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 KWPS, Caddo Valley, Arkansas

November 5, 2013

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 KWPS.

The antenna is the ERI model LP-1E-DA configuration. The circular polarized system consists of one bay using one driven circular polarized radiating element and two horizontal parasitic elements placed one-quarter wave above and below the bay. The antenna was mounted on the North 60 degrees East tower face with bracketry to provide an antenna orientation of North 60 degrees East. The antenna was tested on a 26" face tower, which is the structure the station plans to use to support the array. All tests were performed on a frequency of 99.7 megahertz, which is the center of the FM broadcast channel assigned to KWPS.

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.

7777 Gardner Road
Chandler, IN 47610-9219
USA

+1 812 925 6000 (tel)
+1 812 925 4030 (fax)
877 ERI-LINE (toll-free)

Sales@eriinc.com
CustomerSupport@er
WWW.eriinc.com

EXHIBIT A
APPLICATION FOR PROGRAM TEST AUTHORITY
AND STATION LICENSE
SOUTHWEST ARKANSAS MEDIA, INC.
KWPS-FM RADIO STATION
CH 259A - 99.7 MHz - 0.98 kW - DA
CADDO VALLEY, ARKANSAS
March 2014

Directional Antenna System
For
KWPS, Caddo Valley, Arkansas

(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 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 26" 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 a US Digital angle position indicator. The resolution of this angle position indicator is one-hundredth of a degree.

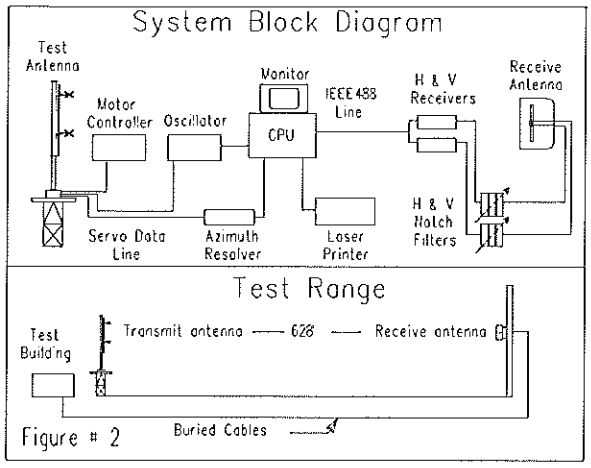


Figure # 2

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 99.7 MHz and was constantly monitored by a Rohde & Schwarz ESVD measuring receiver.

Directional Antenna System
For
KWPS, Caddo Valley, Arkansas

(Continued)

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 one bay using one driven circular polarized radiating element and two horizontal parasitic elements placed one-quarter wave above and below the 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-1E-DA array is to be mounted on the North 60 degrees East tower face of the 26" face tower at a bearing of North 60 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 measured individual horizontal and vertical components, the composite maximum of either the horizontal or vertical component at any azimuth and the FCC filed envelope pattern. The horizontal plane relative field list for the composite pattern and the individual H & V components are shown as Figure #1 & 1A respectively. 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 0.980 kilowatts (-0.088 dBk).

Directional Antenna System
For
KWPS, Caddo Valley, Arkansas

(Continued)

The power at North 230 degrees East does not exceed .088 kilowatts (-10.555 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 that 85% of the filed composite pattern.

The clear vertical length of the structure required to support the antenna is 20 feet.

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.

