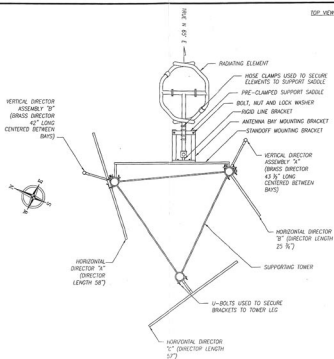
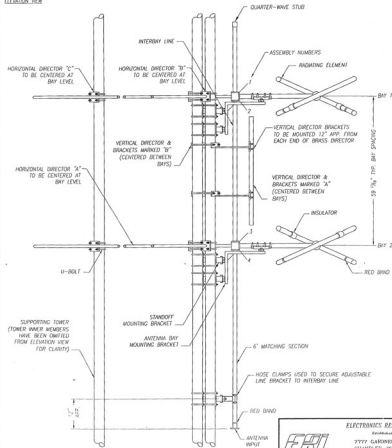


ELEVATION VIEW



NOTES:

1. ALL RED BANDS DESIGNATE SIZE TO BE MOUNTED DIMENSIONS.
2. ASSEMBLY ANTENNA SYSTEM BY MATING CORRESPONDING NUMBERS.
3. OVERALL LENGTH OF ANTENNA SYSTEM IS 12'-3 1/2" APPROXIMATE.
4. ENCLOSE TO PLUMB ANTENNA VERTICALLY BY LOOSENING HOSE CLAMPS ON PINE-CLAMPED SUPPORT SADDLES AND ADJUSTABLE LINE BRACKETS.
5. BAYS 2 & 3 SHOWN (ENCLOSURES 301).
6. REFER TO 301-3 FOR HORIZONTAL AND VERTICAL DIRECTOR LOCATIONS.
7. FINAL ORIENTATION TO BE DETERMINED BY LOCATED SIGNALING.

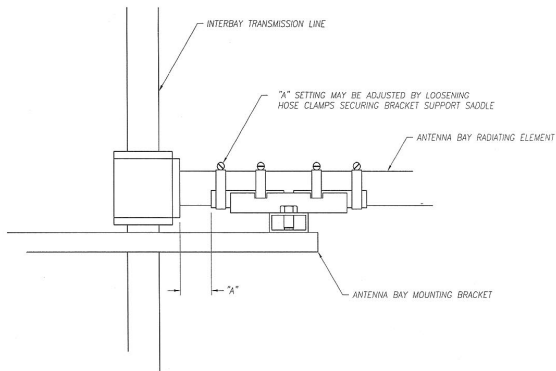
ELECTRONICS RESEARCH, INC.

Electronic Data
 7777 GARDNER RD.
 CHANDLER, IN 47824-1853
 PHONE: (317) 521-4000
 FAX: (317) 525-4000

This document contains information considered confidential to Electronics Research, Inc. (ERI). This information is intended for the use of the recipient only and is not to be distributed, copied, or otherwise used without the express written permission of ERI. If you are not the intended recipient, you are notified that disclosing, copying, distributing, or taking any action in reliance on the contents of this information is strictly prohibited. UNCLASSIFIED DOCUMENT. INFORMATION IS PROVIDED AS IS. NO WARRANTY IS MADE BY ERI.

©COPYRIGHT 2000 BY ELECTRONICS RESEARCH, INC.

NO.	REVISION	APP'D	DATE	NAME
1				INSTALLATION DETAIL
2				REVISION 1 - 10/10/00 - 100
3				REVISION 2 - 10/10/00 - 100
4				REVISION 3 - 10/10/00 - 100
5				REVISION 4 - 10/10/00 - 100
6				REVISION 5 - 10/10/00 - 100
7				REVISION 6 - 10/10/00 - 100
8				REVISION 7 - 10/10/00 - 100
9				REVISION 8 - 10/10/00 - 100
10				REVISION 9 - 10/10/00 - 100
11				REVISION 10 - 10/10/00 - 100



"A" SETTING CHART	
BAY NO.	"A" SETTING
1	1-5/8"
2	1-5/8"

ELECTRONICS RESEARCH, INC.

