

## ***Miami Master Directional Antenna System***

August 4, 2003

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 1084-8CP-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 WPMY @ 93.1 MHz, WLVE @ 93.9 MHZ, WMGE @ 94.9 MHz, WPOW @ 96.5 MHz, WFLC @ 97.3 MHz, WHYI-FM @ 100.7 MHz, WMXJ @ 102.7 MHz, WMIB @ 103.5 MHz, WHQT @ 105.1Mhz and WAMR @ 107.5 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*

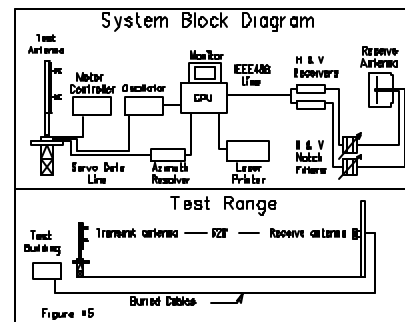
(Continued)

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 Wavetek Model 3000 signal generator. The frequency of the signal source was set at each station's carrier frequency and was constantly monitored by an Anritsu Model ML521B measuring receiver.

A broad-band 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 an Anritsu Model ML521B measuring receiver. This data was interfaced to a Hewlett-Packard Laser Jet 4P printer by means of a Pentium 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.