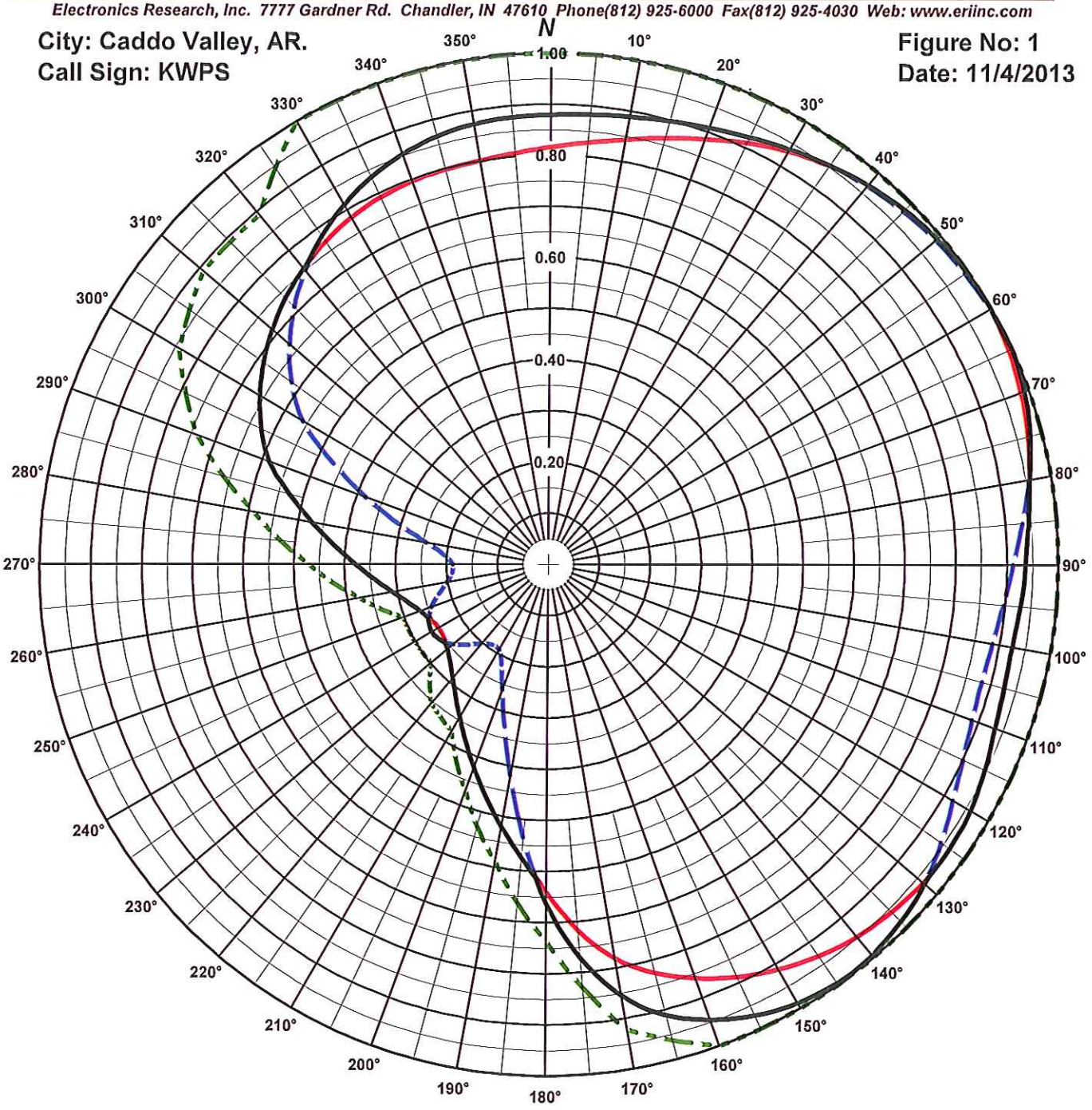
Tom Schaaf

ERI® Horizontal Plane Relative Field Pattern

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

City: Caddo Valley, AR.
Call Sign: KWPS

Figure No: 1
Date: 11/4/2013



Antenna Orientation: 60° True

Frequency: 99.7 MHz
Antenna Type: LP-1E-DA

Antenna Mounting: Custom
Tower Type: 26" Rohn

HORIZONTAL	VERTICAL	COMPOSITE	FCC ENVELOPE
RMS: .761	RMS: .756	RMS: .78	RMS: .85
Maximum: 1 @ 59°	Maximum: 1 @ 64°	Maximum: 1 @ 59°	Maximum: 1 @ 0°
Minimum: .248 @ 238°	Minimum: .187 @ 268°	Minimum: .253 @ 233°	Minimum: .299 @ 230°

Measured patterns of the horizontal and vertical components, with the composite maximum of either the the H or V components and the filed FCC envelope pattern BPH-20130729AKL.