Established 1943

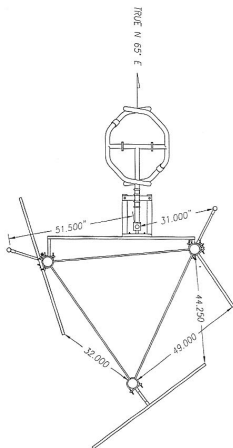
7777 GARDNER RD.
CHANDLER, IN. 47610-9637
PHONE: (812) 925-6000
FAX: (812) 925-4026

This document/drawing contains information considered confidential by Electronics Research, Inc. ("ERI"). This information is disclosed on a confidential basis and only authorized for use in the installation, operation, and maintenance of ERI tower and antenna equipment, as appropriate. Reproduction, transmission or disclosure to others, or unauthorized use, without the express written consent of ERI, is strictly prohibited. UNAUTHORIZED DUPLICATION, REPRODUCTION OR DISCLOSURE OF THIS INFORMATION IS A VIOLATION OF FEDERAL LAW.

© COPYRIGHT 2002 ERI, ELECTRONICS RESEARCH INC.

6					NAME	SUPPORTING SADDLE PLACEMENT
5					STATION	WORE - WEST HAMPTON, NY
4					FREQUENCY	98.5 MHz PROJECT NO. 09731/3
3					PATH	G:\DRAFTING\ALL\PROJECTS\09731\3
2					FILE	A-2 (WORK) JOB: TOWER NTS
1					DATE	12/04/02 APP'D 11 # DWG. NO.
NO	REVISION	APP'D	DATE		MODEL	LP-2E-DA-MW 1A-2





HORIZONTAL & VERTICAL PARASITE LOCATIONS



ELECTRONICS RESEARCH, INC.

Established 1943

7777 GARDNER RD.
CHANDLER, IN. 47610-9637
PHONE: (812) 925-6000
FAX: (812) 925-4026

This document/drawing contains information considered confidential by Electronics Research, Inc. (ERI). This information is disclosed on a confidential basis and only authorized for use in the installation, operation, and maintenance of ERI tower and antenna equipment, as appropriate. Reproduction, dissemination or disclosure to others, or unauthorized use, without the express written consent of ERI, is strictly prohibited. UNAUTHORIZED REPRODUCTION, REPRODUCTION, OR DISCLOSURE OF THIS INFORMATION IS A VIOLATION OF FEDERAL LAW.

© COPYRIGHT 2002 ERI, ELECTRONICS RESEARCH INC.

6				NAME	DIRECTOR DETAIL
5				STATION	WDR - WEST HAMPTON, NY
4				FREQUENCY	58.5 MHz PROJECT NO. 08731/3
3				PATH	C:\DRAWING\ALL\PROJECTS\08731\3
2				FILE	1A - 3 DRAWS WDR TOWER N/S
1				DATE	12/06/02 APP'D DMC XO
NO	REVISION	APP'D	DATE	MODEL	LP-2E-GA-HW 1A-3

REC'D 12/3/02

ERI[®] Electronics Research, Inc.

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 WDRE, West Hampton, New York

December 2, 2002

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 WDRE.

The antenna is the ERI model LP-2E-DA-HW configuration. The circular polarized system consists of two half-wavelength spaced bays using one driven circular polarized radiating element per bay, three horizontal parasitic elements per bay and two vertical parasitic elements interleaved between the bays. The antenna was mounted on the North 60 degrees East tower face with bracketry to provide an antenna orientation of North 65 degrees East. The antenna was tested on a 60" face tower, which is the structure the station plans to use to support the array. All tests were performed on a frequency of 98.5 megahertz, which is the center of the FM broadcast channel assigned to WDRE.

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 For WDRE, West Hampton, New York

(Continued)

DESCRIPTION OF THE TEST PROCEDURE

The test antenna consisted of a full scale model of the complete 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 60" face 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 98.5 MHz 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.

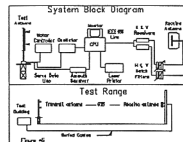


Figure 46

Directional Antenna System
For
WDRE, West Hampton, New York

(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 coordinated graph paper in a clockwise direction. Both horizontal and vertical components were recorded separately.

CONCLUSIONS

The circular polarized system consists of two half-wavelength spaced bays using one driven circular polarized radiating element per bay, three horizontal parasitic elements per bay and two vertical parasitic elements interleaved between the bays. 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-2E-DA-HW array is to be mounted on the North 60 degrees East tower face of the 60" face tower at a bearing of North 65 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 3 kilowatts (4.771 dBk).