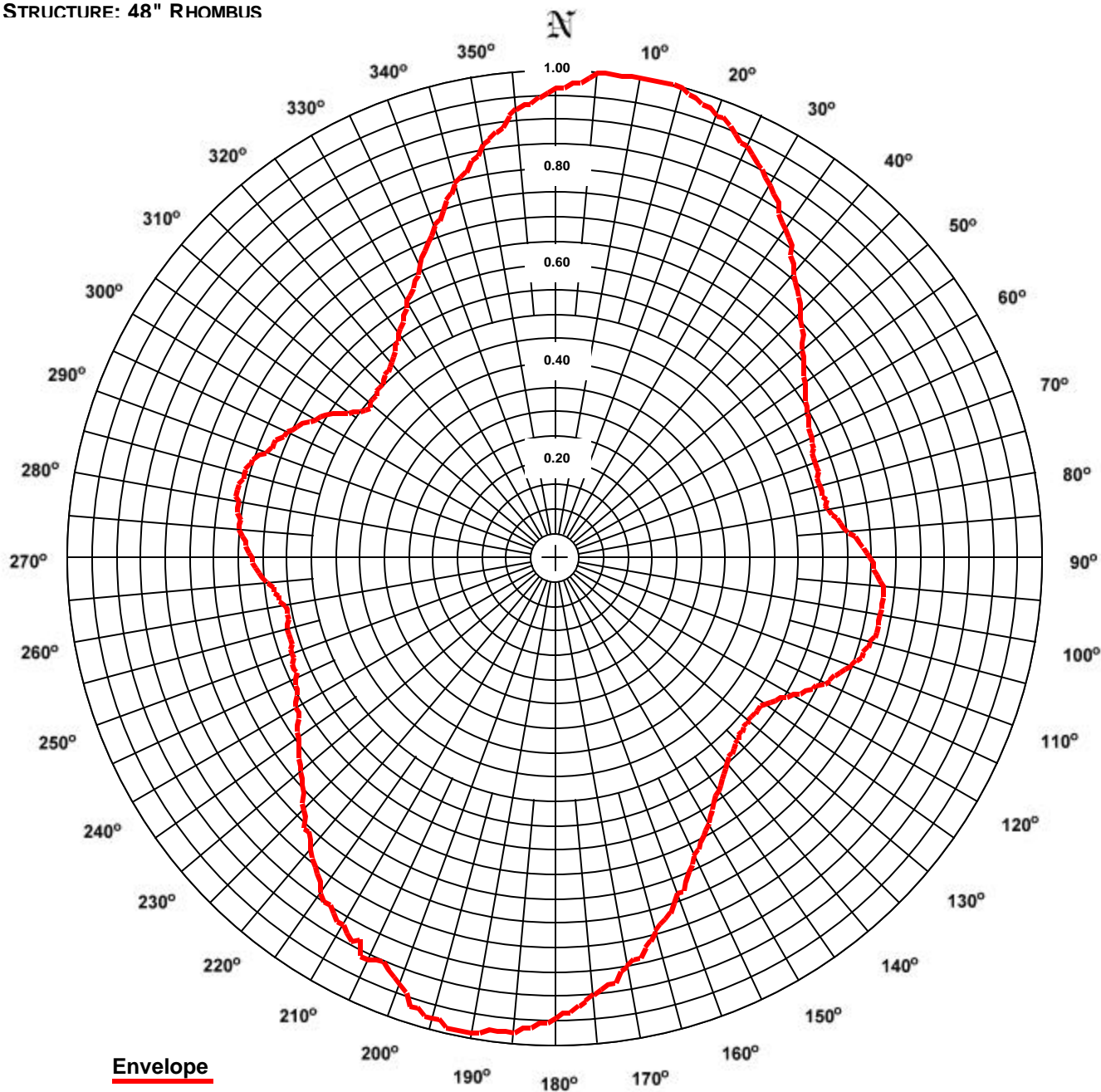


# **ERI**® *Horizontal Plane Relative Field Pattern*

Electronics Research, Inc. 7777 Gardner Rd. Chandler, In 47610 Phone (812) 925-6000 Fax (812) 925-4030 <http://www.eriinc.com/>

FIGURE: 1  
STATION: WHYI  
LOCATION: FORT LAUDERDALE, FL.  
ANTENNA TYPE: 1084-8CP-DA  
STRUCTURE: 48" RHOMBUS

DATE: 07/28/2003  
FREQUENCY: 100.7 MHz  
ORIENTATION: 10° TRUE  
MOUNTING: CUSTOM



RMS: 0.724  
Maximum: 1.000 @ 5° True  
Minimum: 0.490 @ 309° True

COMMENTS: COMPOSITE MAXIMUM OF EITHER THE H OR V COMPONENTS.

# ERI<sup>®</sup> Horizontal Plane Relative Field List

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**Station: WHYI**

**Location: Fort Lauderdale, FL.**

**Frequency: 100.7 MHz**

**Antenna: 1084-8CP-DA**

**Orientation: 10° True**

**Tower: 48" Rhombus**

**Figure: 1**

**Date: 07/28/2003**

**Reference: whyilr.fig**

Angle	Envelope			Polarization	Angle	Envelope			Polarization
	Field	kW	dBk			Field	kW	dBk	
0°	0.966	93.33	19.70	Horizontal	180°	0.944	89.13	19.50	Horizontal
5°	1.000	100.00	20.00	Horizontal	185°	0.977	95.50	19.80	Horizontal
10°	1.000	100.00	20.00	Horizontal	190°	0.989	97.72	19.90	Horizontal
15°	1.000	100.00	20.00	Horizontal	195°	0.977	95.50	19.80	Horizontal
20°	0.966	93.33	19.70	Horizontal	200°	0.933	87.10	19.40	Horizontal
25°	0.933	87.10	19.40	Horizontal	205°	0.912	83.18	19.20	Horizontal
30°	0.881	77.62	18.90	Horizontal	210°	0.871	75.86	18.80	Horizontal
35°	0.822	67.61	18.30	Horizontal	215°	0.841	70.79	18.50	Horizontal
40°	0.759	57.54	17.60	Horizontal	220°	0.785	61.66	17.90	Horizontal
45°	0.708	50.12	17.00	Horizontal	225°	0.733	53.70	17.30	Horizontal
50°	0.661	43.65	16.40	Horizontal	230°	0.684	46.77	16.70	Horizontal
