

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.

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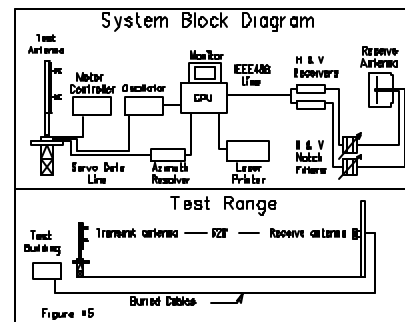
(Continued)

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.

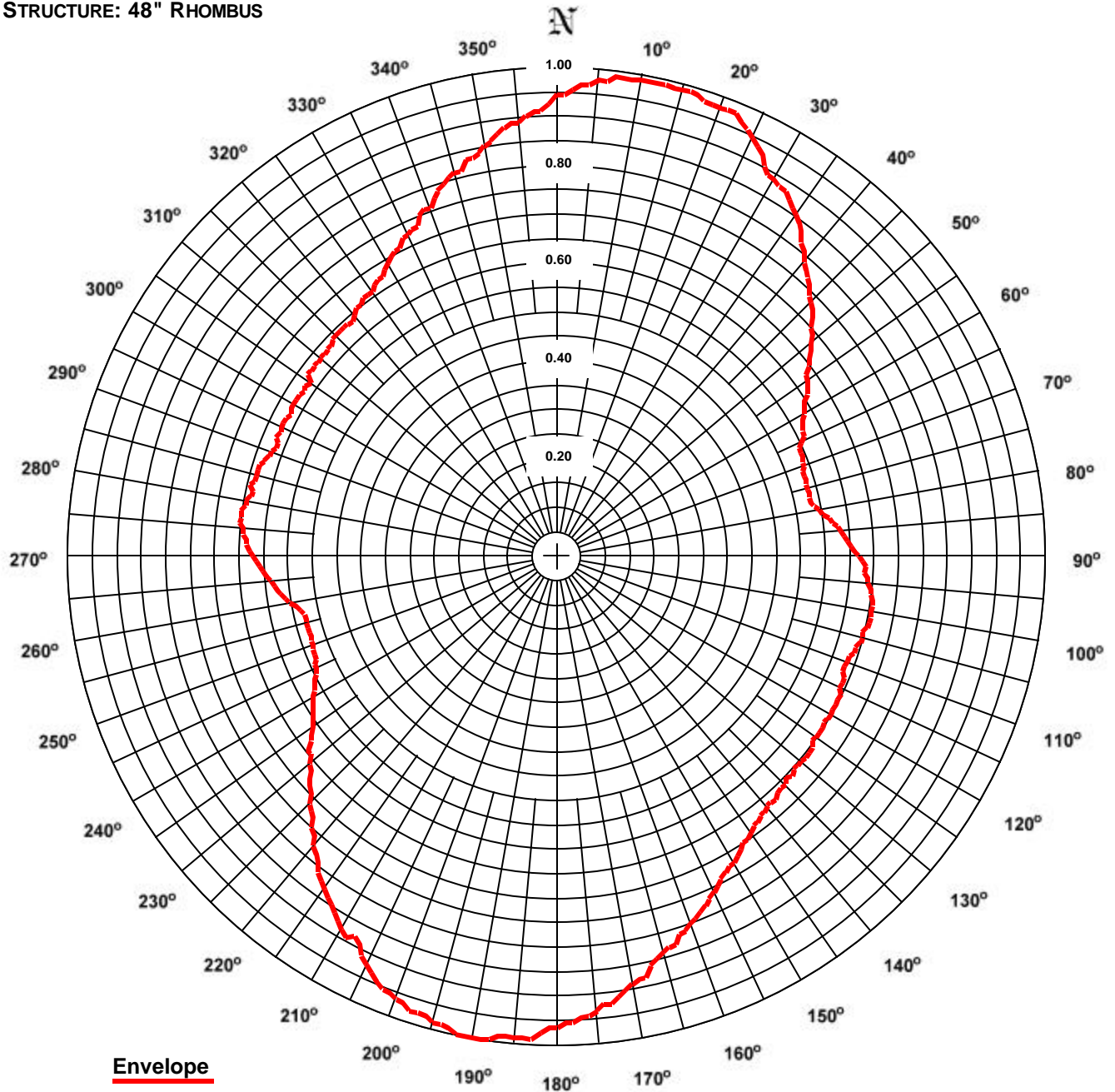


ERI® *Horizontal Plane Relative Field Pattern*

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

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

DATE: 07/28/2003
FREQUENCY: 102.7 MHz
ORIENTATION: 10° TRUE
MOUNTING: CUSTOM



Envelope
RMS: 0.743
Maximum: 1.000 @ 188° True
Minimum: 0.531 @ 71° True

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

ERI[®] Horizontal Plane Relative Field List

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Station: WMXJ
Location: Fort Lauderdale, FL.
Frequency: 102.7 MHz

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

Figure: 1
Date: 07/28/2003
Reference: wmxj1r.fig

Angle	Envelope			Polarization	Angle	Envelope			Polarization
	Field	kW	dBk			Field	kW	dBk	
0°	0.944	89.13	19.50	Horizontal	180°	0.966	93.33	19.70	Horizontal
5°	0.977	95.50	19.80	Horizontal	185°	0.989	97.72	19.90	Horizontal
10°	0.989	97.72	19.90	Horizontal	190°	1.000	100.00	20.00	Horizontal
15°	0.989	97.72	19.90	Horizontal	195°	0.989	97.72	19.90	Horizontal
20°	0.977	95.50	19.80	Horizontal	200°	0.966	93.33	19.70	Horizontal
25°	0.944	89.13	19.50	Horizontal	205°	0.923	85.11	19.30	Horizontal
30°	0.891	79.43	19.00	Horizontal	210°	0.881	77.62	18.90	Horizontal
35°	0.851	72.44	18.60	Horizontal	215°	0.832	69.18	18.40	Horizontal
40°	0.785	61.66	17.90	Horizontal	220°	0.776	60.26	17.80	Horizontal
45°	0.733	53.70	17.30	Horizontal	225°	0.716	51.29	17.10	Horizontal
50°	0.676	45.71	16.60	Horizontal	230°	0.661	43.65	16.40	Horizontal
