ITEM #1

ELECTRONICS RESEARCH, INC. ERI®

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

Directional Antenna System for WFBE, Flint, Michigan

December 2, 2009

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 WFBE.

The antenna is the ERI model MP-6E-DA-HW configuration. The circular polarized system consists of 6 half-wavelength spaced bays using one driven circular polarized radiating element per bay and 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 310 degrees East tower face with bracketry to provide an antenna orientation of North 310 degrees East. The antenna was tested on a Tapered tower, which is the structure the station plans to use to support the array. All tests were performed on a frequency of 95.1 megahertz, which is the center of the FM broadcast channel assigned to WFBE.

Pattern measurements were made on a sixty-acre antenna pattern range that 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
Proposed For
WFBE, Flint, Michigan

(Continued)

DESCRIPTION OF THE TEST PROCEDURE

The test antenna consisted of two bay levels of the circular polarized system with the associated horizontal 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 3 1/8 inch o.d. rigid coaxial line was used to feed the test antenna, and a section of 3 1/8 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 Tapered 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 a US Digital angle position indicator. The resolution of this angle position indicator is one-hundredth of a degree.

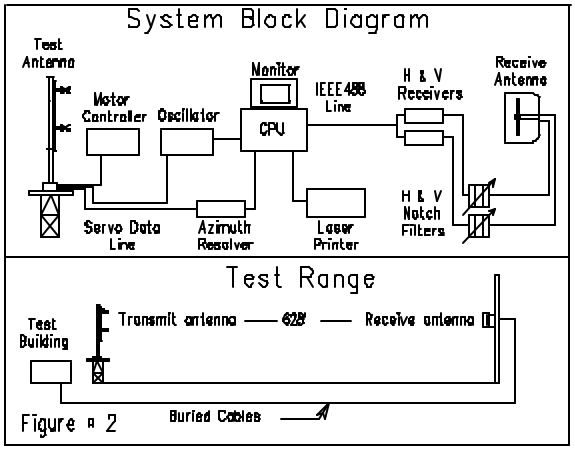


Figure # 2

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

CONCLUSIONS

The circular polarized system consists of 6 half-wavelength spaced bays using one driven circular polarized radiating element per bay and 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 MP-6E-DA-HW array is to be mounted on the North 310 degrees East tower face of the Tapered tower at a bearing of North 310 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 34.000 kilowatts (15.315 dBk).

The power at North 130-150 degrees East does not exceed 7.500 kilowatts (8.751 dBk).

(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 40 feet 9 inches.

The directional antenna should not be mounted on the top of an antenna tower that 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.