ERI® Horizontal Plane Relative Field Pattern

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

Figure# 1
Station: KWPS
Location: Caddo Valley, AR.
Frequency: 99.7 MHz

Date: 11/4/2013
Antenna: LP-1E-DA
Antenna Orientation: 60° True
Number of Bays: 1

Azimuth	Envelope			Polarization	Azimuth	Envelope			Polarization
	Field	kW	dBk	Maximum		Field	kW	dBk	Maximum
0°	0.879	0.757	-1.208	Vertical	180°	0.663	0.430	-3.661	Vertical
5°	0.883	0.764	-1.170	Vertical	185°	0.574	0.323	-4.913	Horizontal
10°	0.889	0.775	-1.109	Vertical	190°	0.518	0.263	-5.793	Horizontal
15°	0.898	0.790	-1.026	Vertical	195°	0.468	0.214	-6.692	Horizontal
20°	0.908	0.809	-0.921	Vertical	200°	0.421	0.174	-7.601	Horizontal
25°	0.922	0.833	-0.795	Vertical	205°	0.380	0.141	-8.496	Horizontal
30°	0.937	0.861	-0.649	Vertical	210°	0.344	0.116	-9.352	Horizontal
35°	0.953	0.890	-0.504	Vertical	215°	0.314	0.097	-10.137	Horizontal
40°	0.969	0.920	-0.361	Horizontal	220°	0.289	0.082	-10.855	Horizontal
45°	0.982	0.945	-0.246	Horizontal	225°	0.271	0.072	-11.444	Horizontal
50°	0.991	0.963	-0.162	Horizontal	230°	0.257	0.065	-11.877	Horizontal
55°	0.998	0.975	-0.109	Horizontal	235°	0.258	0.065	-11.859	Vertical
60°	1.000	0.980	-0.088	Horizontal	240°	0.263	0.068	-11.688	Vertical
65°	1.000	0.980	-0.089	Vertical	245°	0.258	0.065	-11.852	Vertical
70°	0.992	0.965	-0.157	Vertical	250°	0.267	0.070	-11.554	Horizontal
75°	0.977	0.936	-0.289	Vertical	255°	0.286	0.080	-10.970	Horizontal
80°	0.957	0.898	-0.467	Horizontal	260°	0.310	0.094	-10.247	Horizontal
85°	0.945	0.875	-0.580	Horizontal	265°	0.342	0.114	-9.420	Horizontal
90°	0.936	0.859	-0.659	Horizontal	270°	0.379	0.141	-8.522	Horizontal
95°	0.930	0.848	-0.715	Horizontal	275°	0.422	0.175	-7.579	Horizontal
100°	0.925	0.838	-0.768	Horizontal	280°	0.472	0.218	-6.614	Horizontal
105°	0.927	0.843	-0.744	Horizontal	285°	0.528	0.273	-5.643	Horizontal
110°	0.935	0.857	-0.672	Horizontal	290°	0.585	0.336	-4.742	Horizontal
115°	0.948	0.881	-0.552	Horizontal	295°	0.625	0.383	-4.174	Horizontal
120°	0.960	0.903	-0.443	Horizontal	300°	0.658	0.424	-3.727	Horizontal
125°	0.966	0.914	-0.392	Horizontal	305°	0.687	0.463	-3.347	Horizontal
130°	0.969	0.919	-0.365	Vertical	310°	0.713	0.498	-3.025	Horizontal
135°	0.985	0.950	-0.222	Vertical	315°	0.736	0.530	-2.755	Horizontal
140°	0.996	0.971	-0.126	Vertical	320°	0.755	0.558	-2.532	Horizontal
145°	0.997	0.974	-0.113	Vertical	325°	0.783	0.601	-2.212	Vertical
150°	0.989	0.958	-0.187	Vertical	330°	0.811	0.645	-1.903	Vertical
155°	0.972	0.925	-0.337	Vertical	335°	0.835	0.683	-1.658	Vertical
160°	0.947	0.878	-0.564	Vertical	340°	0.853	0.713	-1.471	Vertical
165°	0.912	0.815	-0.890	Vertical	345°	0.866	0.735	-1.338	Vertical
170°	0.855	0.716	-1.451	Vertical	350°	0.874	0.749	-1.257	Vertical
175°	0.771	0.582	-2.352	Vertical	355°	0.877	0.754	-1.226	Vertical

Horizontal Polarization:
Maximum: 0.762 (-1.181 dB)
Horizontal Plane: 0.762 (-1.181 dB)
Maximum ERP: 0.980 kW

Vertical Polarization:
Maximum: 0.762 (-1.181 dB)
Horizontal Plane: 0.762 (-1.181 dB)
Maximum ERP: 0.980 kW

Total Input Power: 1.286 kW
Reference: KWPS2M.FIG

This list shows the the maximum azimuth values of either the horizontal or vertical components.