The power at North 240-280 degrees East does not exceed 0.992 kilowatts (-.035 dBk).

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 than 85% of the filed composite pattern.

Directional Antenna System
For
WDRE, West Hampton, New York

(Continued)

The clear vertical length of the structure required to support the antenna is 20 feet if the antenna is to be top mounted.

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.

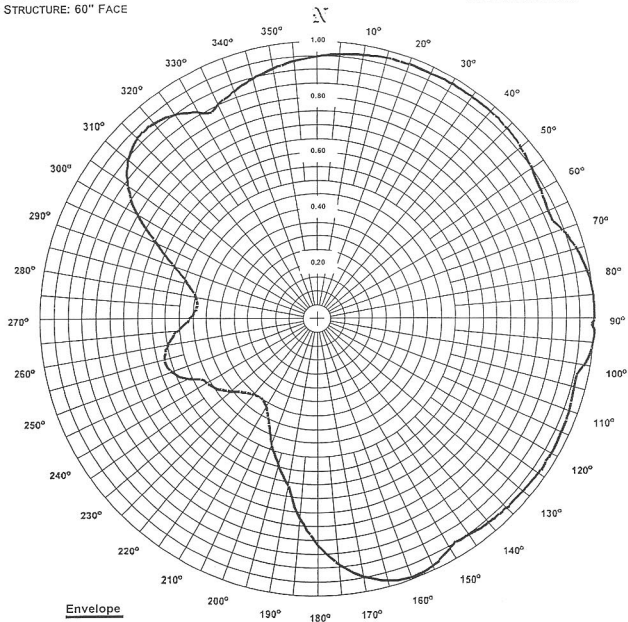
For Mr. [unclear]

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: WDRE
LOCATION: WEST HAMPTON, NY.
ANTENNA TYPE: LP-2E-DA-HW
STRUCTURE: 60" FACE

DATE: 12/2/02
FREQUENCY: 98.5 MHz
ORIENTATION: 65° TRUE
MOUNTING: CUSTOM



RMS: 0.828
Maximum: 1.000 @ 86° True
Minimum: 0.346 @ 216° 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 BPH-20020322ACB.

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: WDRE

Location: West Hampton, NY.

