John W. Garrison, Jr.
Registered in Illinois, Indiana & Missouri
Professional Land Surveyor
1055 Glenway Drive
Glenarm,IL 62536
(217) 483-7560

June 25, 2001

Cornerstone Community Radio, Inc.
600 West Mason Street
Springfield, IL 62702

Re: WLGM Antenna
2116 E. Moffat Avenue
Springfield, IL

To Whom It May Concern:

On June 25th 2001, between 2:00 and 4:00 P.M., I performed a survey for the re-alignment of the WLGM ERI Antenna.

With the aid of your tower crew, the antenna orientation was adjusted from 195 degrees true to its new orientation of 190 degrees true.

I hereby certify that the above azimuth orientation was established under my direct supervision on June 25, 2001.

Sincerely,

John W. Garrison, Jr.
Professional Land Surveyor

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

Directional Antenna System For WLGM, Springfield, Illinois

May 7, 2001

Electronics Research Inc. is providing a custom fabricated antenna system that is specially designed to meet the FCC requirements and the general needs of radio station WLGM.

The antenna is the ERI model LP-4E-DA configuration. The circular polarized system consists of 4 full-wavelength spaced bays using one driven circular polarized radiating element, two horizontal parasitic elements placed one quarter wave above and below each bay and two vertical parasitic elements per bay. The antenna was mounted on the North 180° 48' 50" East tower leg with bracketry to provide an antenna orientation of North 190 degrees East. The antenna was tested on a Rohn 55G tower, which is the structure the station plans to use to support the array. All tests were performed on a frequency of 89.7 megahertz which is the center of the FM broadcast channel assigned to WLGM.

Pattern measurements were made on a sixty-acre antenna pattern range which is owned and operated by Electronics Research, Inc. The tests were performed under the direction of Thomas B. Silliman, president of Electronics Research, Inc. Mr. Silliman has the Bachelor of Electrical Engineering and the Master of Electrical Engineering degrees from Cornell University and is a registered professional engineer in the states of Indiana, Maryland and Minnesota.

Directional Antenna System
For
WLGM, Springfield, Illinois

(Continued)

DESCRIPTION OF THE TEST PROCEDURE

The test antenna consisted of two bay levels of the circular polarized system with the associated horizontal and vertical parasitic elements. The elements and brackets that were used in this test are electrically equivalent to those that will be supplied with the antenna. A section of 1 5/8 inch o.d. rigid coaxial line was used to feed the test antenna, and a section of 1 5/8 inch o.d. rigid outer conductor only was attached above the test 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.

The proof-of-performance was accomplished using a Rohn 55G tower with identical dimension and configuration including all braces, ladders, conduits, coaxial lines and other appurtenances that are 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 89.7 MHz and was constantly monitored by an Anritsu Model ML521B measuring receiver.

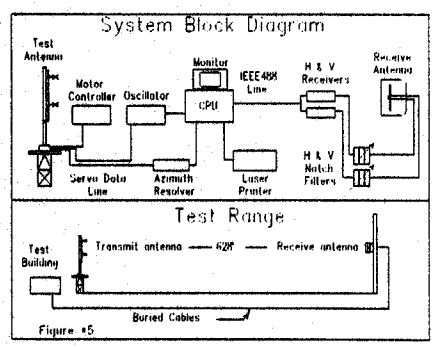


Figure #5

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.

Directional Antenna System
For
WLGM, Springfield, Illinois

(Continued)

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 co-ordinated graph paper in a clockwise direction. Both horizontal and vertical components were recorded separately.

CONCLUSIONS

The circular polarized system consists of 4 full-wavelength spaced bays using one driven circular polarized radiating element, two horizontal parasitic elements placed one quarter wave above and below each bay and two vertical parasitic elements per bay. The power distribution and phase relationship will be fixed when antenna is manufactured. Proper maintenance of the elements should be all that is required to maintain the pattern in adjustment.