55°	0.624	38.90	15.90	Horizontal	235°	0.610	37.15	15.70	Horizontal
60°	0.582	33.88	15.30	Horizontal	240°	0.575	33.11	15.20	Horizontal
65°	0.550	30.20	14.80	Horizontal	245°	0.543	29.51	14.70	Horizontal
70°	0.537	28.84	14.60	Horizontal	250°	0.531	28.18	14.50	Horizontal
75°	0.531	28.18	14.50	Horizontal	255°	0.531	28.18	14.50	Horizontal
80°	0.543	29.51	14.70	Vertical	260°	0.556	30.90	14.90	Vertical
85°	0.582	33.88	15.30	Vertical	265°	0.589	34.67	15.40	Vertical
90°	0.617	38.02	15.80	Vertical	270°	0.624	38.90	15.90	Vertical
95°	0.638	40.74	16.10	Vertical	275°	0.646	41.69	16.20	Vertical
100°	0.653	42.66	16.30	Vertical	280°	0.646	41.69	16.20	Vertical
105°	0.646	41.69	16.20	Vertical	285°	0.638	40.74	16.10	Vertical
110°	0.631	39.81	16.00	Horizontal	290°	0.624	38.90	15.90	Vertical
115°	0.638	40.74	16.10	Horizontal	295°	0.624	38.90	15.90	Horizontal
120°	0.646	41.69	16.20	Horizontal	300°	0.624	38.90	15.90	Horizontal
125°	0.646	41.69	16.20	Horizontal	305°	0.617	38.02	15.80	Horizontal
130°	0.653	42.66	16.30	Horizontal	310°	0.631	39.81	16.00	Horizontal
135°	0.661	43.65	16.40	Horizontal	315°	0.638	40.74	16.10	Horizontal
140°	0.668	44.67	16.50	Horizontal	320°	0.646	41.69	16.20	Horizontal
145°	0.692	47.86	16.80	Horizontal	325°	0.661	43.65	16.40	Horizontal
150°	0.724	52.48	17.20	Horizontal	330°	0.692	47.86	16.80	Horizontal
155°	0.759	57.54	17.60	Horizontal	335°	0.724	52.48	17.20	Horizontal
160°	0.804	64.57	18.10	Horizontal	340°	0.759	57.54	17.60	Horizontal
165°	0.841	70.79	18.50	Horizontal	345°	0.813	66.07	18.20	Horizontal
170°	0.891	79.43	19.00	Horizontal	350°	0.851	72.44	18.60	Horizontal
175°	0.933	87.10	19.40	Horizontal	355°	0.891	79.43	19.00	Horizontal