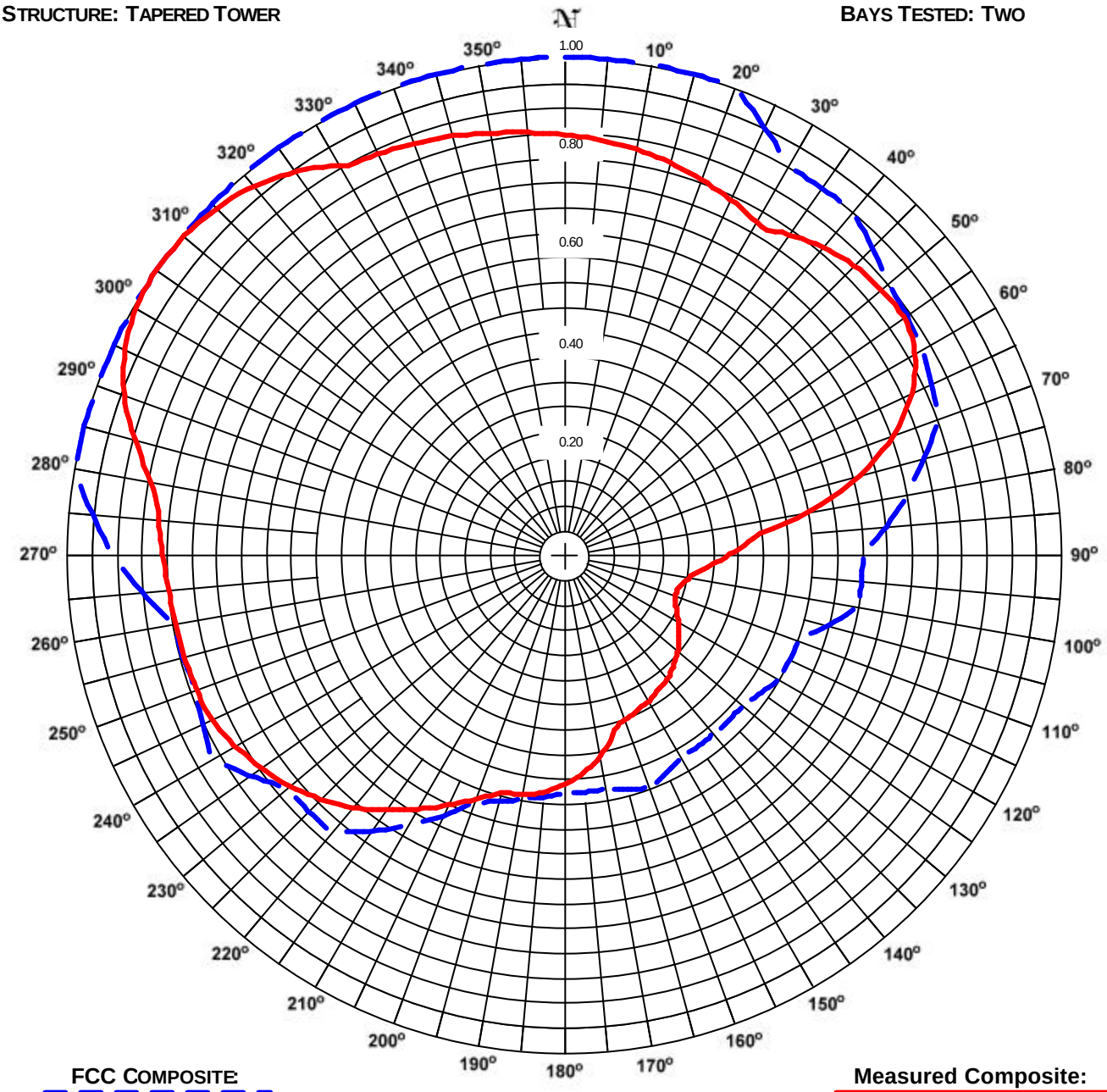
ELECTRONICS RESEARCH, INC.

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 NO: 1
STATION: WFBE
LOCATION: FLINT, MI.
ANTENNA: MP-6E-DA-HW
STRUCTURE: TAPERED TOWER

DATE: 11/20/2009
FREQUENCY: 95.1 MHZ
ORIENTATION: 310° TRUE
MOUNTING: CUSTOM
BAYS TESTED: TWO



FCC COMPOSITE:
RMS: 0.791
MAXIMUM: 1.000 @ 0° TRUE
MINIMUM: 0.470 @ 130° TRUE

Measured Composite:
RMS: 0.701
Maximum: 1.000 @ 304° True
Minimum: 0.238 @ 108° True

COMMENTS: COMPOSITE PATTERN: THIS PATTERN SHOWS THE MAXIMUM OF EITHER THE H OR V AZIMUTH VALUES. THIS PATTERN IS GREATER THAT 85% OF THE FCC FILED COMPOSITE PATTERN BPH-20070518ADJ.

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: WFBE
Location: Flint, MI.
Frequency: 95.1 MHz