Frequency: 98.5 MHz

Antenna: LP-2E-DA-HW

Orientation: 65° True

Tower: 60' Face

Figure: 1

Date: 12/2/02

Reference: wdre1m.fig

Angle	Envelope			Polarization	Angle	Envelope			Polarization
	Field	kW	dBk			Field	kW	dBk	
0°	0.953	2.72	4.35	Vertical	180°	0.813	1.98	2.97	Horizontal
5°	0.964	2.79	4.45	Vertical	185°	0.721	1.56	1.93	Horizontal
10°	0.972	2.83	4.52	Vertical	190°	0.610	1.12	0.47	Horizontal
15°	0.978	2.87	4.57	Vertical	195°	0.544	0.89	-0.52	Vertical
20°	0.980	2.88	4.60	Vertical	200°	0.481	0.69	-1.59	Vertical
25°	0.981	2.89	4.60	Vertical	205°	0.415	0.52	-2.87	Vertical
30°	0.981	2.89	4.60	Vertical	210°	0.368	0.41	-3.91	Vertical
35°	0.981	2.89	4.60	Vertical	215°	0.347	0.36	-4.42	Vertical
40°	0.980	2.88	4.59	Vertical	220°	0.351	0.37	-4.31	Vertical
45°	0.974	2.85	4.54	Vertical	225°	0.369	0.41	-3.88	Vertical
50°	0.964	2.79	4.45	Vertical	230°	0.400	0.48	-3.18	Vertical
55°	0.948	2.70	4.31	Vertical	235°	0.436	0.57	-2.44	Vertical
60°	0.933	2.61	4.17	Vertical	240°	0.459	0.63	-1.99	Vertical
65°	0.923	2.56	4.07	Vertical	245°	0.505	0.76	-1.17	Horizontal
70°	0.945	2.68	4.28	Horizontal	250°	0.559	0.94	-0.29	Horizontal
75°	0.973	2.84	4.54	Horizontal	255°	0.573	0.99	-0.06	Horizontal
80°	0.992	2.95	4.70	Horizontal	260°	0.554	0.92	-0.35	Horizontal
85°	1.000	3.00	4.77	Horizontal	265°	0.512	0.79	-1.04	Horizontal
90°	1.000	3.00	4.77	Horizontal	270°	0.465	0.65	-1.87	Horizontal
95°	0.997	2.98	4.75	Horizontal	275°	0.442	0.59	-2.32	Horizontal
100°	0.973	2.84	4.53	Horizontal	280°	0.446	0.60	-2.24	Horizontal
105°	0.959	2.76	4.40	Vertical	285°	0.481	0.69	-1.59	Horizontal
110°	0.965	2.79	4.46	Vertical	290°	0.545	0.89	-0.50	Horizontal
115°	0.969	2.82	4.50	Vertical	295°	0.638	1.22	0.87	Horizontal
120°	0.971	2.83	4.52	Vertical	300°	0.750	1.69	2.27	Horizontal
125°	0.970	2.83	4.51	Vertical	305°	0.838	2.10	3.23	Horizontal
130°	0.968	2.81	4.49	Vertical	310°	0.896	2.41	3.82	Horizontal
135°	0.963	2.78	4.45	Vertical	315°	0.925	2.57	4.09	Horizontal
140°	0.957	2.75	4.39	Vertical	320°	0.924	2.56	4.09	Horizontal
145°	0.948	2.70	4.31	Vertical	325°	0.904	2.45	3.89	Horizontal
150°	0.957	2.75	4.39	Horizontal	330°	0.866	2.25	3.52	Horizontal
155°	0.982	2.89	4.61	Horizontal	335°	0.854	2.19	3.40	Vertical
160°	0.989	2.93	4.67	Horizontal	340°	0.880	2.32	3.66	Vertical
165°	0.973	2.84	4.54	Horizontal	345°	0.902	2.44	3.88	Vertical
170°	0.939	2.64	4.22	Horizontal	350°	0.922	2.55	4.06	Vertical
175°	0.885	2.35	3.71	Horizontal	355°	0.939	2.64	4.22	Vertical

Polarization: Envelope
 Maximum Field: 1.000 @ 86° True
 Minimum Field: 0.346 @ 216° True
 RMS: 0.828
 Maximum ERP: 3.000 kW
 Maximum Power Gain: 1.094 (0.390 dB)

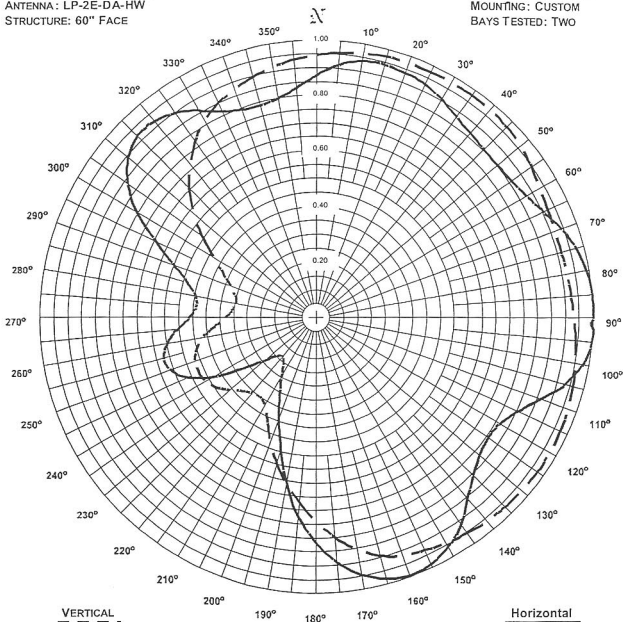
Total Input Power: 2.743 kW

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: WDRE
LOCATION: WEST HAMPTON, NY.
ANTENNA: LP-2E-DA-HW
STRUCTURE: 60" FACE

DATE: 12/2/02
FREQUENCY: 98.5 MHz
ORIENTATION: 65° TRUE
MOUNTING: CUSTOM
BAYS TESTED: TWO



RMS: 0.781
MAXIMUM: 0.981 @ 22° TRUE
MINIMUM: 0.297 @ 281° TRUE

RMS: 0.781
Maximum: 1.000 @ 86° True
Minimum: 0.181 @ 223° 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.eriinc.com/>