55°	0.624	38.90	15.90	Horizontal	235°	0.646	41.69	16.20	Horizontal
60°	0.596	35.48	15.50	Horizontal	240°	0.617	38.02	15.80	Horizontal
65°	0.582	33.88	15.30	Horizontal	245°	0.589	34.67	15.40	Horizontal
70°	0.569	32.36	15.10	Horizontal	250°	0.575	33.11	15.20	Horizontal
75°	0.562	31.62	15.00	Horizontal	255°	0.569	32.36	15.10	Horizontal
80°	0.569	32.36	15.10	Horizontal	260°	0.562	31.62	15.00	Horizontal
85°	0.603	36.31	15.60	Vertical	265°	0.596	35.48	15.50	Vertical
90°	0.646	41.69	16.20	Vertical	270°	0.624	38.90	15.90	Vertical
95°	0.676	45.71	16.60	Vertical	275°	0.653	42.66	16.30	Vertical
100°	0.676	45.71	16.60	Vertical	280°	0.661	43.65	16.40	Vertical
105°	0.668	44.67	16.50	Vertical	285°	0.661	43.65	16.40	Vertical
110°	0.646	41.69	16.20	Vertical	290°	0.631	39.81	16.00	Vertical
115°	0.610	37.15	15.70	Vertical	295°	0.610	37.15	15.70	Vertical
120°	0.562	31.62	15.00	Vertical	300°	0.569	32.36	15.10	Vertical
125°	0.525	27.54	14.40	Vertical	305°	0.519	26.92	14.30	Vertical
130°	0.519	26.92	14.30	Horizontal	310°	0.495	24.55	13.90	Horizontal
135°	0.531	28.18	14.50	Horizontal	315°	0.501	25.12	14.00	Horizontal
140°	0.550	30.20	14.80	Horizontal	320°	0.525	27.54	14.40	Horizontal
145°	0.582	33.88	15.30	Horizontal	325°	0.562	31.62	15.00	Horizontal
150°	0.631	39.81	16.00	Horizontal	330°	0.610	37.15	15.70	Horizontal
155°	0.676	45.71	16.60	Horizontal	335°	0.661	43.65	16.40	Horizontal
160°	0.733	53.70	17.30	Horizontal	340°	0.724	52.48	17.20	Horizontal
165°	0.794	63.10	18.00	Horizontal	345°	0.794	63.10	18.00	Horizontal
170°	0.851	72.44	18.60	Horizontal	350°	0.861	74.13	18.70	Horizontal
175°	0.902	81.28	19.10	Horizontal	355°	0.923	85.11	19.30	Horizontal