Antenna: MP-6E-DA-HW
Orientation: 310° True
Tower: Tapered Tower

Figure: 1
Date: 11/20/2009
Reference: wfbe1m.fig

Angle	Envelope			Polarization	Angle	Envelope			Polarization
	Field	kW	dBk			Field	kW	dBk	
0°	0.845	24.25	13.85	Vertical	180°	0.464	7.31	8.64	Horizontal
5°	0.836	23.78	13.76	Vertical	185°	0.480	7.84	8.94	Horizontal
10°	0.827	23.28	13.67	Vertical	190°	0.490	8.17	9.12	Horizontal
15°	0.816	22.67	13.55	Vertical	195°	0.497	8.39	9.24	Vertical
20°	0.803	21.93	13.41	Vertical	200°	0.524	9.35	9.71	Vertical
25°	0.788	21.10	13.24	Vertical	205°	0.557	10.54	10.23	Vertical
30°	0.771	20.21	13.06	Vertical	210°	0.592	11.93	10.77	Vertical
35°	0.786	21.00	13.22	Horizontal	215°	0.629	13.45	11.29	Vertical
40°	0.807	22.14	13.45	Horizontal	220°	0.665	15.06	11.78	Vertical
45°	0.822	22.96	13.61	Horizontal	225°	0.696	16.47	12.17	Vertical
50°	0.831	23.45	13.70	Horizontal	230°	0.724	17.82	12.51	Vertical
55°	0.832	23.54	13.72	Horizontal	235°	0.748	19.01	12.79	Vertical
60°	0.813	22.48	13.52	Horizontal	240°	0.768	20.07	13.03	Horizontal
65°	0.771	20.19	13.05	Horizontal	245°	0.783	20.86	13.19	Horizontal
70°	0.704	16.87	12.27	Horizontal	250°	0.789	21.17	13.26	Horizontal
75°	0.615	12.84	11.09	Horizontal	255°	0.793	21.38	13.30	Vertical
80°	0.501	8.54	9.31	Horizontal	260°	0.796	21.52	13.33	Vertical
85°	0.381	4.93	6.93	Vertical	265°	0.800	21.78	13.38	Vertical
90°	0.333	3.77	5.76	Vertical	270°	0.809	22.23	13.47	Vertical
95°	0.289	2.85	4.55	Vertical	275°	0.820	22.87	13.59	Vertical
100°	0.258	2.26	3.55	Vertical	280°	0.847	24.42	13.88	Horizontal
105°	0.241	1.97	2.95	Vertical	285°	0.896	27.32	14.36	Horizontal
110°	0.239	1.93	2.87	Vertical	290°	0.943	30.22	14.80	Horizontal
115°	0.247	2.08	3.18	Vertical	295°	0.975	32.35	15.10	Horizontal
120°	0.263	2.36	3.72	Vertical	300°	0.995	33.63	15.27	Horizontal
125°	0.281	2.68	4.28	Vertical	305°	1.000	34.00	15.31	Horizontal
130°	0.298	3.02	4.80	Vertical	310°	0.998	33.86	15.30	Horizontal
135°	0.312	3.32	5.21	Vertical	315°	0.987	33.15	15.20	Horizontal
140°	0.324	3.56	5.51	Vertical	320°	0.968	31.86	15.03	Horizontal
145°	0.331	3.72	5.71	Vertical	325°	0.940	30.04	14.78	Horizontal
150°	0.340	3.93	5.94	Vertical	330°	0.903	27.73	14.43	Horizontal
155°	0.347	4.08	6.11	Vertical	335°	0.889	26.86	14.29	Vertical
160°	0.354	4.27	6.30	Vertical	340°	0.879	26.28	14.20	Vertical
165°	0.377	4.82	6.83	Horizontal	345°	0.871	25.81	14.12	Vertical
170°	0.412	5.77	7.61	Horizontal	350°	0.861	25.19	14.01	Vertical
175°	0.441	6.61	8.20	Horizontal	355°	0.852	24.66	13.92	Vertical

Polarization: **Envelope**
Maximum Field: **1.000 @ 304° True**
Minimum Field: **0.238 @ 108° True**
RMS: **0.701**
Maximum ERP: **34.000 kW**
Maximum Power Gain: **4.066 (6.092 dB)**