Station: WDRE
Location: West Hampton, NY.
Frequency: 98.5 MHz

Antenna: LP-2E-DA-HW
Orientation: 65° True
Tower: 60" Face

Figure: 2
Date: 12/2/02
Reference: wdre1m.tif

Angle	Horizontal			Vertical			Angle	Horizontal			Vertical		
	Field	kW	dBk	Field	kW	dBk		Field	kW	dBk	Field	kW	dBk
0°	0.881	2.33	3.67	0.953	2.72	4.35	180°	0.813	1.98	2.97	0.734	1.62	2.09
5°	0.920	2.54	4.04	0.964	2.79	4.45	185°	0.721	1.56	1.93	0.669	1.34	1.28
10°	0.942	2.66	4.25	0.972	2.83	4.52	190°	0.610	1.12	0.47	0.609	1.11	0.46
15°	0.948	2.70	4.31	0.978	2.87	4.57	195°	0.492	0.73	-1.39	0.544	0.89	-0.52
20°	0.942	2.66	4.25	0.980	2.88	4.60	200°	0.392	0.46	-3.36	0.481	0.69	-1.59
25°	0.929	2.59	4.13	0.981	2.89	4.60	205°	0.312	0.29	-5.35	0.415	0.52	-2.87
30°	0.909	2.48	3.94	0.981	2.89	4.60	210°	0.251	0.19	-7.25	0.368	0.41	-3.91
35°	0.885	2.35	3.71	0.981	2.89	4.60	215°	0.209	0.13	-8.84	0.347	0.36	-4.42
40°	0.867	2.26	3.53	0.980	2.88	4.59	220°	0.186	0.10	-9.86	0.351	0.37	-4.31
45°	0.857	2.20	3.43	0.974	2.85	4.54	225°	0.186	0.10	-9.86	0.369	0.41	-3.88
50°	0.854	2.19	3.40	0.964	2.79	4.45	230°	0.224	0.15	-8.22	0.400	0.48	-3.18
55°	0.862	2.23	3.49	0.948	2.70	4.31	235°	0.301	0.27	-5.66	0.436	0.57	-2.44
60°	0.881	2.33	3.67	0.933	2.61	4.17	240°	0.413	0.51	-2.92	0.459	0.63	-1.99
65°	0.909	2.48	3.94	0.923	2.56	4.07	245°	0.505	0.76	-1.17	0.469	0.66	-1.80
70°	0.945	2.68	4.28	0.917	2.52	4.02	250°	0.559	0.94	-0.29	0.468	0.66	-1.82
75°	0.973	2.84	4.54	0.916	2.52	4.01	255°	0.573	0.99	-0.06	0.453	0.62	-2.11
80°	0.992	2.95	4.70	0.919	2.53	4.03	260°	0.554	0.92	-0.35	0.423	0.54	-2.70
85°	1.000	3.00	4.77	0.923	2.56	4.08	265°	0.512	0.79	-1.04	0.378	0.43	-3.67
90°	1.000	3.00	4.77	0.930	2.60	4.14	270°	0.465	0.65	-1.87	0.337	0.34	-4.69
95°	0.997	2.98	4.75	0.939	2.65	4.23	275°	0.442	0.59	-2.32	0.310	0.29	-5.41
100°	0.973	2.84	4.53	0.950	2.71	4.33	280°	0.446	0.60	-2.24	0.298	0.27	-5.75
105°	0.925	2.57	4.09	0.959	2.76	4.40	285°	0.481	0.69	-1.59	0.304	0.28	-5.57
110°	0.854	2.19	3.40	0.965	2.79	4.46	290°	0.545	0.89	-0.50	0.328	0.32	-4.91
115°	0.796	1.90	2.79	0.969	2.82	4.50	295°	0.638	1.22	0.87	0.369	0.41	-3.88
120°	0.763	1.74	2.42	0.971	2.83	4.52	300°	0.750	1.69	2.27	0.428	0.55	-2.60
125°	0.754	1.70	2.32	0.970	2.83	4.51	305°	0.838	2.10	3.23	0.503	0.76	-1.19
130°	0.768	1.77	2.48	0.968	2.81	4.49	310°	0.896	2.41	3.82	0.587	1.03	0.14
135°	0.801	1.93	2.85	0.963	2.78	4.45	315°	0.925	2.57	4.09	0.657	1.29	1.12
140°	0.852	2.18	3.38	0.957	2.75	4.39	320°	0.924	2.56	4.09	0.719	1.55	1.90
145°	0.913	2.50	3.98	0.948	2.70	4.31	325°	0.904	2.45	3.89	0.775	1.80	2.56
150°	0.957	2.75	4.39	0.938	2.64	4.22	330°	0.866	2.25	3.52	0.821	2.02	3.06
155°	0.982	2.89	4.61	0.926	2.57	4.10	335°	0.825	2.04	3.10	0.854	2.19	3.40
160°	0.989	2.93	4.67	0.912	2.49	3.97	340°	0.801	1.93	2.85	0.880	2.32	3.66
165°	0.973	2.84	4.54	0.888	2.36	3.74	345°	0.795	1.90	2.78	0.902	2.44	3.88
170°	0.939	2.64	4.22	0.846	2.15	3.32	350°	0.808	1.96	2.92	0.922	2.55	4.06
175°	0.885	2.35	3.71	0.796	1.90	2.79	355°	0.837	2.10	3.22	0.939	2.64	4.22