The LP-4E-DA array is to be mounted on the North 180° 48' 50" East tower leg of the Rohn 55G tower at a bearing of North 190 degrees East. Blue prints provided with the antenna will show the proper antenna orientation alignment. The antenna alignment procedure should be directed by a licensed surveyor as prescribed by the FCC.

Figure #1 represents the maximum value of either the horizontal or vertical component at any azimuth. The measured horizontal plane relative field pattern, for both the horizontal and vertical polarization components, is shown on Figure #2 attached. The actual measured pattern does not exceed the authorized FCC composite pattern at any azimuth. A calculated vertical plane relative field pattern is shown on Figure #3 attached. The power in the maximum will reach 20 kilowatts (13.01 dBk).

The power at North 0 degrees East does not exceed 0.63 kilowatts (-2.007 dBk).

The power at North 85 degrees East does not exceed 5.10 kilowatts (7.076 dBk).

Directional Antenna System
For
WLGM, Springfield, Illinois

(Continued)

The RMS of the vertically polarized horizontal plane component does not exceed the RMS of the horizontally polarized horizontal plane component.

The composite horizontal and vertical maximum relative field pattern obtained from the measured data as shown on Figure #1 has an RMS that is greater that 85% of the filed composite pattern.

The clear vertical length of the structure required to support the antenna is 48 feet.

The directional antenna should not be mounted on the top of an antenna tower which includes a top-mounted platform larger than the cross-sectional area of the tower in the horizontal plane. No obstructions other than those that are specified by the blue prints supplied with the antenna are to be mounted within 75 ft. horizontally of the system. The vertical distance to the nearest obstruction should be a minimum of 10 ft. from the directional antenna. Metallic guy wires should be a minimum distance of forty feet horizontally from the antenna.

ELECTRONICS RESEARCH, INC.