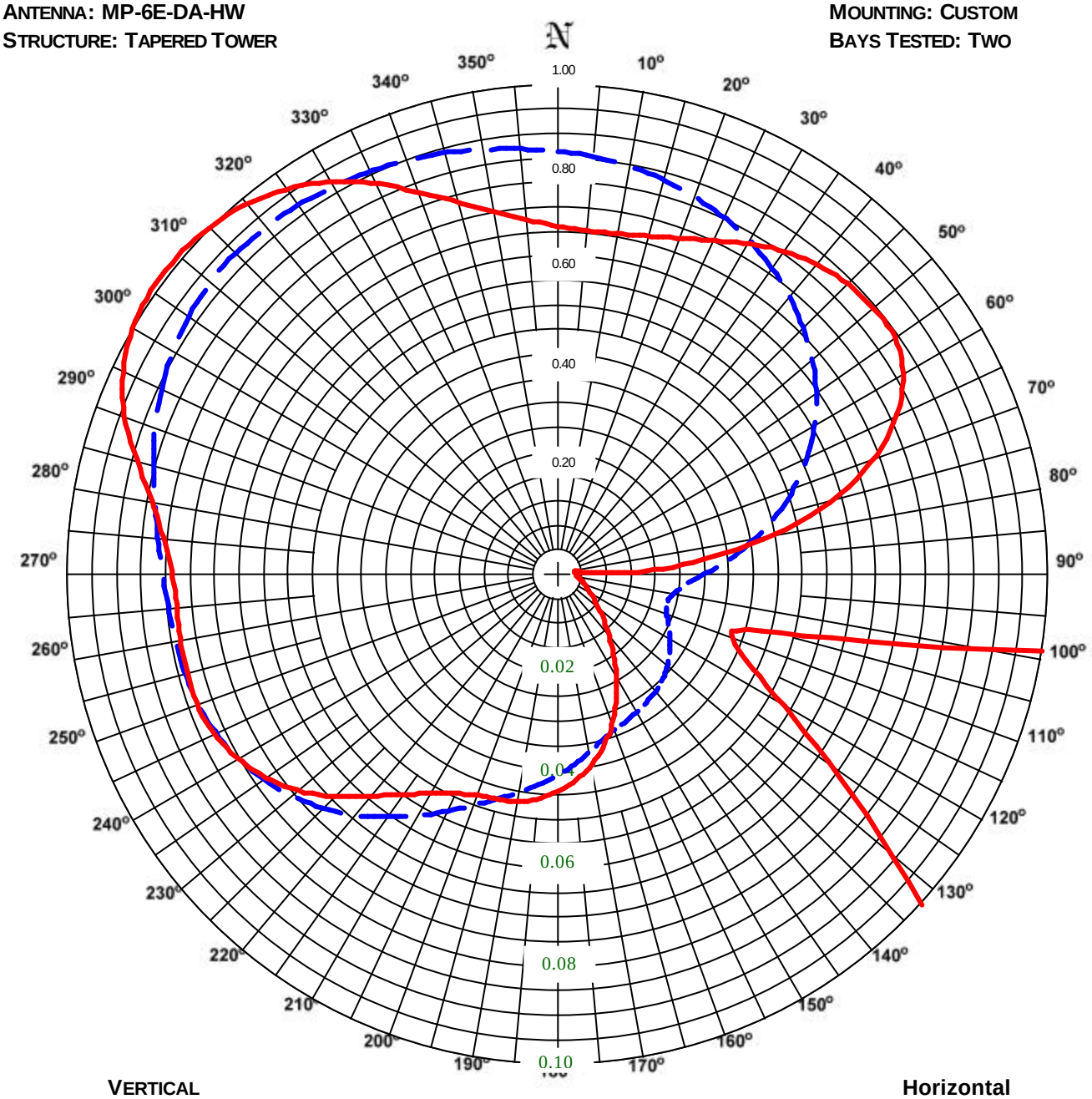
Total Input Power: 8.361 kW

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.eriinc.com/

FIGURE NO: 2
STATION: WFBE
LOCATION: FLINT, MI.
ANTENNA: MP-6E-DA-HW
STRUCTURE: TAPERED TOWER

DATE: 11/20/2009
FREQUENCY: 95.1 MHZ
ORIENTATION: 310° TRUE
MOUNTING: CUSTOM
BAYS TESTED: TWO



VERTICAL

RMS: 0.668
MAXIMUM: 0.915 @ 312° TRUE
MINIMUM: 0.238 @ 108° TRUE

10X Scale

Horizontal

RMS: 0.668
Maximum: 1.000 @ 304° True
Minimum: 0.038 @ 111° True

COMMENTS: MEASURED PATTERNS OF THE HORIZONTAL AND VERTICAL PATTERNS.