Polarization: Horizontal
Maximum Field: 1.000 @ 86° True
Minimum Field: 0.181 @ 223° True
RMS: 0.781
Maximum ERP: 3.000 kW
Maximum Power Gain: 1.094 (0.390 dB)

Vertical
0.981 @ 22° True
0.297 @ 281° True
0.781
2.886 kW
1.052 (0.221 dB)

Total Input Power: 2.743 kW

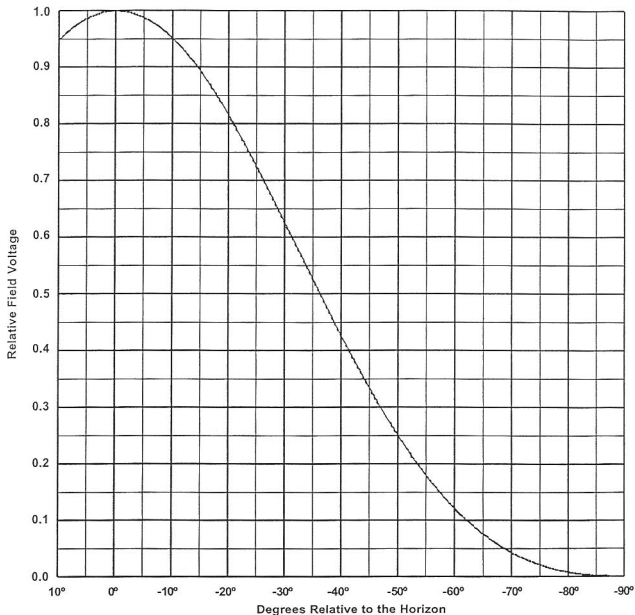
ERI[®] Vertical Plane Relative Field Pattern

WDRE, West Hampton, NY., 98.5 MHz

Figure#: 3

Date: 12/2/02

A 2 level, .5 wave-length spaced LP-2E-DA-HW directional antenna with 0° beam tilt, 0% null fill and a H/V maximum power ratio of 1.040



Vertical Polarization Gain:

Maximum: 1.052 (0.221 dB)

Horizontal Plane: 1.052 (0.221 dB)

Horizontal Polarization Gain:

Maximum: 1.094 (0.390 dB)

Horizontal Plane: 1.094 (0.390 dB)

Directional Antenna System
for
WDRE, West Hampton, New York

(Continued)

ANTENNA SPECIFICATIONS

Antenna Type:	LP-2E-DA-HW
Frequency:	98.5 MHz
Number of Bays:	2

MECHANICAL SPECIFICATIONS

Mounting:	Custom
System length:	13 ft 7 in
Aperture length required:	20 ft.
Orientation:	65° true
Input flange to the antenna	1 5/8 inch female

ELECTRICAL SPECIFICATIONS

(For directional use)

Maximum horizontal ERP:	3 kW (4.771 dBk)
Horizontal maximum power gain:	1.094 (0.390 dB)
Maximum vertical ERP:	3 kW (4.771 dBk)
Vertical maximum power gain:	1.052 (0.221 dB)
Total input power:	2.743 kW (4.382 dBk)