ERI® Horizontal Plane Relative Field Pattern

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

Figure# 1A
Station: KWPS
Location: Caddo Valley, AR.
Frequency: 99.7 MHz

Date: 11/4/2013
Antenna: LP-1E-DA
Antenna Orientation: 60° True
Number of Bays: 1

Azimuth	Horizontal			Vertical			Azimuth	Horizontal			Vertical		
	Field	kW	dBk	Field	kW	dBk		Field	kW	dBk	Field	kW	dBk
0°	0.816	0.652	-1.855	0.879	0.757	-1.208	180°	0.641	0.403	-3.950	0.663	0.430	-3.661
5°	0.828	0.672	-1.725	0.883	0.764	-1.170	185°	0.574	0.323	-4.913	0.535	0.280	-5.528
10°	0.844	0.698	-1.563	0.889	0.775	-1.109	190°	0.518	0.263	-5.793	0.418	0.171	-7.660
15°	0.863	0.730	-1.369	0.898	0.790	-1.026	195°	0.468	0.214	-6.692	0.328	0.105	-9.777
20°	0.885	0.768	-1.147	0.908	0.809	-0.921	200°	0.421	0.174	-7.601	0.260	0.066	-11.777
25°	0.910	0.812	-0.906	0.922	0.833	-0.795	205°	0.380	0.141	-8.496	0.215	0.045	-13.422
30°	0.933	0.853	-0.690	0.937	0.861	-0.649	210°	0.344	0.116	-9.352	0.193	0.036	-14.378
35°	0.953	0.890	-0.508	0.953	0.890	-0.504	215°	0.314	0.097	-10.137	0.192	0.036	-14.441
40°	0.969	0.920	-0.361	0.967	0.916	-0.380	220°	0.289	0.082	-10.855	0.202	0.040	-13.974
45°	0.982	0.945	-0.246	0.978	0.938	-0.278	225°	0.271	0.072	-11.444	0.222	0.048	-13.168
50°	0.991	0.963	-0.162	0.987	0.955	-0.198	230°	0.257	0.065	-11.877	0.244	0.058	-12.355
55°	0.998	0.975	-0.109	0.994	0.968	-0.140	235°	0.250	0.061	-12.141	0.258	0.065	-11.859
60°	1.000	0.980	-0.088	0.998	0.977	-0.103	240°	0.249	0.061	-12.178	0.263	0.068	-11.688
65°	0.994	0.967	-0.144	1.000	0.980	-0.089	245°	0.255	0.064	-11.967	0.258	0.065	-11.852
70°	0.984	0.949	-0.226	0.992	0.965	-0.157	250°	0.267	0.070	-11.554	0.244	0.058	-12.330
75°	0.972	0.926	-0.333	0.977	0.936	-0.289	255°	0.286	0.080	-10.970	0.223	0.049	-13.140
80°	0.957	0.898	-0.467	0.956	0.897	-0.474	260°	0.310	0.094	-10.247	0.202	0.040	-13.961
85°	0.945	0.875	-0.580	0.932	0.852	-0.695	265°	0.342	0.114	-9.420	0.190	0.036	-14.495
90°	0.936	0.859	-0.659	0.911	0.814	-0.893	270°	0.379	0.141	-8.522	0.189	0.035	-14.576
95°	0.930	0.848	-0.715	0.897	0.788	-1.034	275°	0.422	0.175	-7.579	0.205	0.041	-13.836
100°	0.925	0.838	-0.768	0.886	0.769	-1.138	280°	0.472	0.218	-6.614	0.244	0.058	-12.345
105°	0.927	0.843	-0.744	0.882	0.763	-1.177	285°	0.528	0.273	-5.643	0.305	0.091	-10.395
110°	0.935	0.857	-0.672	0.887	0.771	-1.130	290°	0.585	0.336	-4.742	0.382	0.143	-8.440
115°	0.948	0.881	-0.552	0.900	0.794	-1.004	295°	0.625	0.383	-4.174	0.467	0.214	-6.703
120°	0.960	0.903	-0.443	0.920	0.829	-0.813	300°	0.658	0.424	-3.727	0.559	0.306	-5.138
125°	0.966	0.914	-0.392	0.945	0.876	-0.577	305°	0.687	0.463	-3.347	0.619	0.376	-4.253
130°	0.965	0.913	-0.394	0.969	0.919	-0.365	310°	0.713	0.498	-3.025	0.668	0.437	-3.593
135°	0.958	0.900	-0.457	0.985	0.950	-0.222	315°	0.736	0.530	-2.755	0.711	0.496	-3.046
140°	0.948	0.881	-0.551	0.996	0.971	-0.126	320°	0.755	0.558	-2.532	0.750	0.551	-2.589
145°	0.933	0.852	-0.695	0.997	0.974	-0.113	325°	0.770	0.582	-2.353	0.783	0.601	-2.212
150°	0.913	0.816	-0.883	0.989	0.958	-0.187	330°	0.783	0.600	-2.215	0.811	0.645	-1.903
155°	0.888	0.773	-1.117	0.972	0.925	-0.337	335°	0.792	0.614	-2.117	0.835	0.683	-1.658
160°	0.859	0.724	-1.405	0.947	0.878	-0.564	340°	0.797	0.623	-2.058	0.853	0.713	-1.471
165°	0.826	0.668	-1.751	0.912	0.815	-0.890	345°	0.799	0.626	-2.034	0.866	0.735	-1.338
170°	0.781	0.598	-2.234	0.855	0.716	-1.451	350°	0.802	0.630	-2.008	0.874	0.749	-1.257
175°	0.717	0.504	-2.972	0.771	0.582	-2.352	355°	0.807	0.638	-1.949	0.877	0.754	-1.226