Polarization:
Maximum Field:
Minimum Field:
RMS:
Maximum ERP:
Maximum Power Gain:
Horizontal Plane Gain:

Envelope
1.000 @ 188° True
0.531 @ 71° True
0.743
100.000 kW
7.803 (8.923 dB)
7.667 (8.846 dB)

System Beam Tilt: -0.603°
System First Null Fill %: 11
Polarization: Right hand Circular

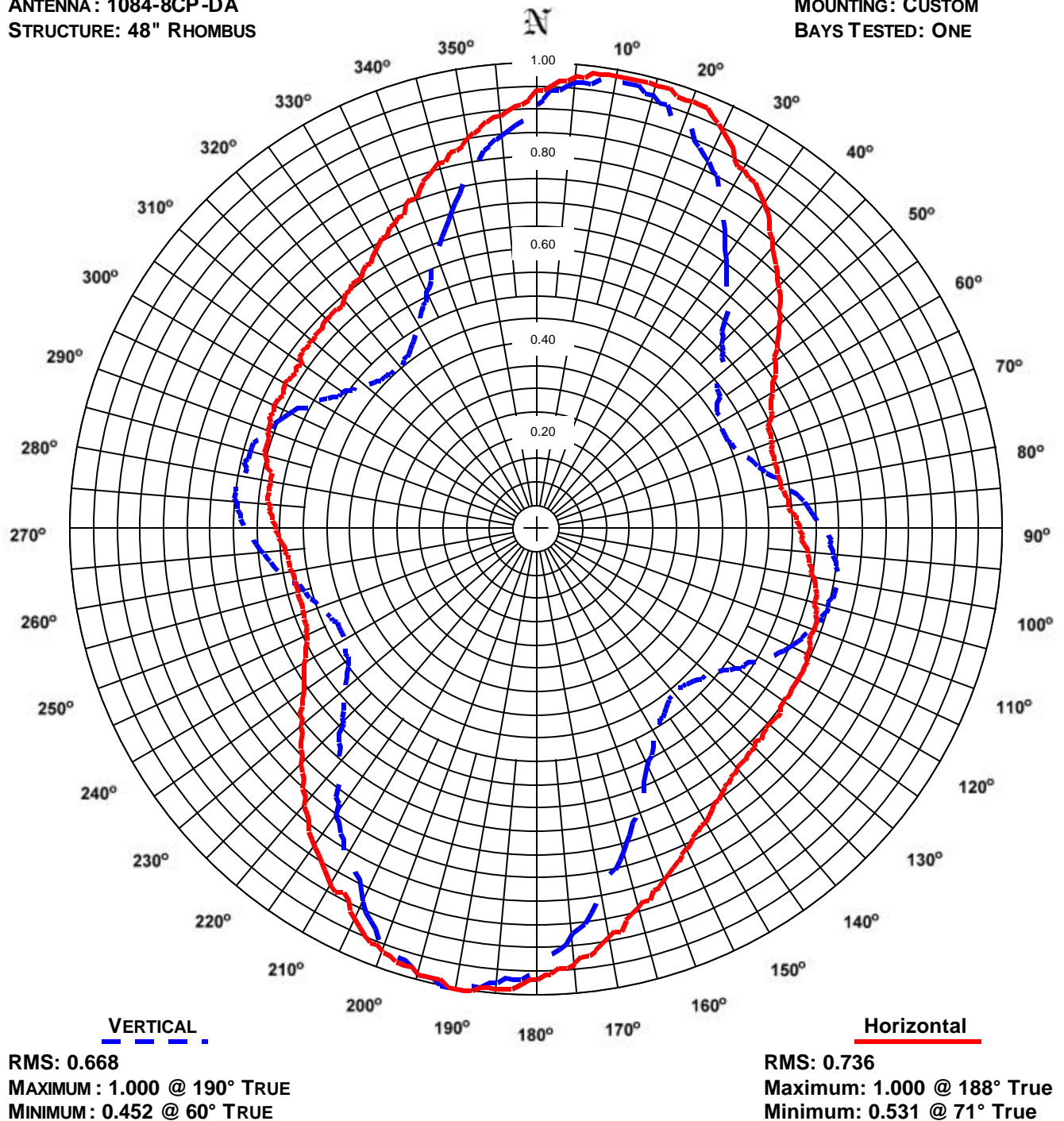
Total Input Power: 12.816 kW

ERI® *Horizontal Plane Relative Field Pattern*

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

DATE: 07/28/2003
FREQUENCY: 102.7 MHz
ORIENTATION: 10° TRUE
MOUNTING: CUSTOM
BAYS TESTED: ONE



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

ERI[®] 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: WMXJ
Location: Fort Lauderdale, FL.
Frequency: 102.7 MHz