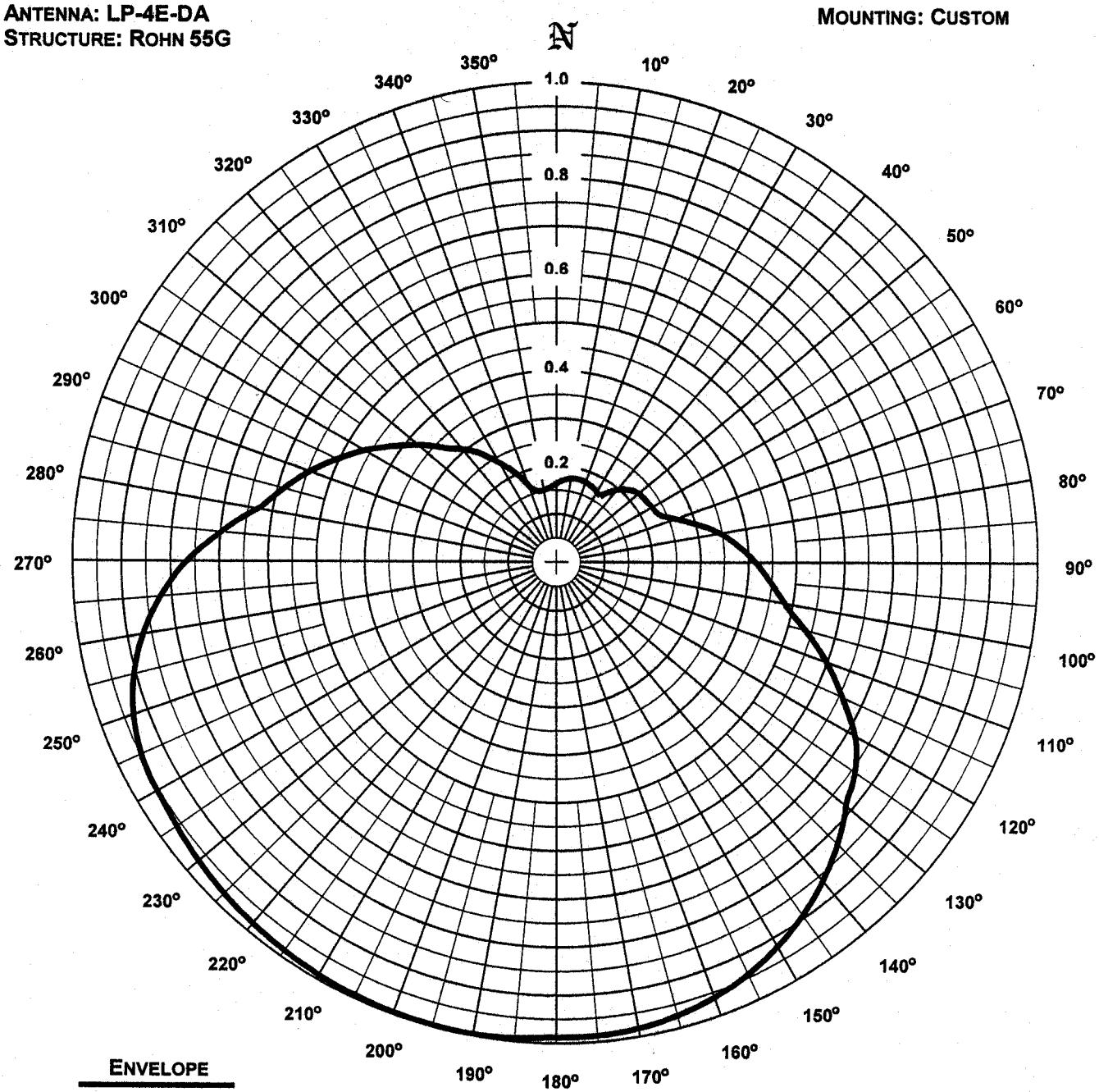
Tom Scharf Jr

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.erlinc.com/

FIGURE NO: 1
STATION: WLGM
LOCATION: SPRINGFIELD, IL
ANTENNA: LP-4E-DA
STRUCTURE: ROHN 55G

DATE: 5/7/01
FREQUENCY: 89.7 MHz
ORIENTATION: 190° TRUE
MOUNTING: CUSTOM



ENVELOPE

RMS: 0.668
MAXIMUM: 1.000 @ 192° TRUE
MINIMUM: 0.148 @ 347° TRUE

COMMENTS: COMPOSITE PATTERN: THIS PATTERN SHOWS THE MAXIMUM OF EITHER THE H OR V AZIMUTH VALUES. THIS PATTERN DOES NOT EXCEED THE FCC FILED COMPOSITE PATTERN AT ANY AZIMUTH. THE RMS OF THIS PATTERN IS GREATER THAN 85% OF THE FILED FCC COMPOSITE PATTERN BPED-20000414ACJ

