORETICAL-----
VERTICAL PLANE RELATIVE FIELD

8 LEVELS OF ERI PANEL ELEMENTS
-.60 DEGREE(S) BEAM TILT
10 PERCENT FIRST NULL FILL

AUGUST 1, 2013

96.5 MHz.

BAY SPACING:
100.000 INCHES