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

Figure: 2
Date: 07/28/2003
Reference: wmxj1r.fig

Angle	Horizontal			Vertical			Angle	Horizontal			Vertical		
	Field	kW	dBk	Field	kW	dBk		Field	kW	dBk	Field	kW	dBk
0°	0.944	89.13	19.50	0.912	83.18	19.20	180°	0.966	93.33	19.70	0.944	89.13	19.50
5°	0.977	95.50	19.80	0.966	93.33	19.70	185°	0.989	97.72	19.90	0.977	95.50	19.80
10°	0.989	97.72	19.90	0.977	95.50	19.80	190°	1.000	100.00	20.00	1.000	100.00	20.00
15°	0.989	97.72	19.90	0.966	93.33	19.70	195°	0.989	97.72	19.90	0.989	97.72	19.90
20°	0.977	95.50	19.80	0.923	85.11	19.30	200°	0.966	93.33	19.70	0.955	91.20	19.60
25°	0.944	89.13	19.50	0.871	75.86	18.80	205°	0.923	85.11	19.30	0.881	77.62	18.90
30°	0.891	79.43	19.00	0.794	63.10	18.00	210°	0.881	77.62	18.90	0.813	66.07	18.20
35°	0.851	72.44	18.60	0.708	50.12	17.00	215°	0.832	69.18	18.40	0.750	56.23	17.50
40°	0.785	61.66	17.90	0.638	40.74	16.10	220°	0.776	60.26	17.80	0.661	43.65	16.40
45°	0.733	53.70	17.30	0.562	31.62	15.00	225°	0.716	51.29	17.10	0.589	34.67	15.40
50°	0.676	45.71	16.60	0.507	25.70	14.10	230°	0.661	43.65	16.40	0.537	28.84	14.60
55°	0.624	38.90	15.90	0.473	22.39	13.50	235°	0.610	37.15	15.70	0.495	24.55	13.90
60°	0.582	33.88	15.30	0.452	20.42	13.10	240°	0.575	33.11	15.20	0.479	22.91	13.60
65°	0.550	30.20	14.80	0.452	20.42	13.10	245°	0.543	29.51	14.70	0.473	22.39	13.50
70°	0.537	28.84	14.60	0.473	22.39	13.50	250°	0.531	28.18	14.50	0.490	23.99	13.80
75°	0.531	28.18	14.50	0.501	25.12	14.00	255°	0.531	28.18	14.50	0.513	26.30	14.20
80°	0.531	28.18	14.50	0.543	29.51	14.70	260°	0.531	28.18	14.50	0.556	30.90	14.90
85°	0.543	29.51	14.70	0.582	33.88	15.30	265°	0.543	29.51	14.70	0.589	34.67	15.40
90°	0.562	31.62	15.00	0.617	38.02	15.80	270°	0.562	31.62	15.00	0.624	38.90	15.90
95°	0.582	33.88	15.30	0.638	40.74	16.10	275°	0.575	33.11	15.20	0.646	41.69	16.20