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.erilnc.com/

Station: WLGM
Location: Springfield, IL
Frequency: 89.7 MHz

Antenna: LP-4E-DA
Orientation: 190° True
Tower: Rohn 55G

Figure: 1
Date: 5/7/01
Reference: wlgm1m.fig

Angle	Envelope			Polarization	Angle	Envelope			Polarization
	Field	kW	dBk			Field	kW	dBk	
0°	0.160	0.51	-2.90	Vertical	180°	0.991	19.65	12.93	Vertical
5°	0.168	0.57	-2.47	Vertical	185°	0.996	19.85	12.98	Horizontal
10°	0.173	0.60	-2.20	Vertical	190°	1.000	19.98	13.01	Horizontal
15°	0.175	0.62	-2.11	Vertical	195°	1.000	19.99	13.01	Horizontal
20°	0.174	0.61	-2.17	Vertical	200°	0.999	19.94	13.00	Horizontal
25°	0.171	0.59	-2.32	Vertical	205°	0.996	19.86	12.98	Horizontal
30°	0.166	0.55	-2.58	Vertical	210°	0.993	19.73	12.95	Horizontal
35°	0.168	0.56	-2.50	Horizontal	215°	0.989	19.56	12.91	Horizontal
40°	0.192	0.74	-1.33	Horizontal	220°	0.984	19.36	12.87	Horizontal
45°	0.209	0.88	-0.58	Horizontal	225°	0.978	19.11	12.81	Horizontal
50°	0.220	0.97	-0.14	Horizontal	230°	0.970	18.83	12.75	Horizontal
55°	0.224	1.00	0.02	Horizontal	235°	0.962	18.52	12.68	Horizontal
60°	0.228	1.04	0.15	Horizontal	240°	0.956	18.27	12.62	Horizontal
65°	0.232	1.08	0.33	Horizontal	245°	0.948	17.98	12.55	Horizontal
70°	0.258	1.34	1.26	Vertical	250°	0.931	17.33	12.39	Horizontal
75°	0.298	1.77	2.49	Vertical	255°	0.904	16.34	12.13	Horizontal
80°	0.340	2.32	3.65	Vertical	260°	0.867	15.04	11.77	Horizontal
85°	0.377	2.84	4.53	Vertical	265°	0.821	13.48	11.30	Horizontal
90°	0.412	3.39	5.30	Vertical	270°	0.764	11.66	10.67	Horizontal
95°	0.444	3.95	5.96	Vertical	275°	0.695	9.65	9.85	Horizontal
100°	0.481	4.62	6.65	Vertical	280°	0.625	7.82	8.93	Vertical
105°	0.534	5.69	7.55	Horizontal	285°	0.584	6.81	8.33	Vertical
110°	0.597	7.12	8.53	Horizontal	290°	0.543	5.89	7.70	Vertical
115°	0.655	8.59	9.34	Horizontal	295°	0.500	4.99	6.98	Vertical
120°	0.716	10.26	10.11	Horizontal	300°	0.458	4.20	6.23	Vertical
125°	0.759	11.51	10.61	Horizontal	305°	0.413	3.41	5.33	Vertical
130°	0.786	12.36	10.92	Vertical	310°	0.373	2.78	4.43	Vertical
135°	0.828	13.71	11.37	Vertical	315°	0.330	2.18	3.38	Vertical
140°	0.864	14.93	11.74	Vertical	320°	0.301	1.81	2.59	Horizontal
145°	0.896	16.05	12.05	Vertical	325°	0.270	1.45	1.62	Horizontal
150°	0.923	17.03	12.31	Vertical	330°	0.233	1.08	0.35	Horizontal
155°	0.945	17.88	12.52	Vertical	335°	0.200	0.80	-0.97	Horizontal
160°	0.963	18.57	12.69	Vertical	340°	0.164	0.54	-2.70	Horizontal
165°	0.977	19.09	12.81	Vertical	345°	0.150	0.45	-3.49	Vertical
170°	0.986	19.45	12.89	Vertical	350°	0.149	0.44	-3.52	Vertical
175°	0.991	19.62	12.93	Vertical	355°	0.153	0.47	-3.30	Vertical

Polarization: Envelope
Maximum Field: 1.000 @ 192° True
Minimum Field: 0.148 @ 347° True
RMS: 0.668
Maximum ERP: 20.000 kW
Maximum Power Gain: 4.766 (6.781 dB)