**Polarization:**

**Maximum Field:**

**Minimum Field:**

**RMS:**

**Maximum ERP:**

**Maximum Power Gain:**

**Horizontal Plane Gain:**

**Total Input Power: 12.482 kW**

**Envelope**

**1.000 @ 5° True**

**0.490 @ 309° True**

**0.724**

**100.000 kW**

**8.011 (9.037 dB)**

**7.877 (8.964 dB)**

**System Beam Tilt: -0.603 °**

**System First Null Fill %: 10**

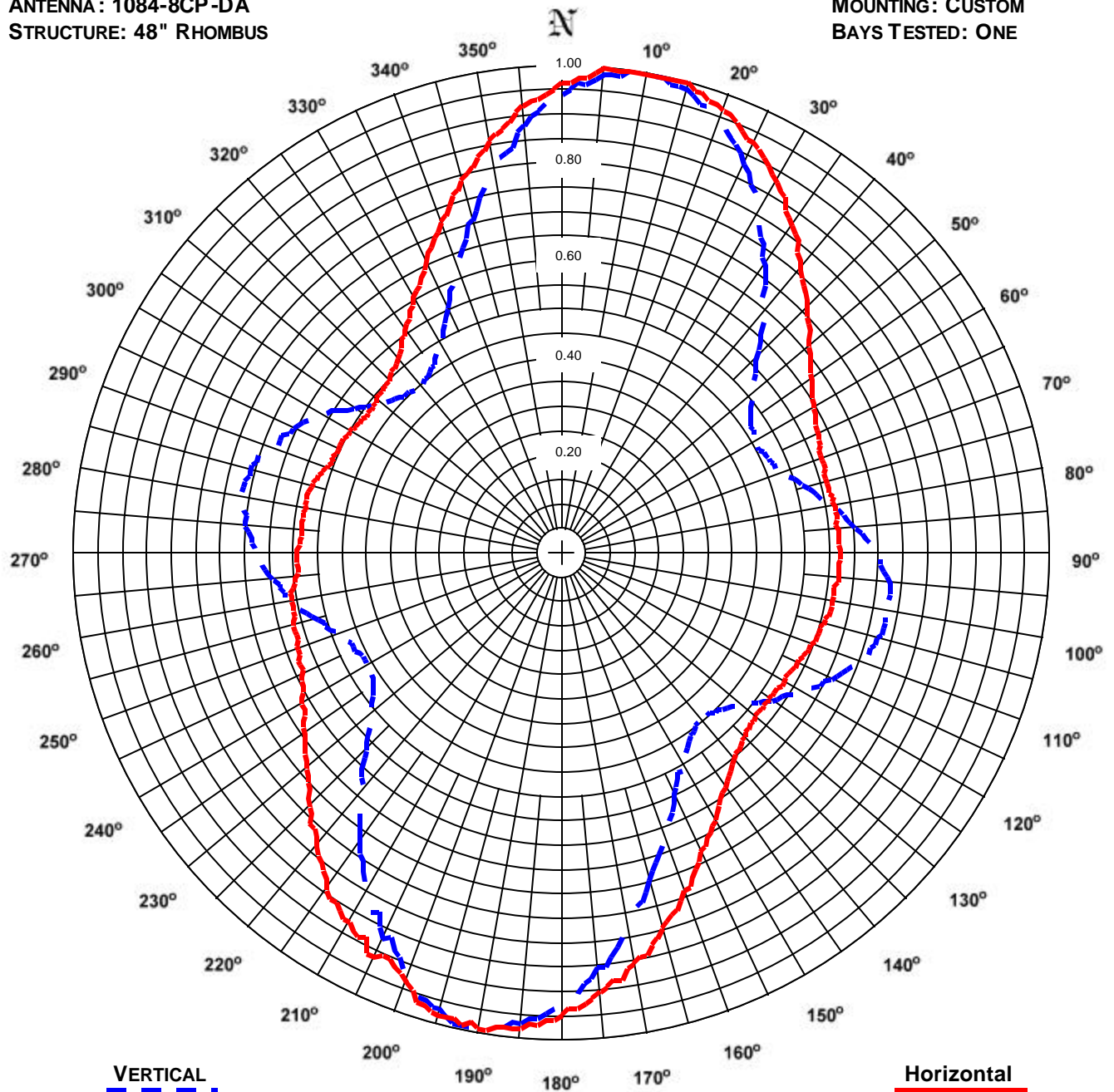
**Polarization: Left hand Circular**

# **ERI**® *Horizontal Plane Relative Field Pattern*

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FIGURE NO: 2  
STATION: WHYI  
LOCATION: FORT LAUDERDALE, FL.  
ANTENNA: 1084-8CP-DA  
STRUCTURE: 48" RHOMBUS

DATE: 07/28/2003  
FREQUENCY: 100.7 MHz  
ORIENTATION: 10° TRUE  
MOUNTING: CUSTOM  
BAYS TESTED: ONE



**VERTICAL**  
RMS: 0.670  
MAXIMUM: 1.000 @ 8° TRUE  
MINIMUM: 0.447 @ 137° TRUE

**Horizontal**  
RMS: 0.707  
MAXIMUM: 1.000 @ 5° TRUE  
MINIMUM: 0.490 @ 305° TRUE

COMMENTS: MEASURED PATTERNS OF THE HORIZONTAL AND VERTICAL COMPONENTS. LEFT HAND CIRCULAR POLARIZED.

# ERI<sup>®</sup> Horizontal Plane Relative Field List

Electronics Research, Inc. 7777 Gardner Rd. Chandler, In 47610 Phone (812) 925-6000 Fax (812) 925-4030 <http://www.eriinc.com/>