100°	0.603	36.31	15.60	0.653	42.66	16.30	280°	0.582	33.88	15.30	0.646	41.69	16.20
105°	0.617	38.02	15.80	0.646	41.69	16.20	285°	0.603	36.31	15.60	0.638	40.74	16.10
110°	0.631	39.81	16.00	0.631	39.81	16.00	290°	0.617	38.02	15.80	0.624	38.90	15.90
115°	0.638	40.74	16.10	0.596	35.48	15.50	295°	0.624	38.90	15.90	0.589	34.67	15.40
120°	0.646	41.69	16.20	0.556	30.90	14.90	300°	0.624	38.90	15.90	0.550	30.20	14.80
125°	0.646	41.69	16.20	0.519	26.92	14.30	305°	0.617	38.02	15.80	0.513	26.30	14.20
130°	0.653	42.66	16.30	0.484	23.44	13.70	310°	0.631	39.81	16.00	0.484	23.44	13.70
135°	0.661	43.65	16.40	0.462	21.38	13.30	315°	0.638	40.74	16.10	0.462	21.38	13.30
140°	0.668	44.67	16.50	0.462	21.38	13.30	320°	0.646	41.69	16.20	0.457	20.89	13.20
145°	0.692	47.86	16.80	0.479	22.91	13.60	325°	0.661	43.65	16.40	0.473	22.39	13.50
150°	0.724	52.48	17.20	0.513	26.30	14.20	330°	0.692	47.86	16.80	0.507	25.70	14.10
155°	0.759	57.54	17.60	0.562	31.62	15.00	335°	0.724	52.48	17.20	0.562	31.62	15.00
160°	0.804	64.57	18.10	0.638	40.74	16.10	340°	0.759	57.54	17.60	0.631	39.81	16.00
165°	0.841	70.79	18.50	0.716	51.29	17.10	345°	0.813	66.07	18.20	0.708	50.12	17.00
170°	0.891	79.43	19.00	0.794	63.10	18.00	350°	0.851	72.44	18.60	0.785	61.66	17.90
175°	0.933	87.10	19.40	0.871	75.86	18.80	355°	0.891	79.43	19.00	0.851	72.44	18.60

Polarization: Horizontal
Maximum Field: 1.000 @ 188° True
Minimum Field: 0.531 @ 71° True
RMS: 0.736
Maximum ERP: 100.000 kW
Maximum Power Gain: 8.012 (9.038 dB)
Horizontal Plane Gain: 7.874 (8.962 dB)

Vertical
1.000 @ 190° True
0.452 @ 60° True
0.668
100.000 kW
8.012 (9.037 dB)
7.874 (8.962 dB)

System Beam Tilt: -0.603 deg
System First Null Fill %: 11
Polarization: Right hand
Circular

Total Input Power: 12.481 kW

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

FIGURE 7

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

FEBRUARY 27, 2003

102.7 MHz.

BAY SPACING:
100.00 INCHES