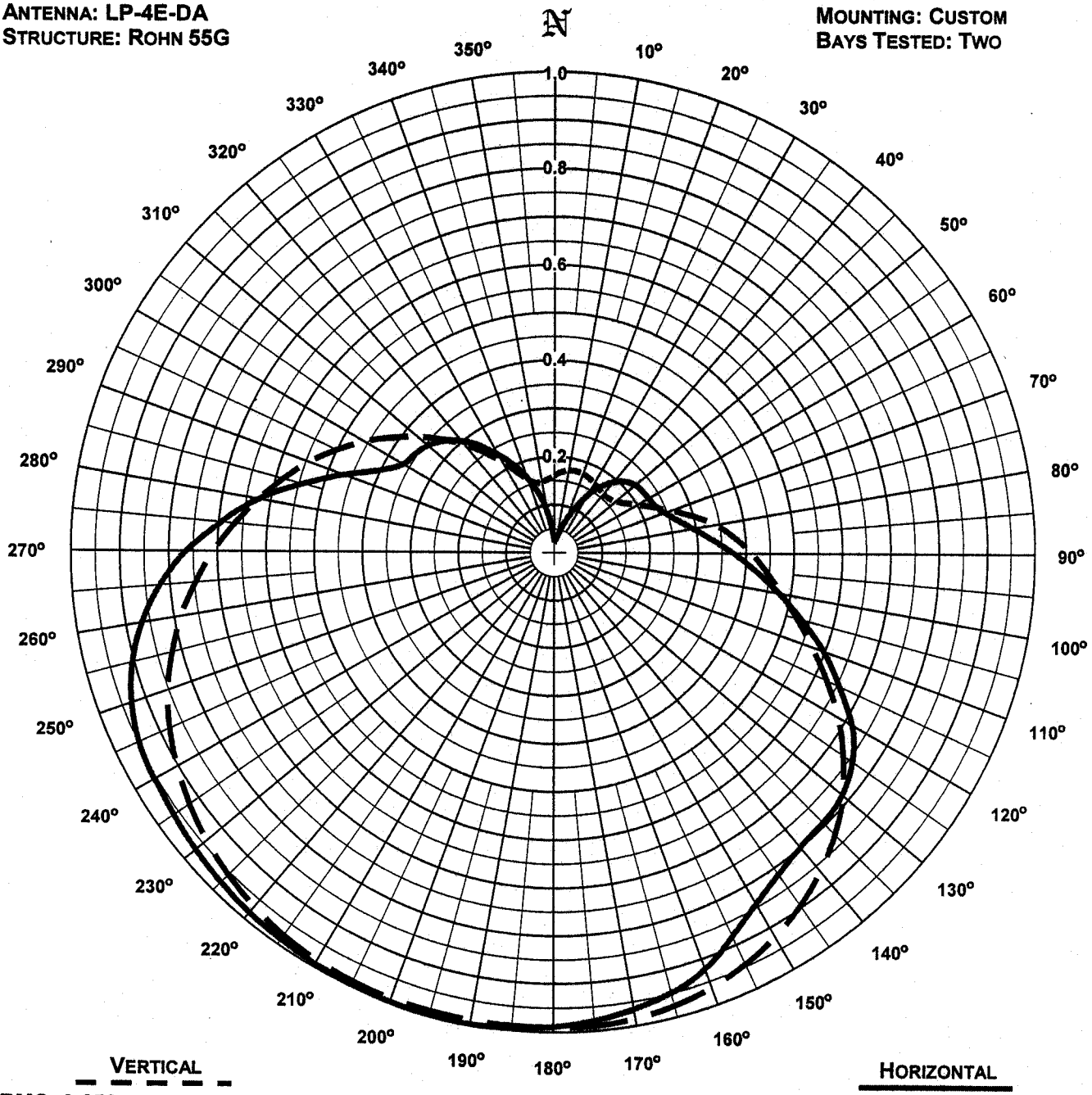
Total Input Power: 4.197 kW

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.erilnc.com/

FIGURE NO: 2
STATION: WLGM
LOCATION: SPRINGFIELD, IL
ANTENNA: LP-4E-DA
STRUCTURE: ROHN 55G

DATE: 5/7/01
FREQUENCY: 89.7 MHz
ORIENTATION: 190° TRUE
MOUNTING: CUSTOM
BAYS TESTED: TWO



VERTICAL
RMS: 0.652
MAXIMUM: 0.991 @ 177° TRUE
MINIMUM: 0.148 @ 347° TRUE

HORIZONTAL
RMS: 0.652
MAXIMUM: 1.000 @ 192° TRUE
MINIMUM: 0.021 @ 1° TRUE

COMMENTS: MEASURED PATTERNS OF THE HORIZONTAL AND VERTICAL COMPONENTS.