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: WFBE
Location: Flint, MI.
Frequency: 95.1 MHz

Antenna: MP-6E-DA-HW
Orientation: 310° True
Tower: Tapered Tower

Figure: 2
Date: 11/20/2009
Reference: wfbe1m.fig

Angle	Horizontal			Vertical			Angle	Horizontal			Vertical		
	Field	kW	dBk	Field	kW	dBk		Field	kW	dBk	Field	kW	dBk
0°	0.691	16.25	12.11	0.845	24.25	13.85	180°	0.464	7.31	8.64	0.431	6.32	8.00
5°	0.684	15.92	12.02	0.836	23.78	13.76	185°	0.480	7.84	8.94	0.452	6.93	8.41
10°	0.686	16.02	12.05	0.827	23.28	13.67	190°	0.490	8.17	9.12	0.472	7.58	8.80
15°	0.695	16.43	12.16	0.816	22.67	13.55	195°	0.494	8.30	9.19	0.497	8.39	9.24
20°	0.710	17.14	12.34	0.803	21.93	13.41	200°	0.500	8.49	9.29	0.524	9.35	9.71
25°	0.731	18.18	12.60	0.788	21.10	13.24	205°	0.515	9.01	9.55	0.557	10.54	10.23
30°	0.758	19.56	12.91	0.771	20.21	13.06	210°	0.539	9.88	9.95	0.592	11.93	10.77
35°	0.786	21.00	13.22	0.751	19.17	12.83	215°	0.573	11.16	10.48	0.629	13.45	11.29
40°	0.807	22.14	13.45	0.728	18.01	12.55	220°	0.616	12.92	11.11	0.665	15.06	11.78
45°	0.822	22.96	13.61	0.702	16.77	12.25	225°	0.667	15.11	11.79	0.696	16.47	12.17
50°	0.831	23.45	13.70	0.675	15.50	11.90	230°	0.710	17.14	12.34	0.724	17.82	12.51
55°	0.832	23.54	13.72	0.644	14.10	11.49	235°	0.744	18.81	12.74	0.748	19.01	12.79
60°	0.813	22.48	13.52	0.608	12.57	10.99	240°	0.768	20.07	13.03	0.766	19.97	13.00
65°	0.771	20.19	13.05	0.569	11.02	10.42	245°	0.783	20.86	13.19	0.780	20.69	13.16
70°	0.704	16.87	12.27	0.527	9.44	9.75	250°	0.789	21.17	13.26	0.789	21.16	13.25
75°	0.615	12.84	11.09	0.481	7.85	8.95	255°	0.787	21.08	13.24	0.793	21.38	13.30
80°	0.501	8.54	9.31	0.431	6.32	8.01	260°	0.784	20.88	13.20	0.796	21.52	13.33
85°	0.370	4.65	6.68	0.381	4.93	6.93	265°	0.782	20.79	13.18	0.800	21.78	13.38
90°	0.257	2.24	3.50	0.333	3.77	5.76	270°	0.790	21.23	13.27	0.809	22.23	13.47
95°	0.167	0.94	-0.25	0.289	2.85	4.55	275°	0.812	22.42	13.51	0.820	22.87	13.59
100°	0.101	0.34	-4.64	0.258	2.26	3.55	280°	0.847	24.42	13.88	0.835	23.72	13.75
105°	0.058	0.11	-9.42	0.241	1.97	2.95	285°	0.896	27.32	14.36	0.853	24.76	13.94
110°	0.039	0.05	-12.85	0.239	1.93	2.87	290°	0.943	30.22	14.80	0.872	25.84	14.12
115°	0.041	0.06	-12.51	0.247	2.08	3.18	295°	0.975	32.35	15.10	0.887	26.77	14.28
120°	0.049	0.08	-10.80	0.263	2.36	3.72	300°	0.995	33.63	15.27	0.900	27.52	14.40
125°	0.065	0.14	-8.48	0.281	2.68	4.28	305°	1.000	34.00	15.31	0.908	28.06	14.48
130°	0.086	0.25	-5.99	0.298	3.02	4.80	310°	0.998	33.86	15.30	0.914	28.40	14.53
135°	0.114	0.44	-3.56	0.312	3.32	5.21	315°	0.987	33.15	15.20	0.914	28.38	14.53
140°	0.148	0.74	-1.29	0.324	3.56	5.51	320°	0.968	31.86	15.03	0.910	28.15	14.49
145°	0.188	1.21	0.81	0.331	3.72	5.71	325°	0.940	30.04	14.78	0.904	27.82	14.44
150°	0.235	1.88	2.74	0.340	3.93	5.94	330°	0.903	27.73	14.43	0.896	27.31	14.36
155°	0.287	2.80	4.47	0.347	4.08	6.11	335°	0.857	25.00	13.98	0.889	26.86	14.29
160°	0.335	3.81	5.81	0.354	4.27	6.30	340°	0.807	22.16	13.46	0.879	26.28	14.20
165°	0.377	4.82	6.83	0.367	4.59	6.61	345°	0.765	19.90	12.99	0.871	25.81	14.12
170°	0.412	5.77	7.61	0.386	5.07	7.05	350°	0.732	18.21	12.60	0.861	25.19	14.01
175°	0.441	6.61	8.20	0.408	5.67	7.54	355°	0.707	17.00	12.31	0.852	24.66	13.92