Horizontal Polarization:
Maximum: 0.762 (-1.181 dB)
Horizontal Plane: 0.762 (-1.181 dB)
Maximum ERP: 0.980 kW

Vertical Polarization:
Maximum: 0.762 (-1.181 dB)
Horizontal Plane: 0.762 (-1.181 dB)
Maximum ERP: 0.980 kW

Total Input Power: 1.286 kW
Reference: KWPS2M.FIG

This list shows the azimuth values for the horizontal and vertical components.

ERI® Vertical Plane Relative Field Pattern

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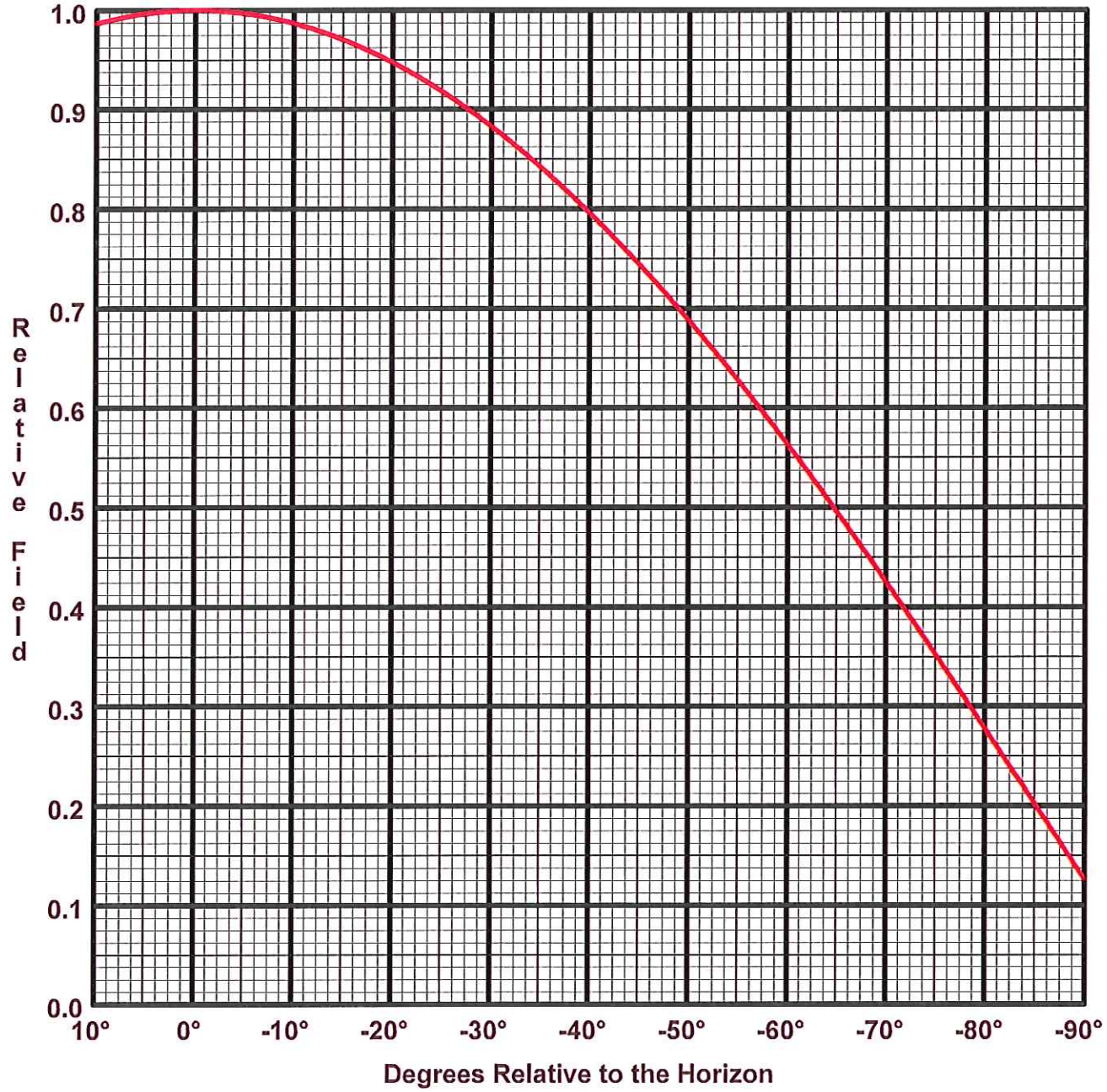
Figure No: 3
Call Sign: KWPS
Location: Caddo Valley, AR.
Frequency: 99.7 MHz
1 bay LP-1E-DA antenna