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.erlinc.com/

Station: WLGM
Location: Springfield, IL
Frequency: 89.7 MHz

Antenna: LP-4E-DA
Orientation: 190° True
Tower: Rohn 55G

Figure: 2
Date: 5/7/01
Reference: wlgm1m.fig

Angle	Horizontal			Vertical			Angle	Horizontal			Vertical		
	Field	kW	dBk	Field	kW	dBk		Field	kW	dBk	Field	kW	dBk
0°	0.022	0.01	-20.08	0.160	0.51	-2.90	180°	0.990	19.58	12.92	0.991	19.65	12.93
5°	0.024	0.01	-19.47	0.168	0.57	-2.47	185°	0.996	19.85	12.98	0.991	19.65	12.93
10°	0.033	0.02	-16.58	0.173	0.60	-2.20	190°	1.000	19.98	13.01	0.991	19.65	12.93
15°	0.049	0.05	-13.14	0.175	0.62	-2.11	195°	1.000	19.99	13.01	0.991	19.65	12.93
20°	0.072	0.10	-9.83	0.174	0.61	-2.17	200°	0.999	19.94	13.00	0.991	19.65	12.93
25°	0.102	0.21	-6.85	0.171	0.59	-2.32	205°	0.996	19.86	12.98	0.990	19.58	12.92
30°	0.137	0.37	-4.27	0.166	0.55	-2.58	210°	0.993	19.73	12.95	0.985	19.41	12.88
35°	0.168	0.56	-2.50	0.162	0.52	-2.81	215°	0.989	19.56	12.91	0.978	19.14	12.82
40°	0.192	0.74	-1.33	0.159	0.51	-2.94	220°	0.984	19.36	12.87	0.968	18.76	12.73
45°	0.209	0.88	-0.58	0.160	0.51	-2.92	225°	0.978	19.11	12.81	0.956	18.28	12.62
50°	0.220	0.97	-0.14	0.166	0.55	-2.57	230°	0.970	18.83	12.75	0.941	17.70	12.48
55°	0.224	1.00	0.02	0.179	0.64	-1.91	235°	0.962	18.52	12.68	0.923	17.04	12.31
60°	0.228	1.04	0.15	0.199	0.79	-1.01	240°	0.956	18.27	12.62	0.903	16.29	12.12
65°	0.232	1.08	0.33	0.225	1.02	0.07	245°	0.948	17.98	12.55	0.879	15.46	11.89
70°	0.245	1.20	0.79	0.258	1.34	1.26	250°	0.931	17.33	12.39	0.853	14.54	11.63
75°	0.265	1.41	1.49	0.298	1.77	2.49	255°	0.904	16.34	12.13	0.820	13.44	11.28
80°	0.294	1.73	2.37	0.340	2.32	3.65	260°	0.867	15.04	11.77	0.786	12.37	10.92
85°	0.330	2.18	3.38	0.377	2.84	4.53	265°	0.821	13.48	11.30	0.748	11.18	10.48
90°	0.374	2.80	4.47	0.412	3.39	5.30	270°	0.764	11.66	10.67	0.708	10.03	10.01
95°	0.422	3.56	5.52	0.444	3.95	5.96	275°	0.695	9.65	9.85	0.666	8.88	9.48
100°	0.476	4.53	6.56	0.481	4.62	6.65	280°	0.624	7.78	8.91	0.625	7.82	8.93
105°	0.534	5.69	7.55	0.523	5.48	7.38	285°	0.542	5.88	7.69	0.584	6.81	8.33
110°	0.597	7.12	8.53	0.572	6.54	8.16	290°	0.467	4.36	6.40	0.543	5.89	7.70
115°	0.655	8.59	9.34	0.626	7.84	8.95	295°	0.401	3.21	5.07	0.500	4.99	6.98
120°	0.716	10.26	10.11	0.683	9.33	9.70	300°	0.365	2.66	4.24	0.458	4.20	6.23
125°	0.759	11.51	10.61	0.735	10.80	10.33	305°	0.355	2.52	4.01	0.413	3.41	5.33
130°	0.784	12.28	10.89	0.786	12.36	10.92	310°	0.344	2.36	3.74	0.373	2.78	4.43
135°	0.793	12.58	11.00	0.828	13.71	11.37	315°	0.326	2.12	3.27	0.330	2.18	3.38
140°	0.799	12.78	11.06	0.864	14.93	11.74	320°	0.301	1.81	2.59	0.293	1.71	2.33
145°	0.816	13.32	11.24	0.896	16.05	12.05	325°	0.270	1.45	1.62	0.252	1.27	1.03
150°	0.843	14.22	11.53	0.923	17.03	12.31	330°	0.233	1.08	0.35	0.217	0.94	-0.27
155°	0.881	15.52	11.91	0.945	17.88	12.52	335°	0.200	0.80	-0.97	0.183	0.67	-1.73
160°	0.923	17.04	12.31	0.963	18.57	12.69	340°	0.164	0.54	-2.70	0.161	0.52	-2.86
165°	0.949	18.02	12.56	0.977	19.09	12.81	345°	0.128	0.33	-4.84	0.150	0.45	-3.49
170°	0.966	18.66	12.71	0.986	19.45	12.89	350°	0.087	0.15	-8.24	0.149	0.44	-3.52
175°	0.979	19.19	12.83	0.991	19.62	12.93	355°	0.044	0.04	-14.17	0.153	0.47	-3.30