**Station: WHYI**  
**Location: Fort Lauderdale, FL.**  
**Frequency: 100.7 MHz**

**Antenna: 1084-8CP-DA**  
**Orientation: 10° True**  
**Tower: 48" Rhombus**

**Figure: 2**  
**Date: 07/28/2003**  
**Reference: whyilr.fig**

Angle	Horizontal			Vertical			Angle	Horizontal			Vertical		
	Field	kW	dBk	Field	kW	dBk		Field	kW	dBk	Field	kW	dBk
0°	0.966	93.33	19.70	0.944	89.13	19.50	180°	0.944	89.13	19.50	0.923	85.11	19.30
5°	1.000	100.00	20.00	0.989	97.72	19.90	185°	0.977	95.50	19.80	0.966	93.33	19.70
10°	1.000	100.00	20.00	1.000	100.00	20.00	190°	0.989	97.72	19.90	0.977	95.50	19.80
15°	1.000	100.00	20.00	0.989	97.72	19.90	195°	0.977	95.50	19.80	0.966	93.33	19.70
20°	0.966	93.33	19.70	0.955	91.20	19.60	200°	0.933	87.10	19.40	0.923	85.11	19.30
25°	0.933	87.10	19.40	0.881	77.62	18.90	205°	0.912	83.18	19.20	0.871	75.86	18.80
30°	0.881	77.62	18.90	0.813	66.07	18.20	210°	0.871	75.86	18.80	0.794	63.10	18.00
35°	0.822	67.61	18.30	0.724	52.48	17.20	215°	0.841	70.79	18.50	0.724	52.48	17.20
40°	0.759	57.54	17.60	0.638	40.74	16.10	220°	0.785	61.66	17.90	0.638	40.74	16.10
45°	0.708	50.12	17.00	0.562	31.62	15.00	225°	0.733	53.70	17.30	0.569	32.36	15.10
50°	0.661	43.65	16.40	0.507	25.70	14.10	230°	0.684	46.77	16.70	0.513	26.30	14.20
55°	0.624	38.90	15.90	0.473	22.39	13.50	235°	0.646	41.69	16.20	0.473	22.39	13.50
60°	0.596	35.48	15.50	0.462	21.38	13.30	240°	0.617	38.02	15.80	0.457	20.89	13.20
65°	0.582	33.88	15.30	0.468	21.88	13.40	245°	0.589	34.67	15.40	0.468	21.88	13.40
70°	0.569	32.36	15.10	0.490	23.99	13.80	250°	0.575	33.11	15.20	0.484	23.44	13.70
75°	0.562	31.62	15.00	0.525	27.54	14.40	255°	0.569	32.36	15.10	0.519	26.92	14.30
80°	0.569	32.36	15.10	0.562	31.62	15.00	260°	0.562	31.62	15.00	0.562	31.62	15.00
85°	0.569	32.36	15.10	0.603	36.31	15.60	265°	0.550	30.20	14.80	0.596	35.48	15.50
90°	0.569	32.36	15.10	0.646	41.69	16.20	270°	0.543	29.51	14.70	0.624	38.90	15.90
95°	0.569	32.36	15.10	0.676	45.71	16.60	275°	0.537	28.84	14.60	0.653	42.66	16.30
100°	0.562	31.62	15.00	0.676	45.71	16.60	280°	0.531	28.18	14.50	0.661	43.65	16.40
105°	0.556	30.90	14.90	0.668	44.67	16.50	285°	0.531	28.18	14.50	0.661	43.65	16.40
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130°	0.519	26.92	14.30	0.479	22.91	13.60	310°	0.495	24.55	13.90	0.484	23.44	13.70
135°	0.531	28.18	14.50	0.452	20.42	13.10	315°	0.501	25.12	14.00	0.457	20.89	13.20
140°	0.550	30.20	14.80	0.447	19.95	13.00	320°	0.525	27.54	14.40	0.452	20.42	13.10
145°	0.582	33.88	15.30	0.457	20.89	13.20	325°	0.562	31.62	15.00	0.468	21.88	13.40
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165°	0.794	63.10	18.00	0.692	47.86	16.80	345°	0.794	63.10	18.00	0.708	50.12	17.00
170°	0.851	72.44	18.60	0.776	60.26	17.80	350°	0.861	74.13	18.70	0.804	64.57	18.10
175°	0.902	81.28	19.10	0.851	72.44	18.60	355°	0.923	85.11	19.30	0.881	77.62	18.90

**Polarization:**

**Maximum Field:**

**Minimum Field:**

**RMS:**

**Maximum ERP:**

**Maximum Power Gain:**

**Horizontal Plane Gain:**

**Horizontal**

**1.000 @ 5° True**

**0.490 @ 305° True**

**0.707**

**100.000 kW**

**8.011 (9.037 dB)**

**7.877 (8.964 dB)**

**Vertical**

**1.000 @ 8° True**

**0.447 @ 137° True**

**0.670**

**100.000 kW**

**8.011 (9.037 dB)**

**7.877 (8.964 dB)**

**System Beam Tilt: -0.603°**

**System First Null Fill %: 10**

**Polarization: Left hand**

**Circular**

**Total Input Power: 12.482 kW**



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

FIGURE 6

----THEORETICAL----  
VERTICAL PLANE RELATIVE FIELD  
8 LEVELS OF TYPE 1080 ELEMENTS  
-.60 DEGREE(S) BEAM TILT  
10 PERCENT FIRST NULL FILL  
0 PERCENT SECOND NULL FILL

FEBRUARY 27, 2003

100.7 MHz.

BAY SPACING:  
100.00 INCHES