Date: 11/4/2013
H/V Power Ratio: 1
1 Wave-length Spacing
0° Beam Tilt
0% First Null Fill



Horizontal Polarization:
Maximum: 0.762 (-1.181 dB)
Horizontal Plane: 0.762 (-1.181 dB)
Maximum ERP: 0.980 kW

Vertical Polarization:
Maximum: 0.762 (-1.181 dB)
Horizontal Plane: 0.762 (-1.181 dB)
Maximum ERP: 0.980 kW

Directional Antenna System
for
KWPS, Caddo Valley, Arkansas

(Continued)

ANTENNA SPECIFICATIONS

Antenna Type:	LP-1E-DA
Frequency:	99.7 MHz
Number of Bays:	One

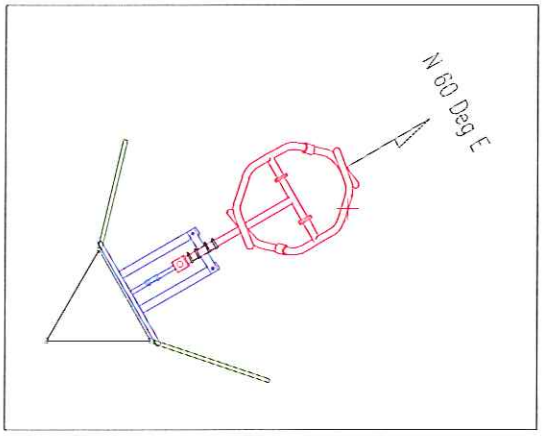
MECHANICAL SPECIFICATIONS

Mounting:	Custom
System length:	8 ft 7 in
Aperture length required:	20 ft in
Orientation:	60° true

Input flange to the antenna: 1 5/8" female.

ELECTRICAL SPECIFICATIONS
(For directional use)

Maximum horizontal ERP:	0.98 kW (-0.088 dBk)
Horizontal maximum power gain:	0.762 (-1.181 dB)
Maximum vertical ERP:	0.98 kW (-0.088 dBk)
Vertical maximum power gain:	0.762 (-1.181 dB)
Total input power:	1.286 kW (1.093 dBk)



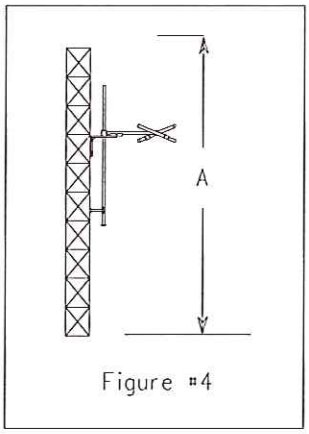


Figure #4