Polarization:	**Horizontal**	**Vertical**
Maximum Field:	**1.000 @ 192° True**	**0.991 @ 177° True**
Minimum Field:	**0.021 @ 1° True**	**0.148 @ 347° True**
RMS:	**0.652**	**0.652**
Maximum ERP:	**20.000 kW**	**19.646 kW**
Maximum Power Gain:	**4.766 (6.781 dB)**	**4.681 (6.704 dB)**

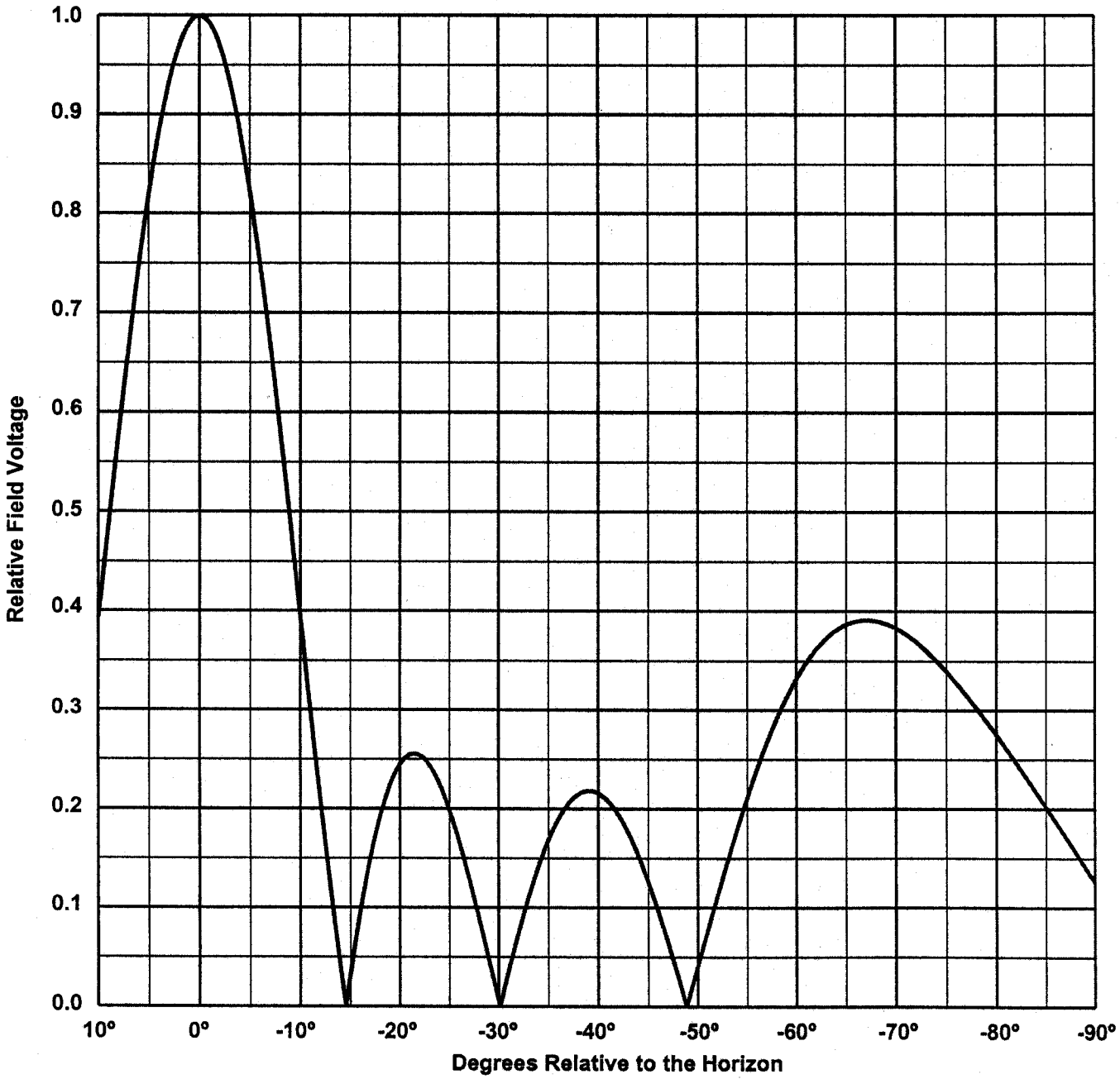
Total Input Power: 4.197 kW

ERI® Vertical Plane Relative Field Pattern

WLGM, Springfield, IL, 89.7 MHz

Figure#: 3 **Date: 5/7/01**

A 4 level, 1 wave-length spaced LP-4E-DA directional antenna with 0° beam tilt, 0% null fill and a H/V maximum power ratio of 1.018



Vertical Polarization Gain:	Horizontal Polarization Gain:
Maximum: 4.681 (6.704 dB)	Maximum: 4.766 (6.781 dB)
Horizontal Plane: 4.681 (6.704 dB)	Horizontal Plane: 4.766 (6.781 dB)