Polarization:	**Horizontal**	**Vertical**
Maximum Field:	**1.000 @ 304° True**	**0.915 @ 312° True**
Minimum Field:	**0.038 @ 111° True**	**0.238 @ 108° True**
RMS:	**0.668**	**0.668**
Maximum ERP:	**34.000 kW**	**28.467 kW**
Maximum Power Gain:	**4.066 (6.092 dB)**	**3.405 (5.321 dB)**

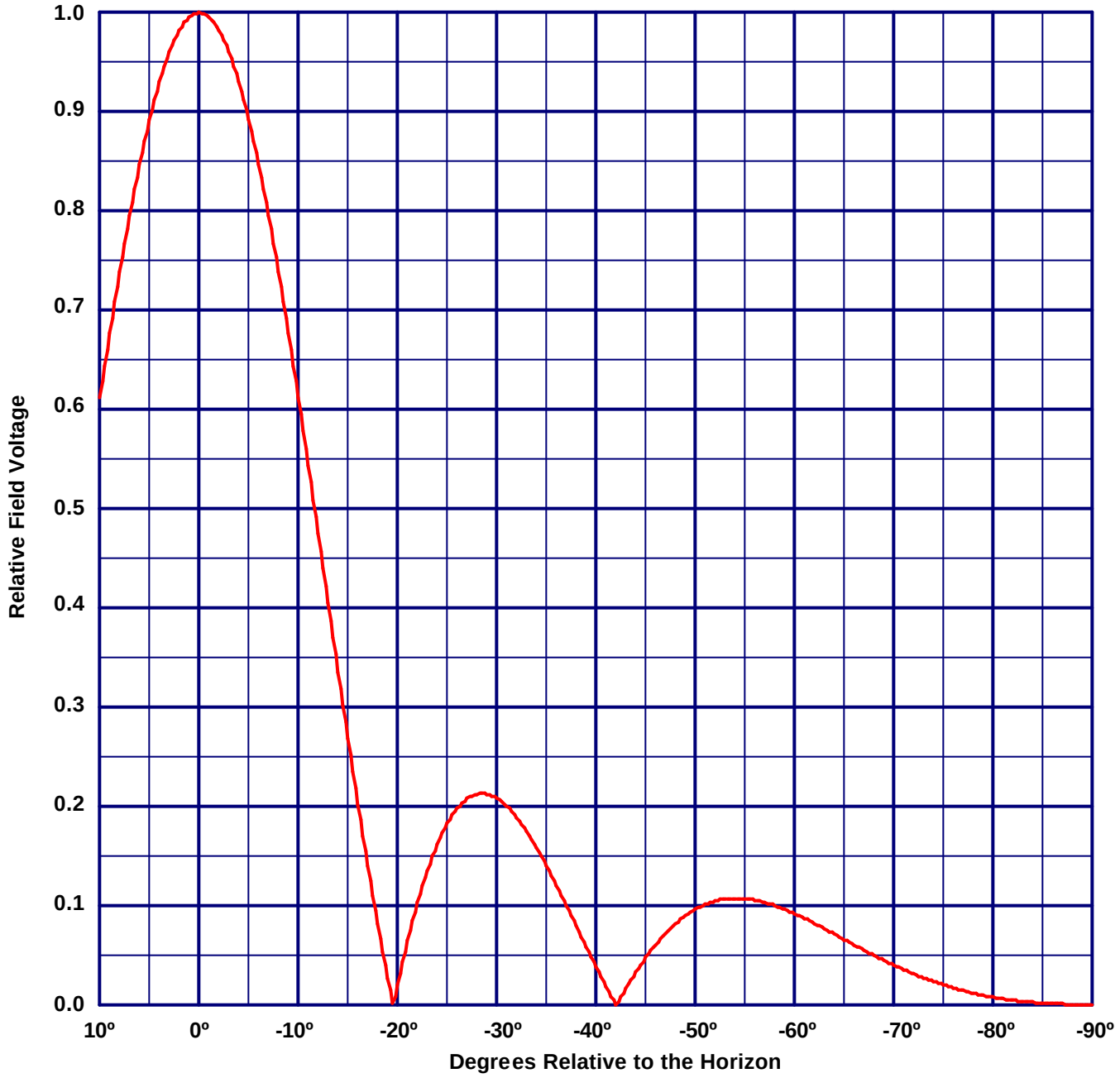
Total Input Power: 8.361 kW

Vertical Plane Relative Field Pattern

WFBE, Flint, MI, 95.1 MHz

Figure#: 3 Date: 11/20/2009

A 6 level, .5 wave-length spaced LP-6E-DA-HW directional antenna with 0° beam tilt, 0% null fill and a H/V maximum power ratio of 1.194



Vertical Polarization Gain:	Horizontal Polarization Gain:
Maximum: 3.405 (5.321 dB)	Maximum: 4.066 (6.092 dB)