Electronics Research, Inc. 7777 Gardner Rd. Chandler, IN 47601 Phone: (812) 925-6000 Fax: (812) 925-4030 http://www.eriinc.com/

Directional Antenna System
For
WLGM, Springfield, Illinois

(Continued)

ANTENNA SPECIFICATIONS

Antenna Type:	LP-4E-DA
Frequency:	89.7 MHz
Number of Bays:	4

MECHANICAL SPECIFICATIONS

Mounting:	Custom
System length:	41 ft 8 in
Aperture length required:	48 ft.
Orientation:	190° true

Input flange to the antenna 1 5/8 inch female

ELECTRICAL SPECIFICATIONS
(For directional use)

Maximum horizontal ERP:	20 kW (13.01 dBk)
Horizontal maximum power gain:	4.766 (6.781 dB)
Maximum vertical ERP:	19.646 kW (12.933 dBk)
Vertical maximum power gain:	4.681 (6.704 dB)
Total input power:	4.197 kW (6.229 dBk)

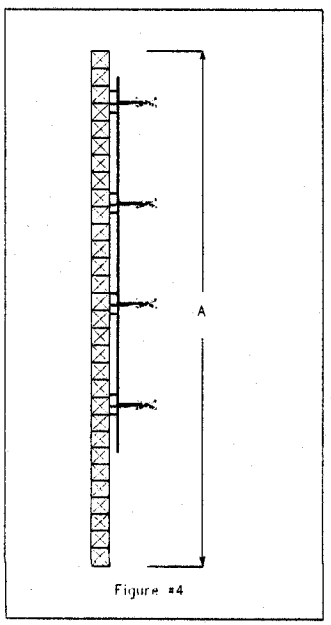


Figure #4