Horizontal Plane: 3.405 (5.321 dB)	Horizontal Plane: 4.066 (6.092 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
WFBE, Flint, Michigan

(Continued)

ANTENNA SPECIFICATIONS

Antenna Type:	MP-6E-DA-HW
Frequency:	95.1 MHz
Number of Bays:	Six

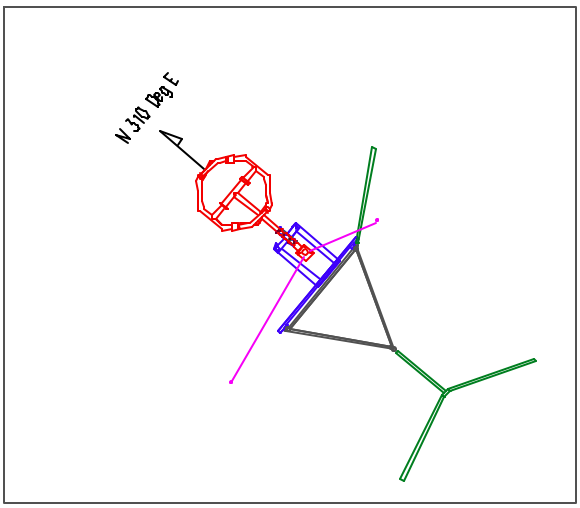
MECHANICAL SPECIFICATIONS

Mounting:	Custom
System length:	34 ft 4 in
Aperture length required:	40 ft 9 in
Orientation:	310° true

Input flange to the antenna 3 1/8 " female.

ELECTRICAL SPECIFICATIONS
(For directional use)

Maximum horizontal ERP:	34.000 kW (15.315 dBk)
Horizontal maximum power gain:	4.066 (6.0923 dB)
Maximum vertical ERP:	28.467 kW (14.543 dBk)
Vertical maximum power gain:	3.405 (5.321 dB)
Total input power:	8.361 kW (9.222 dBk)



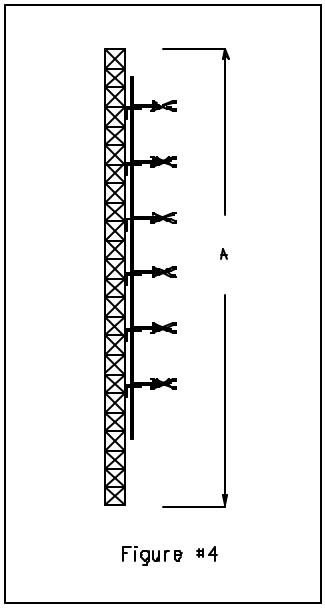


Figure #4